As filed with the Securities and Exchange Commission on March 29, 2019

**Registration No. 333-**

**SECURITIES AND EXCHANGE COMMISSION**
**WASHINGTON, D.C. 20549**

# FORM S-4

**REGISTRATION STATEMENT UNDER**
**THE SECURITIES ACT OF 1933**

# XENETIC BIOSCIENCES, INC.

(Exact name of registrant as specified in its charter)

| **Nevada** | **2834** | **45-2952962** |
|---|---|---|
| (State or other jurisdiction of incorporation or organization) | (Primary Standard Industrial Classification Code Number) | (I.R.S. Employer Identification Number) |

**40 Speen Street, Suite 102**
**Framingham, Massachusetts**
**(781) 778-7720**
(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

**James F. Parslow**
**Chief Financial Officer**
**40 Speen Street, Suite 102**
**Framingham, Massachusetts**
**(781) 778-7720**
(Name, address, including zip code, and telephone number, including area code, of agent for service)

*With a copy to:*

**Michael Francis, Esq.**
**Christina C. Russo, Esq.**
**Akerman LLP**
**350 East Las Olas Boulevard, Suite 1600**
**Fort Lauderdale, Florida 33301**
**(954) 463-2700**
**(480) 750-8700**

**Approximate date of commencement of proposed sale to the public:** As soon as practicable after the effective date of this registration statement and upon completion of the merger described in the accompanying joint proxy statement/prospectus.

If the securities being registered on this Form are being offered in connection with the formation of a holding company and there is compliance with General Instruction G, check the following box. ☐

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

If this Form is a post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act.

| | |
|---|---|
| Large accelerated filer ☐ | Accelerated filer ☐ |
| Non-accelerated filer ☐ | Smaller reporting company ☒ |
| | Emerging growth company ☐ |

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for comply with any new or revised financial accounting standards provided pursuant to Section 7(a)(2)(B) of Securities Act. ☐

If applicable, place an X in the box to designate the appropriate rule provision relied upon in conducting this transaction:
Exchange Act Rule 13e-4(i) (Cross-Border Issuer Tender Offer) ☐
Exchange Act Rule 14d-l(d) (Cross-Border Third-Party Tender Offer) ☐

**CALCULATION OF REGISTRATION FEE**

| Title of each class of securities to be registered | Amount to be registered | Proposed maximum offering price per unit | Proposed maximum aggregate offering price | Amount of registration fee |
|---|---|---|---|---|
| Common Stock, $0.001 par value | 4,875,000 (1) | $1.8935 (2) | $ 9,230,812.50 (2) | $ 1,118.77 |

(1) Represents the maximum number of shares of common stock of Xenetic Biosciences, Inc. issuable in connection with the proposed acquisition of Hesperix described in the proxy statement/prospectus included herein.

(2) Estimated solely for purposes of calculation of the registration fee in accordance with Rule 457(f) of the Securities Act.

**The registrant hereby amends this registration statement on such date or dates as may be necessary to delay its effective date until the registrant shall file a further amendment which specifically states that this registration statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933 or until the registration statement shall become effective on such date as the Commission, acting pursuant to such Section 8(a), may determine.**

**Information contained herein is subject to completion or amendment. A registration statement relating to these securities has been filed with the Securities and Exchange Commission. These securities may not be sold nor may offers to buy be accepted prior to the time the registration statement becomes effective. This proxy statement/prospectus shall not constitute an offer to sell or the solicitation of an offer to buy nor shall there be any sale of these securities in any jurisdiction in which such offer, solicitation, or sale would be unlawful.**

**SUBJECT TO COMPLETION—DATED MARCH 29, 2019**

**XENETIC BIOSCIENCES, INC.**
**40 Speen Street, Suite 102**
**Framingham, Massachusetts 01701**
**NOTICE OF SPECIAL MEETING OF STOCKHOLDERS**
**To Be Held On [●], 2019**

Dear Stockholder:

You are cordially invited to attend a Special Meeting of Stockholders (the "Special Meeting") of XENETIC BIOSCIENCES, INC., a Nevada corporation (the "Company"). The Special Meeting will be held on [●], [●], 2019 at [●] local time at 4400 Biscayne Blvd, Miami, Florida 33137 for the following purposes:

1. To approve the transaction pursuant to which the Company will acquire the XCART platform technology, as described in the proxy statement/prospectus accompanying this Notice (the "Transaction"). In connection with the Transaction, the Company entered into a Share Purchase Agreement, dated as of March 1, 2019 (the "Share Purchase Agreement"), with Hesperix SA, a Swiss corporation ("Hesperix"), the stockholders of Hesperix (each a "Seller" and collectively, the "Sellers"), and Alexey Andreevich Vinogradov, as the representative of each Seller (the "Sellers' Representative"), providing for the acquisition by the Company of all the outstanding shares of capital stock of Hesperix (the "Hesperix Acquisition"). Upon completion of the Hesperix Acquisition, the Company will assume the rights and obligations under the Assignment Agreement by and among Hesperix, Shemyakin-Ovchinnikov Institute of Bioorganic Chemistry ("IBCH"), PJSC Pharmsynthez ("Pharmsynthez"), and other parties thereto (the "Assignors"), dated March 1, 2019 (the "Hesperix Assignment Agreement"). Completion of the Transaction is conditioned upon the consummation of the Assignment Agreement, dated March 1, 2019, by and between the Company and OPKO Pharmaceuticals, LLC (the "OPKO Assignment Agreement," and together with the Share Purchase Agreement and the Hesperix Assignment Agreement, the "Transaction Documents"). We refer to this proposal as the "Transaction Proposal."

2. To approve the issuance of shares of the Company's common stock, par value $0.001 (the "Common Stock"), to be issued in connection with the Hesperix Acquisition and in accordance with the OPKO Assignment Agreement as required by and in accordance with the applicable rules of The NASDAQ Stock Market LLC ("NASDAQ"). We refer to this proposal as the "Share Issuance Proposal."

3. To elect Dr. Alexey Vinogradov to the Company's board of directors. We refer to this proposal as the "Director Proposal."

4. To approve a proposal to adjourn the Special Meeting to a later date or dates, if necessary, to permit further solicitation and vote of proxies if, based upon the tabulated vote at the time of the Special Meeting, the Company is not authorized to consummate the transactions contemplated by the aforementioned proposals. We refer to this proposal as the "Adjournment Proposal."

These items of business are more fully described in the proxy statement/prospectus accompanying this Notice.

Stockholders of record at the close of business on [●], 2019 (the "Record Date") are entitled to notice of, and to attend and to vote at, the Special Meeting and any postponement or adjournment thereof. This Notice of Special Meeting of Stockholders and the attached proxy statement/prospectus are first being mailed to the Company's stockholders on or about [●], 2019.

All stockholders are cordially invited to attend the Special Meeting in person. Stockholders of record as of the Record Date will be admitted to the Special Meeting and any postponement or adjournment thereof upon presentation of identification. Please note that if your shares are held in the name of a bank, broker, or other nominee, and you wish to vote in person at the Special Meeting, you must bring to the Special Meeting a statement or letter from your bank, broker or other nominee showing your ownership of shares as of the Record Date and a proxy from the record holder of the shares authorizing you to vote at the Special Meeting.

Whether or not you plan to attend the Special Meeting in person, you are encouraged to read the proxy statement/prospectus accompanying this Notice and then cast your vote as promptly as possible in accordance with the instructions contained in the proxy statement/prospectus. Even if you have given your proxy, you may still vote in person if you attend the Special Meeting and follow the instructions contained in the attached proxy statement/prospectus.

By Order of the Board of Directors:

James Parslow
Secretary
Framingham, Massachusetts
[●], 2019

**Your vote is important, whether or not you expect to attend the Special Meeting, we urge you to vote by proxy to ensure your vote is counted. You are urged to vote either via the Internet or telephone, or to mark, sign and date and promptly return the proxy in the stamped return envelope provided with these materials. Voting promptly will help avoid the additional expense of further solicitation to assure a quorum at the meeting.**

## REFERENCES TO ADDITIONAL INFORMATION

This proxy statement/prospectus incorporates important business and financial information about Xenetic that is not included in or delivered with this document. You may obtain this information without charge through the SEC website (www.sec.gov) or upon your written or oral request by contacting the Secretary of Xenetic Biosciences, Inc., 40 Speen Street, Suite 102, Framingham MA 01701 or by calling (781) 778-7720.

**To ensure timely delivery of these documents, any request should be made no later than [●], 2019 to receive them before the special meeting.**

**For additional details about where you can find information about Xenetic, please see the section titled "Where You Can Find More Information" in this proxy statement/prospectus.**

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**XENETIC BIOSCIENCES, INC.**
**40 Speen Street, Suite 102**
**Framingham, Massachusetts 01701**

The following information is furnished to each stockholder in connection with the foregoing Notice of Special Meeting of Stockholders of XENETIC BIOSCIENCES, INC., a Nevada corporation, to be held on [●], [●], 2019 at [●] local time at 4400 Biscayne Blvd, Miami, Florida 33137. The enclosed proxy is for use at the special meeting of stockholders and any postponement or adjournment thereof. This proxy statement/prospectus and form of proxy are being mailed to stockholders on or about [●], 2019. Unless the content requires otherwise, references in this proxy statement/prospectus to "Xenetic," the "Company," "we," "our," and "us" refer to Xenetic Biosciences, Inc.

In accordance with the Amended and Restated Bylaws of the Company (the "Bylaws"), the Special Meeting has been called for the following purposes:

1. To approve the transaction pursuant to which the Company will acquire the XCART platform technology, as described in this proxy statement/prospectus (the "Transaction"). In connection with the Transaction, the Company entered into a Share Purchase Agreement, dated as of March 1, 2019 (the "Share Purchase Agreement"), with Hesperix SA, a Swiss corporation ("Hesperix"), the stockholders of Hesperix (each a "Seller" and collectively, the "Sellers"), and Alexey Andreevich Vinogradov, as the representative of each Seller (the "Sellers' Representative"), providing for the acquisition by the Company of all the outstanding shares of capital stock of Hesperix (the "Hesperix Acquisition"). Upon completion of the Hesperix Acquisition, the Company will assume the rights and obligations under the Assignment Agreement by and among Hesperix, Shemyakin-Ovchinnikov Institute of Bioorganic Chemistry ("IBCH"), PJSC Pharmsynthez ("Pharmsynthez"), and other parties thereto (the "Assignors"), dated March 1, 2019 (the "Hesperix Assignment Agreement"). Completion of the Transaction is conditioned upon the consummation of the Assignment Agreement, dated March 1, 2019, by and between the Company and OPKO Pharmaceuticals, LLC (the "OPKO Assignment Agreement," and together with the Share Purchase Agreement and the Hesperix Assignment Agreement, the "Transaction Documents"). We refer to this proposal as the "Transaction Proposal."

2. To approve the issuance of shares of the Company's common stock, par value $0.001 (the "Common Stock"), to be issued in connection with the Hesperix Acquisition and in accordance with the OPKO Assignment Agreement as required by and in accordance with the applicable rules of The NASDAQ Stock Market LLC ("NASDAQ"). We refer to this proposal as the "Share Issuance Proposal."

3. To elect Dr. Alexey Vinogradov to the Company's board of directors. We refer to this proposal as the "Director Proposal."

4. To approve a proposal to adjourn the Special Meeting to a later date or dates, if necessary, to permit further solicitation and vote of proxies if, based upon the tabulated vote at the time of the Special Meeting, Xenetic is not authorized to consummate the transactions contemplated by the aforementioned proposals. We refer to this proposal as the "Adjournment Proposal."

Pursuant to the Bylaws, no business is proper for consideration, or may be acted upon, at the Special Meeting, except as set forth in the Notice of Special Meeting of Stockholders.

Shares represented by duly executed and unrevoked proxies will be voted at the Special Meeting and any postponement or adjournment thereof in accordance with the specifications made therein. **If no such specification is made, shares represented by duly executed and unrevoked proxies will be voted "FOR" each of Proposals 1, 2, 3, and 4.**

## PROXY STATEMENT/PROSPECTUS SUMMARY

*This summary highlights selected information from this proxy statement/prospectus and may not contain all of the information that is important to you. To better understand the Transaction, the proposals being considered at the Special Meeting, you should read this entire proxy statement/prospectus carefully, including the Transaction Documents and the other documents to which you are referred to herein. For more information, please see the section titled "Where You Can Find More Information."*

**Overview of the Transaction**

On March 4, 2019, Xenetic announced its agreement to acquire the novel Chimeric Antigen Receptor T Cell ("CAR T") platform technology, referred to herein as "XCART," a proximity-based screening platform capable of identifying CAR constructs that can target patient-specific tumor neoantigens, with a demonstrated proof of mechanism in B-cell non-Hodgkin lymphomas. The XCART technology, developed by The Scripps Research Institute (the "Institute") in collaboration with IBCH, is believed to have the potential to significantly enhance the safety and efficacy of cell therapy for B-cell lymphomas by generating patient-and tumor-specific CAR T cells.

The XCART technology platform was designed by its originators to utilize an established screening technique to identify peptide ligands that bind specifically to the unique B-cell receptor ("BCR") on the surface of an individual patient's malignant tumor cells. The peptide is then inserted into the antigen-binding domain of a CAR T, and a subsequent transduction/transfection process is used to engineer the patient's T cells into a CAR T format which redirects the patient's T cells to attack the tumor. Essentially, the XCART screening platform is the inverse of a typical CAR T screening protocol wherein libraries of highly specific antibody domains are screened against a given target. In the case of XCART screening, the target is itself an antibody domain, and hence highly specific by its nature. The XCART technology creates the possibility of personalized treatment of lymphomas utilizing a CAR with an antigen-binding domain that should only recognize, and only be recognized by, the unique BCR of a particular patient's B-cell lymphoma. An expected result for XCART is limited off-tumor toxicities, such as B-cell aplasia. Xenetic's clinical development program will seek to confirm the early preclinical results, and to demonstrate a more attractive safety profile than existing therapies.

**The Parties**

*Xenetic Biosciences, Inc.*

Xenetic Biosciences, Inc., a Nevada corporation, is a clinical-stage biopharmaceutical company focused on the discovery, research and development of next - generation biologic drugs and novel orphan oncology therapeutics. Our principal executive offices are located at 40 Speen Street, Suite 102, Framingham MA 01701. Our telephone number is (781) 778-7720.

*Hesperix SA*

Hesperix SA, a Swiss corporation, is a biotechnology company created as a holding company with assets recently assigned specifically for the Transaction. Hesperix does not have executive offices but its mailing address is Agus Corporate Services SA, Via Luganetto 4, PO Box 433, CH-6962 Lugano-Viganello.

**The Transaction Documents**

A summary description of the Transaction Documents and the transactions contemplated thereby is set forth below. Subject to the satisfaction of the closing conditions, the Transaction is expected to close in the first half of 2019.

*Share Purchase Agreement*

On March 1, 2019 (the "Signing Date"), the Company entered into the Share Purchase Agreement with Hesperix, the Sellers and the Sellers' Representative, pursuant to which the Company will purchase from Sellers all of the issued and outstanding shares of capital stock of Hesperix.

Under the terms of the Share Purchase Agreement, the Company will issue to Sellers an aggregate of Four Million Eight Hundred Seventy-Five Thousand (4,875,000) shares of Common Stock (the "Hesperix Transaction Shares"), regardless of the trading price per share of the Common Stock at the time of the closing.

The closing of the Hesperix Acquisition is subject to customary closing conditions as well as conditions regarding (i) the Company having adequate financing to fund future working capital obligations of the Company following the closing and, (ii) the Company obtaining necessary and appropriate stockholder approvals, evidencing among other matters, approval of the Transaction and the issuance of the Transaction Shares (as defined below). Subject to the satisfaction of the closing conditions, the Transaction is expected to close in the first half of 2019.

*Hesperix Assignment Agreement*

On the Signing Date and in connection with the Transaction, Hesperix entered into the Hesperix Assignment Agreement with the Assignors, pursuant to which, the Assignors have agreed, among other things, to sell, assign, transfer, and convey unto Hesperix all of their individual right, title, and interest throughout the world in and to patents related to "Articles And Methods Directed To Personalized Therapy Of Cancer," and the related know-how. Hesperix has agreed to pay each of IBCH and Pharmsynthez a royalty rate in the low single digit range based on the net sales of products in each country in which, in absence of the Hesperix Assignment Agreement, the manufacture, use, offer for sale, sale, or importation of such product would infringe a valid claim of an issued patent or a valid claim of a pending application, if such were issued. Upon completion of the Hesperix Acquisition, the Company will assume the rights and obligations under the Hesperix Assignment Agreement.

*OPKO Assignment Agreement and License Agreement*

On the Signing Date, the Company entered into the OPKO Assignment Agreement with OPKO, pursuant to which the Company will acquire and accept, all of OPKO's right, title and interest in and to that certain Intellectual Property License Agreement (the "IP License Agreement"), entered into between the Institute and OPKO regarding certain patents related to "Articles And Methods Directed To Personalized Therapy Of Cancer" and which the Institute agreed to grant an exclusive royalty-bearing license, to the patent rights owned by the Institute to OPKO and OPKO has agreed to pay the Institute a royalty rate in the low single digit range based on the net sales of products in each country in which, in absence of the IP License Agreement, the manufacture, use, offer for sale, sale, or importation of such product would infringe a valid claim of a patent or pending application.

Under the terms of the OPKO Assignment Agreement and the IP License Agreement, the Company will issue to OPKO One Million Nine Hundred Sixty-Eight Thousand Seven Hundred Fifty (1,968,750) shares of Common Stock (the "OPKO Transaction Shares") and to the Institute Six Hundred Fifty-Six Thousand Two Hundred Fifty (656,250) shares of Common Stock (the "Institute Transaction Shares," and along with the Hesperix Transaction Shares and the OPKO Transaction Shares, the "Transaction Shares") regardless of the trading price per share of the Company's Common Stock at the time of the closing.

**Considerations with Respect to U.S. Federal Income Tax Consequences**

Tax matters are very complicated, and the tax consequences of the Transaction to a particular stockholder will depend on such stockholder's circumstances. Accordingly, you should consult your tax advisor for a full understanding of the tax consequences of the Transaction to you, including the applicability and effect of federal, state, local and foreign income and other tax laws. For more information, please see the section titled "Material U.S. Federal Income Tax Consequences."

**Regulatory Approvals**

In the United States, Xenetic must comply with applicable federal and state securities laws and the rules and regulations of NASDAQ in connection with the issuance of shares of Xenetic Common Stock pursuant to the Share Purchase Agreement and the filing of this proxy statement/prospectus with the SEC.

**Dissenters' Rights**

Holders of shares of Xenetic Common Stock are not entitled to dissenter's rights in connection with the Transaction.

**Anticipated Accounting Treatment**

The Transaction is expected to be treated as an asset acquisition by the Company. To determine the accounting for this transaction under United States (U.S.) generally accepted accounting principles (GAAP), a company must assess whether an integrated set of assets and activities should be accounted for as an acquisition of a business or an asset acquisition. Substantially all of the fair value is included in in-process research and development and no substantive processes are being acquired. As such, the Transaction is expected to be treated as an asset acquisition. Asset acquisitions are to be accounted for by allocating costs, including transaction costs, of the acquisition to the acquired assets based on their relative fair value basis.

**Comparison of Stockholder Rights**

The rights of holders of shares in Hesperix are governed by Hesperix's articles of incorporation and Swiss corporate law. The rights of Xenetic stockholders are governed by Xenetic's articles of incorporation, Xenetic's amended and restated bylaws and Nevada law. Accordingly, the rights associated with shares in Hesperix are different from the rights associated with Xenetic Common Stock. After the Hesperix Acquisition, Hesperix shareholders who have tendered their shares in Hesperix will become Xenetic stockholders and will have rights different from those they have now as Hesperix shareholders. See the section titled "Comparison of Xenetic Biosciences Stockholders and Hesperix Shareholders Rights and Corporate Governance Matters" for a discussion of certain aspects of Nevada corporate law and Swiss law, and the different rights associated with Xenetic Common Stock and shares in Hesperix.

**Interests of Certain Persons in Matters to be Acted Upon**

In considering whether to approve the proposals at the Special Meeting, the Company's stockholders should recognize that certain of the Company's directors and stockholders have interests in the Transaction that may differ from, or that are in addition to, their interests as stockholders generally (the "Interested Parties"). These interests may cause some of the Interested Parties to view the Transaction differently than you may view them as a disinterested stockholder of the Company, and may influence or may have influenced the Interested Parties in determining to support or approve the Transaction. See the section titled "Interests of Certain Persons in Matters to be Acted Upon."

As of the Record Date, approximately [●] of our issued and outstanding shares of our Common Stock representing [●]% of the total voting power of stockholders entitled to vote on the Transaction, were held by certain of the Interested Parties. Each of these Interested Parties entered into individual Voting Agreements with the Company pursuant to which each such Interested Party has agreed to vote all of its shares of Common Stock "FOR" the Transaction Proposal, the Share Issuance Proposal, and the Director Proposal. Accordingly, approval of the Transaction Proposal, the Share Issuance Proposal, and the Director Proposal is expected, regardless of whether or not disinterested stockholders vote in favor of such proposals.

## QUESTIONS AND ANSWERS ABOUT THE SPECIAL MEETING AND VOTING

**Why am I receiving these materials?**

The Company sent you this proxy statement/prospectus and enclosed proxy card because the Board of Directors is soliciting your proxy to vote at the Special Meeting. The Company intends to mail this proxy statement/prospectus and accompanying proxy card on or about [●], 2019 to all stockholders of record entitled to vote at the Special Meeting. This document serves as:

- a proxy statement of the Company used to solicit proxies for the Special Meeting; and
- a prospectus of the Company used to offer the Hesperix Transaction Shares to Sellers.

**What is the purpose of the Special Meeting?**

At the Special Meeting, the stockholders of the Company will act upon the matters outlined in the Notice of Special Meeting of Stockholders and discussed in this proxy statement/prospectus.

**Where is the Special Meeting being held?**

We will hold the Special Meeting at 4400 Biscayne Blvd, Miami, Florida 33137 at [●] local time, unless postponed or adjourned to a later date in accordance with the Adjournment Proposal or otherwise.

**Who may vote at the Special Meeting?**

Only stockholders of record at the close of business on [●], 2019, which is the Record Date for the Special Meeting, may vote on the proposals. Each stockholder is entitled to cast one vote on each proposal presented at the Special Meeting for each share of Common Stock such holder owned as of the Record Date.

*Stockholder of Record: Shares Registered in Your Name*

If on the Record Date your shares were registered directly in your name with the Company's transfer agent, Empire Stock Transfer, then you are a stockholder of record. As a stockholder of record, you may vote in person at the meeting or vote by proxy. Whether or not you plan to attend the meeting, we urge you to fill out and return the enclosed proxy card or vote by proxy over the telephone or on the internet as instructed below to ensure your vote is counted.

*Beneficial Owner: Shares Registered in the Name of a Broker or Bank*

If on the Record Date your shares were held not in your name but in an account at a brokerage firm, bank, dealer, or other similar organization, then you are the beneficial owner of shares held in "street name" and these proxy materials are being forwarded to you by that organization. The organization holding your account is considered to be the stockholder of record for purposes of voting at the Special Meeting. As a beneficial owner, you have the right to direct your broker or other agent regarding how to vote the shares in your account. You are also invited to attend the Special Meeting. However, since you are not the stockholder of record, you may not vote your shares in person at the meeting, unless you request and obtain a valid proxy from your broker or other agent.

**What are my voting rights?**

Holders of Common Stock are entitled to one vote per share on each proposal presented at the Special Meeting. As of [●], 2019, a total of [●] shares of Common Stock were outstanding. There is no cumulative voting.

**How do I vote?**

The procedures for voting are simple:

*Stockholder of Record: Shares Registered in Your Name*

If you are a stockholder of record, you may vote in person at the Special Meeting, vote by proxy using the enclosed proxy card, vote by proxy over the telephone, or vote by proxy through the internet. Whether or not you plan to attend the meeting, we urge you to vote by proxy to ensure your vote is counted. You may still attend the meeting and vote in person even if you have already voted by proxy.

- To vote in person, come to the Special Meeting and we will give you a ballot when you arrive.
- To vote using the proxy card, simply complete, sign and date the enclosed proxy card and return it promptly in the envelope provided. If you return your signed proxy card to us before the Special Meeting, we will vote your shares as you direct.

- To vote over the telephone, dial **[●]** using a touch-tone phone and follow the recorded instructions. You will be asked to provide the company number and control number from the enclosed proxy card. Your telephone vote must be received by [●] p.m. Eastern Time on [●], 2019 to be counted.

- To vote through the internet, go to https://stocktrack.simplyvoting.com to complete an electronic proxy card. You will be asked to provide the company number and control number from the enclosed proxy card. Your internet vote must be received by [●] p.m. Eastern Time on [●], 2019 to be counted.

*Beneficial Owner: Shares Registered in the Name of Broker or Bank*

If you are a beneficial owner of shares registered in the name of your broker, bank, or other agent, you should have received a voting instruction form with these proxy materials from that organization rather than from us. Simply complete and mail the voting instruction form to ensure that your vote is counted. Alternatively, you may vote by telephone or over the internet as instructed by your broker or bank. To vote in person at the Special Meeting, you must obtain a valid proxy from your broker, bank or other agent. Follow the instructions from your broker or bank included with these proxy materials, or contact your broker or bank to request a proxy form.

**What happens if I do not vote?**

*Stockholder of Record: Shares Registered in Your Name*

If you are a stockholder of record and do not vote by completing your proxy card, by telephone, through the internet, or in person at the Special Meeting, your shares will not be voted.

*Beneficial Owner: Shares Registered in the Name of Broker or Bank*

If you are a beneficial owner and do not instruct your broker, bank, or other agent how to vote your shares, the question of whether your broker or nominee will still be able to vote your shares depends on whether the particular proposal is deemed by applicable laws to be a "routine" matter. Brokers and nominees can use their discretion to vote "uninstructed" shares with respect to matters that are considered to be "routine," but not with respect to "non-routine" matters. Under applicable rules, "non-routine" matters are matters that may substantially affect the rights or privileges of stockholders, such as mergers, stockholder proposals, elections of directors (even if not contested), executive compensation (including any advisory stockholder votes on executive compensation and on the frequency of stockholder votes on executive compensation), and certain corporate governance proposals, even if management-supported. All of the Proposals described in this proxy statement/prospectus are considered non-routine. Accordingly, your broker or nominee may not vote your shares on any Proposal without your instructions.

**Can I change my vote after submitting my proxy?**

*Stockholder of Record: Shares Registered in Your Name*

Yes.

- You may submit another properly completed proxy card with a later date.

- You may grant a subsequent proxy by telephone or through the internet.

- You may send a timely written notice that you are revoking your proxy to our Corporate Secretary at 40 Speen Street, Suite 102, Framingham, Massachusetts 01701.

- You can revoke your proxy by attending the Special Meeting and voting in person. Simply attending the meeting will not, by itself, revoke your proxy.

Your most current proxy card or telephone or internet proxy received by the time of the Special Meeting is the one that is counted.

*Beneficial Owner: Shares Registered in the Name of Broker or Bank*

If your shares are held by your broker or bank as a nominee or agent, you should follow the instructions provided by your broker or bank.

**How are votes counted?**

Votes will be counted by the inspector of election appointed for the meeting who will separately count (1) with respect to the Director Proposal, votes "FOR," "WITHHOLD," and broker non-votes and, (2) with respect to the other proposals, votes "FOR," "AGAINST," abstentions, and broker non-votes.

**What is the vote required to approve each proposal?**

The vote required and method of calculation for the proposals to be considered at the Special Meeting are as follows:

***Proposal One - The Transaction Proposal***. Approval of this proposal requires the affirmative vote of a majority of the votes cast affirmatively or negatively in person or by proxy at the Special Meeting. For purposes of determining whether this proposal has passed, abstentions and broker non-votes will have no effect on the proposal.

***Proposal Two - The Share Issuance Proposal***. Approval of this proposal requires the affirmative vote of a majority of the votes cast in person or by proxy at the Special Meeting. For purposes of determining whether this proposal has passed, abstentions and broker non-votes will have no effect on the proposal.

***Proposal Three - The Director Proposal.*** Approval of this proposal requires the affirmative vote of a plurality of votes cast in person or by proxy at the Special Meeting. For purposes of determining whether this proposal has passed, broker non-votes will have no effect on the proposal.

***Proposal Four - The Adjournment Proposal.*** Approval of this proposal requires the affirmative vote of a majority of the votes cast affirmatively or negatively in person or by proxy at the Special Meeting. For purposes of determining whether this proposal has passed, abstentions and broker non-votes will have no effect on the proposal.

**How does the Xenetic board of directors recommend that Xenetic stockholders vote?**

After careful consideration, the Board of Directors unanimously recommends that Xenetic stockholders vote:

- **"FOR" Proposal One - the Transaction Proposal;**
- **"FOR" Proposal Two – the Share Issuance Proposal;**
- **"FOR" Proposal Three – the Director Proposal; and**
- **"FOR" Proposal Four – the Adjournment Proposal.**

**What is the quorum requirement?**

A quorum of stockholders is necessary to hold a valid meeting. A quorum will be present if stockholders holding at least fifty percent (50%) of the outstanding shares entitled to vote are present at the Special Meeting in person or represented by proxy. On the Record Date, there were [●] shares outstanding and entitled to vote. **Thus, the holders of** [●] **shares must be present in person or represented by proxy at the meeting to have a quorum.**

Your shares will be counted towards the quorum if you submit a valid proxy (or one is submitted on your behalf by your broker, bank, or other nominee) or if you vote in person at the meeting. Abstentions and broker non-votes will be counted towards the quorum requirement. If there is no quorum, the chairman of the meeting may adjourn the meeting to another date.

**Are there any federal or state regulatory requirements that must be complied with or federal or state regulatory approvals or clearances that must be obtained in connection with the Transaction?**

We must comply with applicable federal and state securities laws and NASDAQ rules and regulations in connection with the issuance of shares of the Common Stock, including the filing with the SEC of this proxy statement/prospectus and the required stockholder approvals under NASDAQ rules.

**How can I find out the results of the voting at the Special Meeting?**

Preliminary voting results will be announced at the Special Meeting. In addition, final voting results will be published in a Current Report on Form 8-K that we expect to file within three business days after the Special Meeting.

**What are the material U.S. federal income tax consequences of the Transaction to U.S. Sellers?**

We have not obtained a tax opinion from legal counsel or tax experts on the Transaction. The Transaction for federal income tax purposes is not intended to qualify as a reorganization within the meaning of Section 368(a) of the Internal Revenue Code of 1986, as amended, and the regulations promulgated thereunder. Based on the provisions of the Internal Revenue Code of 1986, as amended, existing United States Treasury regulations promulgated thereunder and administrative and judicial interpretations thereof, all as in effect as of the date hereof and all of which are subject to change (possibly with retroactive effect), the Transaction will not give rise to the recognition of gain or losses to us or our stockholders for U.S. federal income tax purposes. The foregoing summary is for general information only and does not discuss any state, local, foreign or other tax consequences.

***The U.S. federal income tax consequences described above may not apply to all Sellers. Your tax consequences will depend on your individual situation. Accordingly, we strongly urge you to consult your tax advisor for a full understanding of the particular tax consequences of the Transaction to you.***

**Who is paying for this proxy solicitation?**

The Company will bear the cost of soliciting proxies, including the printing, mailing and filing of this proxy statement/prospectus, the proxy card and any additional information furnished to our stockholders. You will need to obtain your own internet access if you choose to access the proxy materials and/or vote over the internet. We may use the services of our directors, officers and other employees to solicit proxies from our stockholders without additional compensation. Arrangements will also be made with banks, brokers, nominees, custodians and fiduciaries who are record holders of the Common Stock for the forwarding of solicitation materials to the beneficial owners of our Common Stock. We will reimburse these banks, brokers, nominees, custodians and fiduciaries for the reasonable out-of-pocket expenses they incur in connection with the forwarding of solicitation materials. The Company has retained Okapi Partners, LLC ("Okapi"), an independent proxy solicitation firm, to assist in soliciting proxies on its behalf. The Company has agreed to pay Okapi Partners a fee of $6,500, plus costs and expenses, for these services. If stockholders need assistance with casting or changing their vote, they should contact our proxy solicitor, Okapi, toll free at (877) 259-6290.

**Voting by Proxy Over the Internet or by Telephone**

Stockholders whose shares are registered in their own names may vote by proxy by mail, over the Internet or by telephone. Instructions for voting by proxy over the Internet or by telephone are set forth on the notice of proxy materials. The Internet and telephone voting facilities will close at 11:59 p.m. Eastern Time on [●], 2019. The notice will also provide instructions on how you can elect to receive future proxy materials electronically or in printed form by mail. If you choose to receive future proxy materials electronically, you will receive an email with instructions containing a link to future proxy materials and a link to the proxy voting site. Your election to receive proxy materials electronically or in printed form by mail will remain in effect until you terminate such election.

If your shares are held in street name, the voting instruction form sent to you by your broker, bank or other nominee should indicate whether the institution has a process for beneficial holders to provide voting instructions over the Internet or by telephone. A number of banks and brokerage firms participate in a program that also permits stockholders whose shares are held in street name to direct their vote over the Internet or by telephone. If your bank or brokerage firm gives you this opportunity, the voting instructions from the bank or brokerage firm that accompany this proxy statement/prospectus will tell you how to use the Internet or telephone to direct the vote of shares held in your account. If your voting instruction form does not include Internet or telephone information, please complete and return the voting instruction form in the self-addressed, postage-paid envelope provided by your broker. Stockholders who vote by proxy over the Internet or by telephone need not return a proxy card or voting instruction form by mail, but may incur costs, such as usage charges, from telephone companies or Internet service providers.

## CAUTIONARY STATEMENT CONCERNING FORWARD-LOOKING INFORMATION

This proxy statement/prospectus contains various "forward-looking statements." Forward-looking statements relate to expectations, beliefs, projections, future plans and strategies, anticipated events or trends and similar expressions concerning matters that are not historical facts. In some cases, these statements may be identified by terminology such as "may," "will," "should," "expect," "plan," "anticipate," "believe," "estimate," "predict," "potential," or "continue," or the negative of such terms and other comparable terminology. Although we believe that the expectations reflected in the forward-looking statements contained herein are reasonable, we cannot guarantee future results, the levels of activity, performance or achievements. These statements involve known and unknown risks and uncertainties that may cause our or our industry's results, levels of activity, performance or achievements to be materially different from those expressed or implied by forward-looking statements. All forward-looking statements may be impacted by a number of risks and uncertainties. These forward-looking statements include, but are not limited to, statements concerning our plans to develop our proposed drug candidate; our expectations regarding the nature, timing and extent of clinical trials and proposed clinical trials including the timing of generating clinical data from these trials; our expectations regarding the timing for proposed submissions of regulatory filings, including but not limited to any Investigational New Drug ("IND") filing or any New Drug Application ("NDA"); the nature, timing and extent of collaboration arrangements; the expected results pursuant to collaboration arrangements including the receipts of future payments that may arise pursuant to collaboration arrangements; the outcome of our plans to obtain regulatory approval of our drug candidates; the outcome of our plans for the commercialization of our drug candidates; our plans to address certain markets, engage third party manufacturers and evaluate additional drug candidates for subsequent commercial development and the likelihood and extent of competition to our drug candidates; the development of the CAR T technology; and the risk that the Transaction may not be completed on the terms or in the timeframe expected by the Company or at all.

The forward-looking statements in this proxy statement/prospectus are based on our beliefs, assumptions and expectations of our future performance, taking into account all information currently available to us. These beliefs, assumptions and expectations are subject to risks and uncertainties and can change as a result of many possible events or factors, not all of which are known to us. If a change occurs, our business, financial condition, liquidity and results of operations may vary materially from those expressed in our forward-looking statements. You should carefully consider these risks before you make an investment decision with respect to our securities, along with the following factors that could cause actual results to vary from our forward-looking statements:

- our need to raise additional working capital in the very near term for the purpose of developing products and technologies and to continue as a going concern;
- our ability to finance our business;
- our ability to successfully execute, manage and integrate key acquisitions and mergers, including the acquisition of the CAR T technology;
- product development and commercialization risks, including our ability to successfully develop the CAR T technology;
- our ability to successfully commercialize our current and future drug candidates;
- our ability to achieve milestone and other payments associated with our co-development collaborations and strategic arrangements;
- the impact of new technologies on our drug candidates and our competition;
- changes in laws or regulations of governmental agencies;
- interruptions or cancellation of existing contracts;
- impact of competitive products and pricing;
- product demand and market acceptance and risks;
- the presence of competitors with greater financial resources;
- continued availability of supplies or materials used in manufacturing at the current prices;
- the ability of management to execute plans and motivate personnel in the execution of those plans;
- our ability to attract and retain key personnel;
- adverse publicity related to our products or the Company itself;

- adverse claims relating to our intellectual property;
- the adoption of new, or changes in, accounting principles;
- the costs inherent with complying with statutes and regulations applicable to public reporting companies, such as the Sarbanes-Oxley Act of 2002;
- other new lines of business that the Company may enter in the future; and
- other factors set forth in the Risk Factors section of this proxy statement/prospectus and in subsequent filings we make with the Securities and Exchange Commission.

We cannot guarantee future results, levels of activity, performance or achievements. You should not place undue reliance on forward-looking statements, which apply only as of the date of this proxy statement/prospectus. We do not intend and disclaim any duty or obligation to update or revise any industry information or forward-looking statements set forth in this proxy statement/prospectus to reflect new information, future events or otherwise, except as required under the United States federal securities laws.

## RISK FACTORS

*An investment in our Common Stock involves a high degree of risk. Before deciding whether to invest in our Common Stock, you should consider carefully the risks described below. If any of these risks actually occur, our business, financial condition, results of operations or cash flows could be seriously harmed. This could cause the trading price of our Common Stock to decline, resulting in a loss of all or part of your investment.*

**Risks Related to the Transaction**

***We cannot assure you that the proposed Transaction will be completed on a timely basis or at all or that the Company will recognize the anticipated benefits of the Transaction.***

On March 1, 2019, we entered into an agreement to acquire the novel CAR T platform technology, referred to herein as "XCART," a proximity-based screening platform capable of identifying CAR constructs that can target patient-specific tumor neoantigens, with a demonstrated proof of mechanism in B-cell Non-Hodgkin lymphomas. The XCART technology, developed by the Institute in collaboration with the IBCH, is believed to have the potential to significantly enhance the safety and efficacy of cell therapy for B-cell lymphomas by generating patient- and tumor-specific CAR T cells.

There are a number of risks and uncertainties relating to the Transaction. For example, the Transaction may not be completed, or may not be completed in the time frame, on the terms or in the manner currently anticipated and the Company may not recognize the anticipated benefits of the Transaction, as a result of a number of factors, including the following:

- that one or more closing conditions to the Transaction, including certain regulatory approvals, may not be satisfied or waived, on a timely basis or otherwise, that the required approval by the stockholders of the Company may not be obtained, and the Company may not have adequate financing to fund its future working capital obligations following the closing;
- unexpected costs, charges or expenses resulting from the Transaction;
- uncertainty of the expected financial performance of the Company following completion of the Transaction;
- the ability of the Company to implement its business strategy; and
- the occurrence of any event that could give rise to termination of the Transaction.

***Our business is substantially dependent on the success of XCART.***

Our business depends almost entirely on the successful consummation of the acquisition of the XCART platform technology and its clinical development, regulatory approval and commercialization. It will require substantial clinical development and regulatory approval efforts before we are permitted to commence its commercialization, if ever. The clinical trials and manufacturing and marketing of XCART and any other product candidates will be subject to extensive and rigorous review and regulation by numerous government authorities in the United States, the European Union and other jurisdictions where we intend to test and, if approved, market our product candidates. Before obtaining regulatory approvals for the commercial sale of any product candidate, we must demonstrate through preclinical testing and clinical trials that the product candidate is safe and effective for use in each target indication, and potentially in specific patient populations. This process can take many years and may include post-marketing studies and surveillance, which would require the expenditure of substantial resources beyond the proceeds we have currently raised. Of the large number of drugs in development for approval in the United States and the European Union, only a small percentage successfully complete the FDA or European Medicines Agency, or EMA, regulatory approval processes, as applicable, and are commercialized. Accordingly, even if we are able to obtain the requisite financing to continue to fund our research, development and clinical programs, we cannot assure you that XCART or any of our other product candidates will be successfully developed or commercialized.

***Some of the Company's directors and principal stockholders have interests in the Transaction that may differ from, or are in addition to, those of the Company's other stockholders.***

In considering whether to approve the proposals at the Special Meeting, the Company's stockholders should recognize that certain of the Company's directors and stockholders have interests in the Transaction that may differ from, or that are in addition to, their interests as stockholders generally. These interests include, among others, (i) Dr. Genkin, a director of the Company, serves as the Executive Chairman of Pharmsynthez, the Company's largest and controlling stockholder with ownership of approximately **[●]**% of the Company's issued and outstanding Common Stock as of the Record Date, (ii) Mr. Knyazev, a director of the Company, is also a director of Pharmsynthez, (iii) Dr. Curtis Lockshin, an executive officer of the Company, is an officer of a wholly-owned subsidiary of Pharmsynthez, and (iv) Adam Logal, a director of the Company, is the Senior Vice President and Chief Financial Officer of OPKO Health, which owns approximately **[●]**% of the Company's issued and outstanding Common Stock and approximately **[●]**% of the issued and outstanding stock of Pharmsynthez. These interests may cause some of the Interested Parties to view the Transaction differently than you may view them as a disinterested stockholder of the Company, and may influence or may have influenced the Interested Parties in determining to support or approve the Transaction.

***The market price of the Company's Common Stock may decline as a result of the Transaction.***

The market price of the Company's Common Stock may decline as a result of the Transaction for a number of reasons including:

- the Company may not achieve the perceived benefits of the Transaction as rapidly or to the extent anticipated;
- the effect of the Transaction on the Company's business and prospects is not consistent with the expectations of financial or industry analysts; or
- investors react negatively to the effect Company's business and prospects resulting from the Transaction.

***The number of shares of Common Stock that the Sellers, OPKO, and the Institute will receive in the Transaction will not change based on the market price of our Common Stock so the consideration that the Sellers, OPKO, and the Institute will receive at the closing of the Transaction may have a greater or lesser value than the value at the time the Transaction Documents were entered into.***

The Transaction Documents set the number of Transaction Shares of our Common Stock to be issued in the Transaction. Any changes in the market price of our Common Stock before the completion of the Transaction will not affect the number of Transaction Shares issuable pursuant to the Transaction. Therefore, if before the completion of the Transaction the market price of our Common Stock declines from the market price on the date of the Transaction Documents, then paid by the Company in the Transaction may have a consideration with substantially lower value at closing. Conversely, if before the completion of the Transaction the market price of our Common Stock increases from the market price on the date of the Transaction Documents, then paid by the Company in the Transaction may have a consideration with substantially greater value at closing.

**Risks Related to Our Common Stock**

***An active, liquid and orderly market for our Common Stock may not develop.***

Our Common Stock trades on NASDAQ Capital Markets**.** An active trading market for our Common Stock may never develop or be sustained. If an active market for our Common Stock does not continue to develop or is not sustained, it may be difficult for investors in our Common Stock to sell shares without depressing the market price for the shares or to sell the shares at all. An inactive market may also impair our ability to raise capital by selling Common Stock and may impair our ability to acquire other businesses, applications or technologies using our Common Stock as consideration, which, in turn, could materially adversely affect our business.

***The market price of our stock may be highly volatile, and you may not be able to sell shares of our stock.***

Companies trading in the stock market in general have experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of these companies. Broad market and industry factors may negatively affect the market price of our stock, regardless of our actual operating performance.

The market price of our stock may be volatile. Our stock price could be subject to wide fluctuations in response to a variety of factors, including the following:

- adverse results or delays in pre-clinical or clinical studies;
- inability to obtain additional funding;
- any delay in filing an IND or BLA for any of our drug candidates and any adverse development or perceived adverse development with respect to the FDA's review of that IND or BLA;
- failure to develop successfully our drug candidates;
- failure to maintain our existing strategic collaborations or enter into new collaborations;
- failure by us or our licensors and strategic collaboration partners to prosecute, maintain or enforce our intellectual property rights;
- changes in laws or regulations applicable to future products;
- inability to obtain adequate product supply for our drug candidates or the inability to do so at acceptable prices;
- adverse regulatory decisions;
- introduction of new products, services or technologies by our competitors;
- failure to meet or exceed financial projections we may provide to the public;
- failure to meet or exceed the financial projections of the investment community;
- the perception of the pharmaceutical industry by the public, legislatures, regulators and the investment community;
- announcements of significant acquisitions, strategic partnerships, joint ventures or capital commitments by us, our strategic collaboration partner or our competitors;
- disputes or other developments relating to proprietary rights, including patents, litigation matters and our ability to obtain patent protection for our technologies;
- additions or departures of key scientific or management personnel;
- significant lawsuits, including patent or stockholder litigation;
- changes in the market valuations of similar companies;
- sales of our Common Stock by us or our stockholders in the future; and
- trading volume of our Common Stock.

***Our principal stockholders and management own a significant percentage of our stock and will be able to exert significant control over matters subject to stockholder approval.***

As of the Record Date, our executive officers and directors, affiliates, and other principal stockholders beneficially own approximately [ ]% of our outstanding Common Stock. Therefore, these stockholders will have the ability to influence us through their ownership positions. Further, our majority stockholder, Pharmsynthez, has beneficial ownership of approximately [●] million shares of Common Stock. These shares represent ownership of approximately [ ]% of our Common Stock as of the Record Date. These stockholders may be able to determine all matters requiring stockholder approval. For example, these stockholders, acting together, may be able to control elections of directors, amendments of our organizational documents, or approval of any merger, sale of assets, or other major corporate Transaction. This may prevent or discourage unsolicited Transaction proposals or offers for our Common Stock that you may believe are in your best interest as one of our stockholders.

***We have entered into several agreements with our major stockholders.***

We have entered into several agreements with our major stockholders. Some of the agreement parties may be considered affiliates of ours, which may result in conflicts of interest. In addition, these arrangements may not have been negotiated at arm's length and may contain terms and conditions that are not in our best interest and would not otherwise be applicable if we entered into arrangements with a third-party not affiliated with us.

***Our preferred stock has rights, preferences and privileges that are not held by, and are preferential to, the rights of our common stockholders, which could result in the interests of the holders of our preferred stock differing from those of our common stockholders.***

The holders of our preferred stock have the right to receive a liquidation preference entitling them to be paid out of our assets available for distribution to stockholders before any payment may be made to holders of any Common Stock or any series of preferred stock ranked junior to such class of preferred stock. The existence of a liquidation preference may reduce the value of our Common Stock, make it harder for us to sell shares of Common Stock in offerings in the future, or prevent or delay a change of control. Additionally, each share of Series A preferred stock is convertible into one share of Common Stock and each share of Series B preferred stock is convertible into two shares of Common Stock, subject to certain adjustments, which may cause substantial dilution to our common stockholders. The preferential rights could result in divergent interests between the holders of shares of preferred stock and holders of our Common Stock. In addition, our majority shareholder, Pharmsynthez holds shares consisting of the majority of our Series B Preferred Stock and all of our Series A Preferred Stock. The interests of these preferred holders may differ from the interests of our security holders as a whole.

***The issuance of future shares of Common Stock may result in dilution to our stockholders.***

As of the Record Date, we had [●] shares of Common Stock excluding:

- [970,000] shares of Common Stock underlying outstanding Series A Preferred Stock, which are convertible into Common Stock on a one-for-one basis;
- [1,804,394] shares of Common Stock underlying outstanding Series B Preferred Stock, which are convertible into Common Stock on a two-for-one basis;
- [509,000] shares of Common Stock issuable upon the exercise of outstanding pre-funded warrants;
- [5,240,427] shares of Common Stock issuable upon the exercise of outstanding warrants;
- [1,833,011] shares of Common Stock issuable upon the exercise of outstanding options;
- [50,000] shares of Common Stock underlying outstanding restricted stock units;
- [88,817] shares of Common Stock issuable in connection with the Common Stock awards; and
- 7,500,000 shares of Common Stock to be issued in connection with the Transaction, including 4,875,000 shares of Common Stock to be issued to the Hesperix Sellers and 2,625,000 shares of Common Stock to be issued in connection with the OPKO Assignment Agreement.

The issuance of these shares of Common Stock and the sale of these shares of Common Stock, or even the potential of such issuance and sale, may have a depressive effect on the market price of our Common Stock and the issuance of such Common Stock will cause dilution to our stockholders.

***We could be subject to securities class action litigation.***

In the past, securities class action litigation has often been brought against a company following a decline in the market price of its securities. This risk is especially relevant for us because pharmaceutical companies have experienced significant stock price volatility in recent years. If we face such litigation, it could result in substantial costs and a diversion of management's attention and resources, which could harm our business

***We do not intend to pay dividends on our Common Stock or preferred stock so any returns will be limited to the value of our stock.***

We have never declared or paid any cash dividends on our Common Stock or preferred stock. We currently anticipate that we will retain future earnings for the development, operation and expansion of our business and do not anticipate declaring or paying any cash dividends for the foreseeable future. Any return to common or preferred stockholders will therefore be limited to the appreciation of their stock.

**Risks Related to Our Financial Condition and Capital Requirements**

***We have never been profitable and may never achieve or sustain profitability.***

We are a clinical stage biopharmaceutical company with a limited operating history. Pharmaceutical product and technology development is a highly speculative undertaking and involves a substantial degree of risk. To date, we have focused primarily on developing our drug candidates, XBIO-101 and PolyXen, our biological platform technology, and researching additional drug candidates. We have no products approved for commercial sale and have generated only limited revenue to date. Due to capital constraints in 2018 we focused solely on the development of XBIO-101. We continue to incur significant research and development and other expenses related to our ongoing operations. As a result, we have never been profitable and we may not achieve profitability in the foreseeable future, if at all. Our ability to generate profits in the future will depend on a number of factors, including:

- Funding the costs relating to the research and development, regulatory approval, commercialization and sale and marketing of our drug candidates and technologies;
- Market acceptance of our drug candidates and technologies;
- Costs of acquiring and developing new drug candidates and technologies;
- Ability to bring our drug candidates to market;
- General and administrative costs relating to our operations;
- Increases in our research and development costs;
- Charges related to purchases of technology or other assets;
- Establishing, maintaining and protecting our intellectual property rights;
- Attracting, hiring and retaining qualified personnel; and
- Our ability to raise additional capital.

As of December 31, 2018, we had an accumulated deficit of approximately $153.2 million. Substantial doubt exists about our ability to continue as a going concern as a result of anticipated capital needs. We expect to incur additional significant operating losses as we expand our research and development activities and our commercialization, marketing and sales efforts. We may also encounter unforeseen expenses, difficulties, complications, delays and other unknown factors that may adversely affect our business. In addition, because of the numerous risks and uncertainties associated with pharmaceutical product development, including that our current drug candidates may not achieve the clinical endpoints of applicable trials, we are unable to predict the timing or amount of increased expenses, and if or when we will achieve or maintain profitability. If we are unable to generate sufficient revenue from our operations to pay expenses or we are unable to obtain additional financing on commercially reasonable terms, our business, financial condition and results of operations may be materially and adversely affected.

***Our independent registered public accounting firm and the Company have expressed substantial doubt about our ability to continue as a going concern.***

We have concluded there is substantial doubt about our ability to continue as a going concern. As described in their audit report, our auditors have included an explanatory paragraph that states that we have incurred recurring losses and negative cash flows from operations since inception and have an accumulated deficit at December 31, 2018 of $153.2 million. These matters raise substantial doubt about our ability to continue as a going concern. Our consolidated financial statements do not include any adjustments that might result from the outcome of this uncertainty. If we cannot continue as a viable entity, our stockholders may lose some or all of their investment in us.

***We will require substantial additional funding to achieve our goals. Failure to obtain this necessary capital when needed on acceptable terms, or at all, may force us to delay, limit or terminate our product development efforts, other operations or commercialization efforts.***

Developing drug candidates is an expensive, risky and lengthy process, and we expect our expenses to increase in connection with our ongoing activities, particularly as we continue the research and development of, continue and initiate clinical trials of, and seek marketing approval for, our drug candidates.

As of December 31, 2018, we had cash and cash equivalents of $0.6 million. We expect that we will require additional capital to complete clinical trials, obtain regulatory approval for, and to commercialize, our drug candidates, including our other preclinical drug candidates and our future drug candidates. However, our operating plan may change as a result of many factors currently unknown to us, and we may need to seek additional funds sooner than planned, through public or private equity or debt financings, third-party funding, marketing and distribution arrangements, as well as other collaborations, strategic alliances and licensing arrangements, or a combination of these approaches. In any event, we will require additional capital to pursue preclinical and clinical activities, pursue regulatory approval for, and to commercialize, our longer term pipeline drug candidates. Even if we believe we have sufficient funds for our current or future operating plans, we may seek additional capital if market conditions are favorable or if we have specific strategic considerations.

Any additional fundraising efforts may divert our management from their day-to-day activities, which may adversely affect our ability to develop and commercialize our drug candidates. In addition, we cannot guarantee that future financing will be available in sufficient amounts or on terms acceptable to us, if at all. Moreover, the terms of any financing may negatively impact the holdings or the rights of our stockholders, and the issuance of additional securities, whether equity or debt, by us or the possibility of such issuance may cause the market price of our shares to decline. The incurrence of indebtedness could result in increased fixed payment obligations and we may be required to agree to certain restrictive covenants, such as limitations on our ability to incur additional debt, limitations on our ability to acquire, sell or license intellectual property rights and other operating restrictions that could adversely impact our ability to conduct our business.

If we are unable to obtain funding on a timely basis, we may be required to significantly curtail, delay or discontinue our clinical development program or the commercialization of any drug candidates. We may also be unable to expand our operations or otherwise capitalize on our business opportunities, as desired, which could harm our business, financial condition and results of operations.

***Raising additional capital may cause dilution to our stockholders, restrict our operations or require us to relinquish rights to our technologies or drug candidates.***

Until such time, if ever, as we can generate substantial product revenues, we expect to finance our cash needs through a combination of equity and debt financings, as well as selectively continuing to enter into collaborations, strategic alliances and licensing arrangements. We do not currently have any committed external source of funds. To the extent that we raise additional capital through the sale of equity or convertible debt securities, equity interests will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect the rights of our stockholders. Debt financing, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends, and may be secured by all or a portion of our assets.

If we raise funds by selectively continuing to enter into collaborations, strategic alliances or licensing arrangements with third-parties, we may have to relinquish additional valuable rights to our technologies, future revenue streams, research programs or drug candidates or grant licenses on terms that may not be favorable to us. If we are unable to raise additional funds through equity or debt financings when needed, we may be required to delay, limit, reduce or terminate our product development or future commercialization efforts or grant rights to develop and market drug candidates that we would otherwise prefer to develop and market ourselves. If we are unable to raise additional funds through collaborations, strategic alliances or licensing arrangements, we may be required to terminate product development or future commercialization efforts or to cease operations altogether.

**Risks Related to the Discovery and Development of our Pharmaceutical Products**

***We are an early stage company in the business of developing pharmaceutical products including drug candidates and technologies. Given the uncertainty of such development, our business operations may never fully materialize and create value for investors.***

We currently do not have any products that have gained marketing approval. We have invested substantially all of our efforts and financial resources developing ErepoXen, OncoHist and, most recently, XBIO-101. Our revenues to date consist primarily of collaboration revenue from a single partner and not from product sales or royalties. Our ability to generate product revenues, which may not occur for several years, if ever, will depend on the successful development and eventual commercialization of our drug candidates. We currently generate no revenues from sales of any drugs, and we may never be able to develop or commercialize a marketable drug. Each of our drug candidates will require development, management of development and manufacturing activities, marketing approval in multiple jurisdictions, obtaining manufacturing supply, building of a commercial organization, substantial investment and significant marketing efforts before we generate any revenues from drug sales. We have not yet demonstrated an ability to successfully overcome many of the risks and uncertainties frequently encountered by companies in new and rapidly evolving fields, particularly in the pharmaceutical area. For example, to execute our business plan, we will need to successfully:

- Execute development activities for our drug candidates, including successful enrollment in and completion of clinical trials;
- Obtain required marketing approvals for the development and commercialization of our drug candidates;
- Obtain and maintain patent and trade secret protection or regulatory exclusivity for our drug candidates;
- Protect, leverage and expand our intellectual property portfolio;
- Establish and maintain clinical and commercial manufacturing capabilities or make arrangements with third-party manufacturers for clinical and commercial manufacturing;
- Build and maintain robust sales, distribution and marketing capabilities, either on our own or in collaboration with strategic partners, if our drug candidates are approved;
- Gain acceptance for our drug candidates, if approved, by patients, the medical community and third party payors;
- Effectively compete with other therapies;
- Obtain and maintain healthcare coverages and adequate reimbursement;
- Maintain a continued acceptable safety profile for our drug candidates following approval;
- Develop and maintain any strategic relationships we elect to enter into, if any;
- Enforce and defend intellectual property rights and claims; and
- Manage our spending as costs and expenses increase due to preclinical development, clinical trials, marketing approvals and commercialization.

***We may find it difficult to enroll patients in our clinical studies, which could delay or prevent clinical studies of our pharmaceutical products.***

Identifying and qualifying patients to participate in clinical studies of our pharmaceutical products is critical to our success. The timing of our clinical studies depends on the speed at which we can recruit patients to participate in testing our pharmaceutical products. We may experience delays. If patients are unwilling to participate in our clinical studies because of negative publicity from adverse events in the biopharmaceutical industries or for other reasons, including competitive clinical studies for similar patient populations, the timeline for recruiting patients, conducting studies and obtaining regulatory approval of potential products may be delayed. These delays could result in increased costs, delays in advancing our product development, delays in testing the effectiveness of our technology or termination of the clinical studies altogether.

We may not be able to identify, recruit and enroll a sufficient number of patients, or those with required or desired characteristics to achieve diversity in a study, to complete our clinical studies in a timely manner. Patient enrollment is affected by factors including:

- Severity of the disease under investigation;
- Real or perceived availability of alternative treatments;
- Size and nature of the patient population;
- Eligibility criteria for and design of the trial in question;
- Perceived risks and benefits of the drug candidate under study;
- Proximity and availability of clinical sites for prospective patients;
- Ongoing clinical trials of potentially competitive agents;
- Physicians' and patients' perceptions as to the potential advantages of our drug candidates being studied in relation to available therapies or other products under development;
- Our CRO's and our trial sites' efforts to facilitate timely enrollment in clinical trials;
- Patient referral practices of physicians; and
- The need to monitor patients and collect patient data adequately during and after treatment.

We may not be able to initiate or continue clinical studies if we cannot enroll a sufficient number of eligible patients to participate in the clinical studies required by the FDA or other regulatory agencies. Our ability to successfully initiate, enroll and complete a clinical study in any foreign country is subject to numerous risks unique to conducting business in foreign countries, including:

- Difficulty in establishing or managing relationships with CROs and physicians;
- Different standards for the conduct of clinical studies;
- Our inability to locate qualified local consultants, physicians and partners; and
- The potential burden of complying with a variety of foreign laws, medical standards and regulatory requirements, including the regulation of pharmaceutical and biotechnology products and treatment.

If we have difficulty enrolling a sufficient number of patients to conduct our clinical studies as planned, we may need to delay, limit or terminate ongoing or planned clinical studies, any of which would have an adverse effect on our business.

***We may encounter substantial delays in commencement, enrollment or completion of our clinical trials or we may fail to demonstrate safety and efficacy to the satisfaction of applicable regulatory authorities, which could prevent us from commercializing our current and future drug candidates on a timely basis, if at all.***

Before obtaining marketing approval from regulatory authorities for the sale of our current and future drug candidates, we must conduct extensive clinical trials to demonstrate the safety and efficacy of the drug candidates. We cannot guarantee that any clinical studies will be conducted as planned or completed on schedule, if at all. A failure of one or more clinical studies can occur at any stage of testing. Events that may prevent successful or timely completion of clinical development include:

- Delays in reaching a consensus with regulatory agencies on study design;
- Delays in reaching agreement on acceptable terms with prospective CROs and clinical study sites;
- Delays in obtaining required Institutional Review Board, or Independent Ethics Committee approval at each clinical study site;
- Delays in recruiting suitable patients to participate in our clinical studies;
- Imposition of a clinical hold by regulatory agencies, including after an inspection of our clinical study operations or study sites;
- Failure by our CROs, other third-parties or us to adhere to clinical study requirements;
- Failure to perform in accordance with the FDA's GCP, or applicable regulatory requirements in other countries;
- Delays in the testing, validation, manufacturing and delivery of our drug candidates to the clinical sites;
- Delays in having patients complete participation in a study or return for post-treatment follow-up;
- Clinical study sites or patients dropping out of a study;
- Occurrence of serious adverse events associated with the drug candidate that are viewed to outweigh its potential benefits; or
- Changes in regulatory requirements and guidance that require amending or submitting new clinical protocols.

Any inability to successfully complete preclinical studies and clinical trials could result in additional costs to us or impair our ability to generate revenues from product sales, regulatory and commercialization milestones and royalties. In addition, if we make manufacturing or formulation changes to our drug candidates, we may need to conduct additional studies to bridge our modified drug candidates to earlier versions. Clinical trial delays also could shorten any periods during which we may have the exclusive right to commercialize our drug candidates or allow our competitors to bring products to market before we do, which could impair our ability to successfully commercialize our drug candidates and may harm our business, financial condition, results of operations and prospects.

If the results of our clinical studies are inconclusive or if there are safety concerns or adverse events associated with our pharmaceutical products, we may:

- Be delayed in obtaining marketing approval or licenses for our drug candidates, if at all;
- Obtain approval for indications or patient populations that are not as broad as intended or desired;
- Obtain approval with labeling that includes significant use or distribution restrictions or safety warnings;
- Be subject to changes with the way the product is administered;
- Be required to perform additional clinical studies to support approval or be subject to additional post-marketing testing requirements;
- Have regulatory authorities withdraw their approval of the product or impose restrictions on its distribution in the form of a modified risk evaluation and mitigation strategy;
- Be subject to the addition of labeling statements, such as warnings or contraindications;
- Be sued; or
- Experience damage to our reputation.

As described above, any of these events could prevent us from achieving or maintaining market acceptance of our pharmaceutical products and impair our ability to generate revenues.

***Clinical trials may fail to demonstrate the safety and efficacy of our pharmaceutical drug candidates and could prevent or significantly delay regulatory approval.***

Before receiving NDA or BLA approval to commercialize a drug candidate, we must demonstrate to the FDA, with substantial evidence from well-controlled clinical trials, that the drug candidate is both safe and effective or the biologic is safe, pure and potent. If these trials or future clinical trials are unsuccessful, our business and reputation could be harmed and our stock price could be adversely affected.

Clinical failure can occur at any stage of clinical development. Clinical trials may produce negative or inconclusive results, and we or any of our current and future collaborators may decide, or regulators may require us, to conduct additional clinical or preclinical testing. We will be required to demonstrate with substantial evidence through well-controlled clinical trials that our drug candidates are as safe and effective for use in a specific patient population as the respective reference products before we can seek regulatory approvals for their commercial sale. Success in early clinical trials does not mean that future larger registration clinical trials will be successful because drug candidates in later-stage clinical trials may fail to demonstrate equivalent safety and efficacy to the satisfaction of the FDA and foreign regulatory agencies despite having progressed through initial clinical trials. Drug candidates that have shown promising results in early clinical trials may still fail in subsequent confirmatory clinical trials. Similarly, the outcome of preclinical testing and early clinical trials may not be predictive of the success of later clinical trials, and interim results of a clinical trial do not necessarily predict final results. A number of companies in the pharmaceutical industry, including those with greater resources and experience than us, have suffered significant setbacks in advanced clinical trials, even after obtaining promising results in earlier clinical trials.

In addition, the design of a clinical trial can determine whether its results will support approval of a product and flaws in the design of a clinical trial may not become apparent until the clinical trial is well advanced. We may be unable to design and execute a clinical trial to support regulatory approval. In some instances, there can be significant variability in safety or efficacy results between different trials of the same drug candidate due to numerous factors, including but not limited to changes in trial protocols, differences in size and type of the patient populations, adherence to the dosing regimen and the rate of dropout among clinical trial participants.

Because of these risks, our research and development efforts, and those of our collaborative partners, may not result in any commercially viable products. If a significant portion of these development efforts is not successfully completed, or if required regulatory approvals are not obtained by us or our partners, or any approved products are not commercially successful, we may not generate significant revenues or become profitable.

***Even if we complete the necessary preclinical and clinical studies, we cannot predict when or if we will obtain regulatory approval to commercialize a drug candidate or the approval may be for a more narrow indication than we expect.***

A drug candidate cannot be commercialized until the appropriate regulatory authorities have reviewed and approved the drug candidate. Even if our drug candidates demonstrate safety and efficacy in clinical studies, the regulatory agencies may not complete their review processes in a timely manner, or we may not be able to obtain regulatory approval. Additional delays may result if an FDA Advisory Committee or other regulatory advisory group or authority recommends non-approval or restrictions on approval. In addition, we may experience delays or rejections based upon additional government regulation from future legislation or administrative action, or changes in regulatory agency policy during the period of product development, clinical studies and the review process. Regulatory agencies also may approve a drug candidate for fewer or more limited indications than requested or may grant approval subject to the performance of post-marketing studies. In addition, regulatory agencies may not approve the labeling claims that are necessary or desirable for the successful commercialization of our drug candidates. Failure to obtain, or a delay in obtaining, regulatory approval to commercialize a drug candidate will impair our ability to generate revenues and harm our business prospects.

***Even if we obtain regulatory approval for a drug candidate, our drug candidate will remain subject to regulatory scrutiny.***

If our drug candidates are approved, they will be subject to ongoing regulatory requirements for manufacturing, labeling, packaging, storage, advertising, promotion, sampling, record-keeping, conduct of post-marketing studies and submission of safety, efficacy and other post-market information, including both federal and state requirements in the United States and requirements of comparable foreign regulatory authorities.

Manufacturers and manufacturing facilities are required to comply with extensive FDA, and comparable foreign regulatory authority, requirements, including ensuring that quality control and manufacturing procedures conform to cGMP regulations. As such, we will be subject to continual review and inspections to assess compliance with cGMP and adherence to commitments made in any, BLA or marketing authorization application, or MAA. Accordingly, we and our collaborators and suppliers must continue to expend time, money and effort in all areas of regulatory compliance, including manufacturing, production and quality control.

Any regulatory approvals that we or our collaboration partners receive for our drug candidates may be subject to limitations on the approved indicated uses for which the product may be marketed or to the conditions of approval or may contain requirements for potentially costly additional clinical trials and surveillance to monitor the safety and efficacy of the drug candidate. We will be required to report certain adverse reactions and production problems, if any, to the FDA and comparable foreign regulatory authorities. Any new legislation addressing drug safety issues could result in delays in product development or commercialization or increased costs to assure compliance. We will have to comply with requirements concerning advertising and promotion for our products. Promotional communications with respect to prescription drugs are subject to a variety of legal and regulatory restrictions and must be consistent with the information in the product's approved label. As such, we are not allowed to promote our products for indications or uses for which they do not have approval. If our drug candidates are approved, we must submit new or supplemental applications and obtain approval for certain changes to the approved products, product labeling or manufacturing process. We could also be asked to conduct post-marketing clinical trials to verify the safety and efficacy of our products in general or in specific patient subsets. An unsuccessful post-marketing study or failure to complete such a study could result in the withdrawal of marketing approval.

If a regulatory agency discovers previously unknown problems with an approved product, such as adverse events of unanticipated severity or frequency or problems with our manufacturing facilities or disagrees with the promotion, marketing or labeling of a product, such regulatory agency may impose restrictions on that product or us, including requiring withdrawal of the product from the market. If we fail to comply with applicable regulatory requirements, a regulatory agency or enforcement authority may, among other things:

- Issue untitled and warning letters;
- Impose civil or criminal penalties;
- Suspend or withdraw regulatory approval or revoke a license;
- Suspend any of our ongoing clinical trials;
- Refuse to approve pending applications or supplements to approved applications submitted by us;
- Impose restrictions on our operations, including closing our manufacturing facilities; or
- Seize or detain products or require a product recall.

Any government investigation of alleged violations of law could require us to expend significant time and resources in response and could generate negative publicity. Any failure to comply with ongoing regulatory requirements may significantly and adversely affect our ability to commercialize and generate revenue from our products. If regulatory sanctions are applied or if regulatory approval is withdrawn, the value of our company and our operating results will be negatively impacted.

***The commercial success of any current or future pharmaceutical products will depend upon the degree of market acceptance by physicians, patients, third-party payors and others in the medical community.***

Even with the requisite approvals, the commercial success of our pharmaceutical products will depend in part on the medical community, patients, and third-party payors accepting our pharmaceutical products as medically useful, cost-effective, and safe. Any pharmaceutical product that we or our partners bring to the market may not gain market acceptance by physicians, patients, third-party payors and others in the medical community. The degree of market acceptance of these pharmaceutical products, if approved for commercial sale, will depend on a number of factors, including:

- The effectiveness of our approved drug candidates as compared to currently available products;
- Patient willingness to adopt our approved drug candidates in place of current therapies;
- Our ability to provide acceptable evidence of safety and efficacy;
- Relative convenience and ease of administration;
- The prevalence and severity of any adverse side effects;
- Restrictions on use in combination with other products;
- Availability of alternative treatments;
- Pricing and cost-effectiveness assuming either competitive or potential premium pricing requirements, based on the profile of our drug candidates and target markets;
- Effectiveness of our or our partners' sales and marketing strategy;
- Our ability to obtain sufficient third-party coverage or reimbursement; and
- Potential product liability claims.

Even if a potential product displays a favorable efficacy and safety profile in preclinical and clinical studies, market acceptance of the product will not be known until after it is launched. Our efforts to educate the medical community and third-party payors on the benefits of the pharmaceutical products may require a significant amount of resources and may never be successful. If these products do not achieve an adequate level of acceptance, we may not generate significant product revenue and may not become profitable.

***The commercial potential of a pharmaceutical candidate in development is difficult to predict. If the market size for a new drug candidate or technology is significantly smaller than we anticipate, it could significantly and negatively impact our revenue, results of operations and financial condition.***

It is very difficult to estimate the commercial potential of pharmaceutical products due to important factors such as safety and efficacy compared to other available technologies or treatments, including changing standards of care, third-party payor reimbursement standards, patient and physician preferences, the availability of competitive alternatives that may emerge either during the long drug development process or after commercial introduction, and the availability of generic versions of our successful drug candidates following approval by government health authorities based on the expiration of regulatory exclusivity or our inability to prevent generic versions from coming to market by asserting our patents. If due to these factors, or others, the market potential for a pharmaceutical product is lower than we anticipated, it could significantly and negatively impact the commercial terms of any collaboration partnership potential for such pharmaceutical product or, if we have already entered into a collaboration for such pharmaceutical product, the revenue potential from royalty and milestone payments could be significantly diminished which would negatively impact our business, financial condition and results of operations.

***Failure to obtain or maintain adequate coverage and reimbursement for our drug candidates, if approved, could limit our ability to market those products and decrease our ability to generate revenue.***

The success of our drug candidates, if approved, depends on the availability of adequate coverage and reimbursement from third-party payors. In addition, because our drug candidates represent new approaches to the treatment of certain diseases, we cannot be sure that coverage and reimbursement will be available for, or accurately estimate the potential revenue from, our drug candidates or assure that coverage and reimbursement will be available for any product that we may develop.

Patients who are provided medical treatment for their conditions generally rely on third-party payors to reimburse all or part of the costs associated with their treatment. Adequate coverage and reimbursement from governmental healthcare programs, such as Medicare and Medicaid, and commercial payors are critical to new product acceptance.

Government authorities and third-party payors, such as private health insurers and health maintenance organizations, decide which drugs and treatments they will cover and the amount of reimbursement. Coverage and reimbursement by a third-party payor may depend upon a number of factors, including the third-party payor's determination that use of a product is:

- A covered benefit under its health plan;
- Safe, effective and medically necessary;
- Appropriate for the specific patient;
- Cost-effective; and
- Neither experimental nor investigational.

In the United States, no uniform policy of coverage and reimbursement for products exists among third-party payors. As a result, obtaining coverage and reimbursement approval of a product from a government or other third-party payor is a time-consuming and costly process that could require us to provide to each payor supporting scientific, clinical and cost-effectiveness data for the use of our products on a payor-by-payor basis, with no assurance that coverage and adequate reimbursement will be obtained. Even if we obtain coverage for a given product, the resulting reimbursement payment rates might not be adequate for us to achieve or sustain profitability or may require co-payments that patients find unacceptably high. Additionally, third-party payors may not cover, or provide adequate reimbursement for, long-term follow-up evaluations required following the use of our gene-modifying products. Patients are unlikely to use our drug candidates unless coverage is provided and reimbursement is adequate to cover a significant portion of the cost of our drug candidates. There is significant uncertainty related to insurance coverage and reimbursement of newly approved products. It is difficult to predict at this time what third-party payors will decide with respect to the coverage and reimbursement for our drug candidates.

Moreover, increasing efforts by governmental and third-party payors in the United States and abroad to cap or reduce healthcare costs may cause such organizations to limit both coverage and the level of reimbursement for newly approved products and, as a result, they may not cover or provide adequate payment for our drug candidates. We expect to experience pricing pressures in connection with the sale of any of our drug candidates due to the trend toward managed healthcare, the increasing influence of health maintenance organizations, cost containment initiatives and additional legislative changes.

We intend to seek approval to market our drug candidates in both the United States and in select foreign jurisdictions. If we obtain approval in one or more foreign jurisdictions for our drug candidates, we will be subject to rules and regulations in those jurisdictions. In some foreign countries, the pricing of pharmaceutical products is subject to governmental control and other market regulations which could put pressure on the pricing and usage of our drug candidates. In these countries, pricing negotiations with governmental authorities can take considerable time after obtaining marketing approval of a drug candidate. In addition, market acceptance and sales of our drug candidates will depend significantly on the availability of adequate coverage and reimbursement from third-party payors for our drug candidates and may be affected by existing and future health care reform measures. Failure to obtain or maintain adequate coverage and reimbursement for our drug candidates, if approved, could limit our ability to market those products and decrease our ability to generate revenue.

***We may use our financial and human resources to pursue a particular research program or drug candidate and fail to capitalize on programs or drug candidates that may be more profitable or for which there is a greater likelihood of success.***

Because we have limited resources, we may forego or delay pursuit of opportunities with certain programs or drug candidates or for indications that later prove to have greater commercial potential. Our resource allocation decisions may cause us to fail to capitalize on viable commercial products or profitable market opportunities. Our spending on current and future research and development programs for drug candidates may not yield any commercially viable products. If we do not accurately evaluate the commercial potential or target market for a particular drug candidate, we may relinquish valuable rights to that drug candidate through strategic collaboration, licensing or other royalty arrangements in cases in which it would have been more advantageous for us to retain sole development and commercialization rights to such drug candidate, or we may allocate internal resources to a drug candidate in a therapeutic area in which it would have been more advantageous to enter into a partnering arrangement. Failure to pursue opportunities with greater commercial potential or relinquishing valuable rights to drug candidates may adversely impact our business, results of operations and prospects.

***We may not be successful in our efforts to identify or discover additional pharmaceutical products.***

The success of our business depends primarily upon our ability to identify and develop pharmaceutical products. Our research programs may fail to identify potential pharmaceutical products for clinical development for a number of reasons. Our research methodology may be unsuccessful in identifying potential pharmaceutical products or our potential pharmaceutical products may be shown to have harmful side effects or may have other characteristics that may make the products unmarketable or unlikely to receive marketing approval.

If any of these events occur, we may be forced to abandon our development efforts for a program or programs, which would have a material adverse effect on our business and could potentially cause us to cease operations. Research programs to identify new pharmaceutical products require substantial technical, financial and human resources. We may focus our efforts and resources on potential programs or pharmaceutical products that ultimately prove to be unsuccessful. If we are not successful in our efforts to identify or discover additional pharmaceutical products, it could adversely affect our business, results of operations and prospects.

***We may fail to obtain orphan drug designations from the FDA for our drug candidates, and even if we obtain such designations, we may be unable to maintain the benefits associated with orphan drug designation, including the potential for market exclusivity.***

Under the Orphan Drug Act, the FDA may grant orphan drug designation to a drug or biologic intended to treat a rare disease or condition, which is defined as one occurring in a patient population of fewer than 200,000 in the United States, or a patient population greater than 200,000 in the United States where there is no reasonable expectation that the cost of developing the drug or biologic will be recovered from sales in the United States. In the United States, orphan drug designation entitles a party to financial incentives such as opportunities for grant funding towards clinical trial costs, tax advantages and user-fee waivers. In addition, if a product that has orphan drug designation subsequently receives the first FDA approval for the disease for which it has such designation, the product is entitled to orphan drug exclusivity, which means that the FDA may not approve any other applications, including a full NDA or BLA, to market the same drug or biologic for the same indication for seven years, except in limited circumstances, such as a showing of clinical superiority to the product with orphan drug exclusivity or where the manufacturer is unable to assure sufficient product quantity.

OncoHist for AML and XBIO-101 for endometrial cancer have orphan designation in the U.S. While we have not obtained nor have we sought to obtain additional orphan designations for any drug candidate, we believe our products and drug candidates could qualify for additional orphan drug designations for additional indications. We may seek to obtain orphan drug designation for our drug candidates for any qualifying indications they may be approved for in the future. Even if we obtain such designations, we may not be the first to obtain marketing approval of our drug candidate for the orphan-designated indication due to the uncertainties associated with developing pharmaceutical products. In addition, exclusive marketing rights in the United States may be limited if we seek approval for an indication broader than the orphan-designated indication or may be lost if the FDA later determines that the request for designation was materially defective or if the manufacturer is unable to assure sufficient quantities of the product to meet the needs of patients with the rare disease or condition. Further, even if we obtain orphan drug exclusivity for a product, that exclusivity may not effectively protect the product from competition because different drugs with different active moieties can be approved for the same condition. Even after an orphan product is approved, the FDA can subsequently approve the same drug with the same active moiety for the same condition if the FDA concludes that the later drug is safer, more effective or makes a major contribution to patient care. Orphan drug designation neither shortens the development time or regulatory review time of a drug, nor gives the drug any advantage in the regulatory review or approval process. In addition, while we may seek orphan drug designation for our drug candidates, we may never receive such designations.

***The market opportunities for our drug candidates may be limited to those patients who are ineligible for or have failed prior treatments and may be small.***

Cancer therapies are sometimes characterized as first line, second line or third line, and the FDA often approves new therapies initially only for third line use. When cancer is detected early enough, first line therapy is sometimes adequate to cure the cancer or prolong life without a cure. Whenever first line therapy, usually chemotherapy, hormone therapy, surgery or a combination of these, proves unsuccessful, second line therapy may be administered. Second line therapies often consist of more chemotherapy, radiation, antibody drugs, tumor targeted small molecules or a combination of these. Third line therapies can include bone marrow transplantation, antibody and small molecule targeted therapies, more invasive forms of surgery and new technologies. In markets with approved therapies, we expect to initially seek approval of our drug candidates as a later stage therapy for patients who have failed other approved treatments. Subsequently, for those drugs that prove to be sufficiently beneficial, if any, we would expect to seek approval as a second line therapy and potentially as a first line therapy, but there is no guarantee that our drug candidates, even if approved, would be approved for second line or first line therapy. In addition, we may have to conduct additional clinical trials prior to gaining approval for second line or first line therapy.

Our projections of both the number of people who have the cancers we are targeting, as well as the subset of people with these cancers in a position to receive later stage therapy and who have the potential to benefit from treatment with our drug candidates, are based on our beliefs and estimates. These estimates have been derived from a variety of sources, including scientific literature, surveys of clinics, patient foundations or market research and may prove to be incorrect. Further, new studies may change the estimated incidence or prevalence of these cancers. The number of patients may turn out to be lower than expected. In addition, the potentially addressable patient population for our drug candidates may be limited or may not be amenable to treatment with our drug candidates. Even if we obtain significant market share for our drug candidates, we may never achieve profitability without obtaining regulatory approval for additional indications, including use as a first or second line therapy, which may adversely affect our business and results of operations.

***Healthcare legislative reform measures may have a material adverse effect on our business and results of operations.***

In both the United States and certain foreign jurisdictions, there have been a number of legislative and regulatory enactments in recent years that change the healthcare system in ways that could impact our future ability to sell our drug candidates profitably.

Furthermore, there have been and continue to be a number of initiatives at the federal and state level that seek to reduce healthcare costs. Most significantly, in March 2010, the Patient Protection and Affordable Health Care Act, as amended by the Health Care and Education Reconciliation Act, or collectively the ACA, was signed into law, which includes measures that significantly change the way healthcare is financed by both governmental and private insurers. In January 2017, Congress voted to adopt a budget resolution for fiscal year 2017, or the Budget Resolution, that authorizes the implementation of legislation that would repeal portions of the ACA. In addition, on January 20, 2017, President Trump signed an Executive Order directing federal agencies with authorities and responsibilities under the ACA to waive, defer, grant exemptions from, or delay the implementation of any provision of the ACA that would impose a fiscal or regulatory burden on states, individuals, healthcare providers, health insurers, or manufacturers of pharmaceuticals or medical devices. Further, on October 12, 2017, President Trump issued another executive order requiring the Secretaries of the Departments of Health and Human Services ("HHS"), Labor, and the Treasury to consider proposing regulations or revising existing guidance to allow more employers to form association health plans that would be allowed to provide coverage across state lines, increase the availability of short-term, limited duration health insurance plans, which are generally not subject to the requirements of the ACA, and increase the availability and permitted use of health reimbursement arrangements. On October 13, 2017, the Department of Justice announced that HHS was immediately stopping its cost sharing reduction payments to insurance companies based on the determination that those payments had not been appropriated by Congress. Furthermore, on December 22, 2017, President Trump signed the Tax Cuts and Jobs Act (the "TCJA") into law that, in addition to overhauling the federal tax system, also, effective as of January 1, 2019, repeals the penalties associated with the individual mandate. Congress or the President of the United States also could consider subsequent legislation or executive action to replace or eliminate elements of the ACA. We will continue to evaluate the effect that the ACA and any future measures to modify, repeal or replace the ACA have on our business. We are not able to provide any assurance that the continued healthcare reform debate will not result in legislation, regulation, or executive action by the President of the United States that is adverse to our business.

Laws and other reform and cost containment measures that may be proposed and adopted in the future remain uncertain, but may result in additional reductions in Medicare and other healthcare funding, which could have a material adverse effect on our future customers and accordingly, our ability to generate revenue, attain profitability, or commercialize our products.

**Risks Related to Our Reliance on Third-Parties**

***If conflicts arise between us and our collaborators or strategic partners, these parties may act in their self-interest, which may limit our ability to implement our strategies.***

If conflicts arise between our corporate or academic collaborators or strategic partners and us, the other party may act in its self-interest, which may limit our ability to implement our strategies. Some of our academic collaborators and strategic partners are conducting multiple product development efforts within each area that is the subject of the collaboration with us. Our collaborators or strategic partners, however, may develop, either alone or with others, products in related fields that are competitive with the products or potential products that are the subject of these collaborations. Competing products, either developed by the collaborators or strategic partners or to which the collaborators or strategic partners have rights, may result in the withdrawal of partner support for our drug candidates.

Some of our collaborators or strategic partners could also become our competitors in the future. Our collaborators or strategic partners could develop competing products, preclude us from entering into collaborations with their competitors, fail to obtain timely regulatory approvals, terminate their agreements with us prematurely, or fail to devote sufficient resources to the development and commercialization of products. Any of these developments could harm our product development efforts, which may adversely affect our business, results of operations and prospects.

***We expect to rely on third-parties to conduct, supervise and monitor our clinical studies, and if these third-parties perform in an unsatisfactory manner, it may harm our business.***

We expect to rely on CROs, clinical investigators and clinical study sites to ensure our clinical studies are conducted properly and on time. We will have limited influence over the performance by CROs, clinical investigators and clinical study sites and we will control only certain aspects of our CROs' activities. Nevertheless, we will be responsible for ensuring that each of our clinical studies is conducted in accordance with the applicable protocol, legal, and regulatory requirements and scientific standards, and our reliance on the CROs does not relieve us of our regulatory responsibilities.

We, our clinical investigators and our CROs are required to comply with the FDA's GCPs for conducting, recording and reporting the results of clinical trials to assure that the data and reported results are credible and accurate and that the rights, integrity and confidentiality of clinical trial participants are protected. The FDA enforces these GCPs through periodic inspections of study sponsors, principal investigators and clinical trial sites. If we or our CROs or the clinical investigators fail to comply with applicable GCPs, the clinical data generated in our clinical trials may be deemed unreliable and the FDA may require us to perform additional clinical trials before approving any marketing applications. Upon inspection, the FDA may determine that our clinical trials did not comply with GCPs. In addition, our future clinical trials will require a sufficient number of test subjects to evaluate the safety and efficacy of our drug candidates. Accordingly, if our CROs or clinical investigators fail to comply with these regulations or fail to recruit a sufficient number of patients, we may be required to repeat such clinical trials, which would delay the regulatory approval process.

Our CROs are not our employees, and we are therefore unable to directly monitor whether or not they devote sufficient time and resources to our clinical and nonclinical programs, which must be conducted in accordance with GCPs and GLPs, respectively. These CROs may also have relationships with other commercial entities, including our competitors, for whom they may also be conducting clinical studies or other drug development activities that could harm our competitive position. If our CROs do not successfully carry out their contractual duties or obligations, fail to meet expected deadlines, or if the quality or accuracy of the clinical data they obtain is compromised due to the failure to adhere to our clinical protocols or regulatory requirements, or for any other reasons, our clinical studies may be extended, delayed or terminated, and we may not be able to obtain regulatory approval for, or successfully commercialize our pharmaceutical products. As a result, our financial results and the commercial prospects for our pharmaceutical products would be harmed, our costs could increase, and our ability to generate revenues could be delayed.

We may also rely on other third-parties to store and distribute our products for any clinical studies that we may conduct. Any performance failure on the part of our distributors could delay clinical development or marketing approval of our pharmaceutical products or commercialization of our products, if approved, producing additional losses and depriving us of potential product revenue.

***Our collaborators or strategic partners may decide to adopt alternative technologies or may be unable to develop commercially viable products with our technology, which would negatively impact our revenues and our strategy to develop these products.***

Our collaborators or strategic partners may adopt alternative technologies, which could decrease the marketability of our products. Additionally, because our current or future collaborators or strategic partners are likely to be working on more than one development project, they could choose to shift their resources to projects other than those they are working on with us. If they do so, this would delay our ability to test our technology and would delay or terminate the development of potential products based on our platforms. Further, our collaborators and strategic partners may elect not to develop products arising out of our collaborative and strategic partnering arrangements or to devote sufficient resources to the development, manufacturing, marketing or sale of these products. The failure to develop and commercialize a drug candidate pursuant to our agreements with our current or future collaborator would prevent us from receiving future milestone and royalty payments which would negatively impact our revenues.

***We may seek to establish additional collaborations and, if we are not able to establish them on commercially reasonable terms, we may have to alter our development and commercialization plans.***

Our drug candidate development programs and the potential commercialization of our drug candidates will require substantial additional cash to fund expenses. For some of our drug candidates, we may decide to collaborate with additional pharmaceutical and biotechnology companies for the development and potential commercialization of those drug candidates.

We face significant competition in seeking appropriate collaborators. Whether we reach a definitive agreement for any additional collaborations will depend, among other things, upon our assessment of the collaborator's resources and expertise, the terms and conditions of the proposed collaboration and the proposed collaborator's evaluation of a number of factors. Those factors may include the design or results of clinical trials, the likelihood of approval by FDA or similar regulatory authorities outside the United States, the potential market for the subject drug candidate, the costs and complexities of manufacturing and delivering such drug candidate to patients, the potential of competing drugs, the existence of uncertainty with respect to our ownership of technology, which can exist if there is a challenge to such ownership without regard to the merits of the challenge, and industry and market conditions generally. The collaborator may also consider alternative drug candidates or technologies for similar indications that may be available to collaborate on and whether such a collaboration could be more attractive than the one with us for our drug candidate. The terms of any additional collaborations or other arrangements that we may establish may not be favorable to us.

We may also be restricted under existing collaboration agreements from entering into future agreements on certain terms with potential collaborators. Collaborations are complex and time-consuming to negotiate and document. In addition, there have been a significant number of recent business combinations among large pharmaceutical companies that have resulted in a reduced number of potential future collaborators.

We may not be able to negotiate additional collaborations on a timely basis, on acceptable terms, or at all. If we are unable to do so, we may have to curtail the development of the drug candidate for which we are seeking to collaborate, reduce or delay its development program or one or more of our other development programs, delay its potential commercialization or reduce the scope of any sales or marketing activities, or increase our expenditures and undertake development or commercialization activities at our own expense. If we elect to increase our expenditures to fund development or commercialization activities on our own, we may need to obtain additional capital, which may not be available to us on acceptable terms or at all. If we do not have sufficient funds, we may not be able to further develop our drug candidates or bring them to market and generate product revenue.

***If we enter into one or more collaborations, we may be required to relinquish important rights to and control over the development of our drug candidates or otherwise be subject to unfavorable terms.***

Any future collaborations we enter into could subject us to a number of risks, including:

- We may not be able to control the amount and timing of resources that our collaborators devote to the development or commercialization of our drug candidates;
- Collaborators may delay clinical trials, provide insufficient funding, terminate a clinical trial or abandon a drug candidate, repeat or conduct new clinical trials or require a new version of a drug candidate for clinical testing;
- Collaborators may not pursue further development and commercialization of products resulting from the strategic partnering arrangement or may elect to discontinue research and development programs;
- Collaborators may not commit adequate resources to the marketing and distribution of our drug candidates, limiting our potential revenues from these products;
- Disputes may arise between us and our collaborators that result in the delay or termination of the research, development or commercialization of our drug candidates or that result in costly litigation or arbitration that diverts management's attention and consumes resources;
- Collaborators may experience financial difficulties;

- Collaborators may not properly maintain or defend our intellectual property rights or may use our proprietary information in a manner that could jeopardize or invalidate our proprietary information or expose us to potential litigation;
- Business combinations or significant changes in a collaborator's business strategy may also adversely affect a collaborator's willingness or ability to complete its obligations under any arrangement;
- Collaborators could decide to move forward with a competing drug candidate developed either independently or in collaboration with others, including our competitors; and
- Collaborators could terminate the arrangement or allow it to expire, which would delay the development and may increase the cost of developing our drug candidates.

***Our contract manufacturers are subject to significant regulation with respect to manufacturing our products. The manufacturing facilities on which we rely may not continue to meet regulatory requirements and have limited capacity.***

We currently have relationships with a limited number of suppliers for the manufacturing of our pharmaceutical products. Each supplier may require licenses to manufacture components if such processes are not owned by the supplier or in the public domain and we may be unable to transfer or sublicense the intellectual property rights we may have with respect to such activities.

All entities involved in the preparation of pharmaceutical products for clinical studies or commercial sale, including our existing contract manufacturers for our drug candidates, are subject to extensive regulation. Components of a finished pharmaceutical product approved for commercial sale or used in late-stage clinical studies must be manufactured in accordance with cGMP. These regulations govern manufacturing processes and procedures (including record keeping) and the implementation and operation of quality systems to control and assure the quality of investigational products and products approved for sale. Poor control of production processes can lead to the introduction of adventitious agents or other contaminants, or to inadvertent changes in the properties or stability of our pharmaceutical products that may not be detectable in final product testing. Our contract manufacturers must supply all necessary documentation in support of an NDA or BLA on a timely basis and must adhere to the FDA's GLP, and cGMP regulations enforced by the FDA through its facilities inspection program. The facilities and quality systems of some or all of our third-party contractors must pass a pre-approval inspection for compliance with the applicable regulations as a condition of regulatory approval of our pharmaceutical products or any of our other potential products. In addition, the regulatory authorities may, at any time, audit or inspect a manufacturing facility involved with the preparation of our pharmaceutical products or our other potential products or the associated quality systems for compliance with the regulations applicable to the activities being conducted. If these facilities do not pass a pre-approval plant inspection, FDA approval of the products will not be granted.

The regulatory authorities also may, at any time following approval of a product for sale, audit the manufacturing facilities of our third-party contractors. If any such inspection or audit identifies a failure to comply with applicable regulations or if a violation of our product specifications or applicable regulations occurs independent of such an inspection or audit, we or the relevant regulatory authority may require remedial measures that may be costly and/or time-consuming for us or a third-party to implement and that may include the temporary or permanent suspension of a clinical study or commercial sales or the temporary or permanent closure of a facility. Any such remedial measures imposed upon third-parties with whom we contract could materially harm our business.

If our third-party manufacturers fail to maintain regulatory compliance, the FDA can impose regulatory sanctions including, among other things, refusal to approve a pending application for a drug candidate, or revocation of a pre-existing approval. As a result, our business, financial condition and results of operations may be materially harmed.

Additionally, if supply from one approved manufacturer is interrupted, there could be a significant disruption in commercial supply. The number of manufacturers with the necessary manufacturing capabilities is limited. In addition, an alternative manufacturer would need to be qualified through an NDA or BLA supplement which could result in further delay. The regulatory agencies may also require additional studies if a new manufacturer is relied upon for commercial production. Switching manufacturers may involve substantial costs and is likely to result in a delay in our desired clinical and commercial timelines, which could materially harm our business and results of operations.

These factors could cause the delay of clinical studies, regulatory submissions, required approvals or commercialization of our pharmaceutical products, cause us to incur higher costs and prevent us from commercializing our products successfully. Furthermore, if our suppliers fail to meet contractual requirements, and we are unable to secure one or more replacement suppliers capable of production at a substantially equivalent cost, our clinical studies may be delayed or we could lose potential revenue, which could materially harm our business and results of operations.

***We have no manufacturing, sales, marketing or distribution capabilities, and we may have to invest a significant amount of resources to develop these capabilities.***

We have no internal manufacturing capabilities. As a result, for manufacturing we depend on third-party manufacturers, including Kevelt, Pharmsynthez and the Serum Institute, which in turn may rely upon third-parties to manufacture our products. Although our strategy is based on leveraging the ability of collaboration partners to develop and manufacture our products for commercialization in the pharmaceutical marketplace, we will be dependent on collaborations with drug development and manufacturing collaborators. If we are not able to maintain existing collaborative arrangements or establish new arrangements on commercially acceptable terms, we would be required to undertake product manufacturing and development activities at our own expense. This would increase our capital requirements or require us to limit the scope of our development activities. Moreover, we have limited or no experience in conducting full scale bioequivalence or other clinical studies, preparing and submitting regulatory applications, and distributing and marketing pharmaceutical products and as such we are reliant on contract parties for such efforts. We may not be able to enter into collaborations or hire consultants or external service providers to assist us in sales, marketing and distribution functions on acceptable financial terms or at all.

If any of our developmental collaborators breach or terminate their agreements with us or otherwise fail to conduct their collaborative activities in a timely manner, the preclinical and/or clinical development and/or commercialization of our pharmaceutical products will be delayed and we would be required to devote additional resources to product development and commercialization or terminate certain development programs. Also, a license relationship may be terminated at the discretion of our collaborator, or at the end of contract terms, and in some cases with only limited notice to us. The termination of the collaborative arrangement could have a material adverse effect on our business, financial condition and results of operations. There also can be no assurance that disputes will not arise with respect to the ownership of rights to any technology developed with third-parties. These and other possible disagreements with collaborators could lead to delays in the development or commercialization of our pharmaceutical products or could result in litigation or arbitration, which could be time consuming and expensive and could have a material adverse effect on our business, financial condition and results of operations. Even if we decide to perform clinical trials, sales, marketing and distribution functions ourselves, we could face a number of additional related risks, including:

- we may not be able to attract clinical investigators and build effective clinical trials, or a solid marketing department or sales force;
- the cost of establishing an internal clinical trials program, marketing department or sales force may exceed our available financial resources and the revenue generated by any of our current product candidates, if approved, or any other pharmaceutical products that we may develop, in-license or acquire; and
- our direct sales and marketing efforts may not be successful.

Any failure to perform such activities could have a material adverse effect on our business, financial condition and results of our operations.

***Our reliance on third-parties requires us to share our trade secrets, which increases the possibility that a competitor will discover them or that our trade secrets will be misappropriated or disclosed.***

Because we rely on third-parties to manufacture our pharmaceutical products, and because we collaborate with various organizations and academic institutions on the development of our pharmaceutical products, we must, at times, share trade secrets with them. We seek to protect our proprietary technology in part by entering into confidentiality agreements and, if applicable, material transfer agreements, collaborative research agreements, consulting agreements or other similar agreements with our collaborators, advisors, employees and consultants prior to beginning research or disclosing proprietary information. These agreements typically limit the rights of the third-parties to use or disclose our confidential information, such as trade secrets. Despite the contractual provisions employed when working with third-parties, the need to share trade secrets and other confidential information increases the risk that such trade secrets become known by our competitors, are inadvertently incorporated into the technology of others, or are disclosed or used in violation of these agreements. Given that our proprietary position is based, in part, on our know-how and trade secrets, a competitor's discovery of our trade secrets or other unauthorized use or disclosure would impair our competitive position and may have a material adverse effect on our business.

In addition, these agreements typically restrict the ability of our collaborators, advisors, employees and consultants to publish data potentially relating to our trade secrets. Our academic collaborators typically have rights to publish data, provided that we are notified in advance and may delay publication for a specified time in order to secure our intellectual property rights arising from the collaboration. In other cases, publication rights are controlled exclusively by us, although in some cases we may share these rights with other parties. We may also conduct joint research and development programs that may require us to share trade secrets under the terms of our research and development partnerships or similar agreements. Despite our efforts to protect our trade secrets, our competitors may discover our trade secrets, either through breach of these agreements, independent development or publication of information including our trade secrets in cases where we do not have proprietary or otherwise protected rights at the time of publication. A competitor's discovery of our trade secrets would impair our competitive position and have an adverse impact on our business.

**Risks Related to Our Intellectual Property**

***If we fail to adequately protect or enforce our intellectual property rights, we may be unable to operate effectively.***

Our success and ability to compete are substantially dependent on our patents, proprietary formulations and trademarks. Although we believe that the patents and associated trademarks and licenses are valid, there can be no assurance that they will not be challenged and subsequently invalidated and/or canceled. The invalidation or cancellation of any one or all of the patents or trademarks would significantly damage our commercial prospects. Further, we may find it necessary to legally challenge parties infringing our patents or trademarks or licensed trademarks to enforce our rights thereto. There can be no assurance that any of the patents would ultimately be held valid or that efforts to defend any of the patents, trade secrets, know-how or other IP rights would be successful.

The patent positions of pharmaceutical and biotechnology companies, such as ours, are uncertain and involve complex legal and factual issues. We own numerous U.S. and foreign patents and a number of pending patent applications that cover various aspects of our drug candidates and technologies. There can be no assurance that patents that have been issued will be held valid and enforceable in a court of law. Even for patents that are held valid and enforceable, the legal process associated with obtaining such a judgment is time consuming and costly. Additionally, issued patents can be subject to opposition or other proceedings that can result in the revocation of the patent or maintenance of the patent in amended form (and potentially in a form that renders the patent without commercially relevant and/or broad coverage). Further, our competitors may be able to circumvent and otherwise design around our patents. Even if a patent is issued and enforceable, because development and commercialization of pharmaceutical products can be subject to substantial delays, patents may expire early and provide only a short period of protection, if any, following the commercialization of a product encompassed by our patents. We may have to participate in interference proceedings declared by the USPTO, which could result in a loss of the patent and/or substantial cost to us.

We have filed patent applications and plan to file additional patent applications, covering various aspects of our drug candidates and technologies. There can be no assurance that the patent applications for which we apply would actually be issued as patents, or do so with commercially relevant and/or broad coverage. The coverage claimed in a patent application can be significantly reduced before the patent is issued. The scope of our claim coverage can be critical to our ability to enter into licensing transactions with third-parties and our right to receive royalties from our collaboration partnerships. Since publication of discoveries in scientific or patent literature often lags behind the date of such discoveries, we cannot be certain that we were the first inventor of inventions covered by our patents or patent applications. In addition, there is no guarantee that we will be the first to file a patent application directed to an invention.

An adverse outcome in any judicial proceeding involving IP, including patents, could subject us to significant liabilities to third-parties, require disputed rights to be licensed from or to third-parties or require us to cease using the technology in dispute. In those instances where we seek an IP license from another, we may not be able to obtain the license on a commercially reasonable basis, if at all, thereby raising concerns on our ability to freely commercialize our technologies and/or products. It is also possible that we or our licensors or licensees will fail to identify patentable aspects of inventions made in the course of development and commercialization activities before it is too late to obtain patent protection on them. Moreover, in some circumstances, we may not have the right to control the preparation, filing and prosecution of patent applications, or to maintain the patents, covering technology that we license from or license to third-parties and are reliant on our licensors or licensees. Therefore, these patents and applications may not be prosecuted and enforced in a manner consistent with the best interests of our business. If our current or future licensors or licensees fail to establish, maintain or protect such patents and other intellectual property rights, such rights may be reduced or eliminated. If our licensors or licensees are not fully cooperative or disagree with us as to the prosecution, maintenance or enforcement of any patent rights, such patent rights could be compromised.

Failure to adequately protect or enforce our intellectual property rights could have a material adverse impact on our business, results of operations and prospects.

***Issued patents covering our drug candidates could be found invalid or unenforceable if challenged in court.***

If we or one of our licensing partners initiated legal proceedings against a third-party to enforce a patent covering one of our drug candidates, the defendant could counterclaim that the patent covering our drug candidate is invalid and/or unenforceable. In patent litigation in the United States, defendant counterclaims alleging invalidity and/or unenforceability are commonplace. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, including lack of novelty, obviousness or non-enablement. Grounds for an unenforceability assertion could be an allegation that someone connected with prosecution of the patent withheld relevant information from the USPTO, or made a misleading statement, during prosecution. Third-parties may also raise similar claims before administrative bodies in the United States or abroad, even outside the context of litigation. Such mechanisms include re-examination, post grant review, and equivalent proceedings in foreign jurisdictions (e.g., opposition proceedings). Such proceedings could result in revocation or amendment to our patents in such a way that they no longer cover our drug candidates. The outcome following legal assertions of invalidity and unenforceability is unpredictable. With respect to the validity question, for example, we cannot be certain that there is no invalidating prior art, of which we and the patent examiner were unaware during prosecution. If a defendant were to prevail on a legal assertion of invalidity and/or unenforceability, we would lose at least part, and perhaps all, of the patent protection on our drug candidates. Such a loss of patent protection would have a material adverse impact on our business.

***We may not be able to protect our intellectual property rights throughout the world.***

Filing, prosecuting and defending patents on drug candidates in all countries throughout the world would be prohibitively expensive, and our intellectual property rights in some countries outside the United States can be less extensive than those in the United States. In addition, the laws of some foreign countries do not protect intellectual property rights to the same extent as federal and state laws in the United States. Consequently, we may not be able to prevent third-parties from practicing our inventions in all countries outside the United States, or from selling or importing products made using our inventions in and into the United States or other jurisdictions. Competitors may use our inventions in jurisdictions where we have not obtained patent protection to develop their own products and further, may export otherwise infringing products to territories where we have patent protection, but enforcement is not as strong as that in the United States. These products may compete with our products and our patents or other intellectual property rights may not be effective or sufficient to prevent them from competing.

Many companies have encountered significant problems in protecting and defending intellectual property rights in foreign jurisdictions. The legal systems of certain countries, particularly certain developing countries, do not favor the enforcement of patents, trade secrets and other intellectual property protection, particularly those relating to biotechnology products, which could make it difficult for us to stop the infringement of our patents or marketing of competing products in violation of our proprietary rights generally. Proceedings to enforce our patent rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business, could put our patents at risk of being invalidated or interpreted narrowly and our patent applications at risk of not issuing and could provoke third-parties to assert claims against us. We may not prevail in any lawsuits that we initiate and the damages or other remedies awarded, if any, may not be commercially meaningful. Accordingly, our efforts to enforce our intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license.

Failure to adequately protect our intellectual property rights throughout the world could have a material adverse impact on our business, results of operations and prospects.

***If we infringe on the intellectual property rights of others, our business and profitability may be adversely affected.***

Our commercial success will also depend, in part, on us and our collaborative partners not infringing on the patents or proprietary rights of others. There can be no assurance that the technologies and products used or developed by our collaborative partners and marketed and sold by us will not infringe such rights. If such infringement occurs and neither we nor our collaborative partner is able to obtain a license from the relevant third-party, we will not be able to continue the development, manufacture, use, or sale of any such infringing technology or product. There can be no assurance that necessary licenses to third-party technology will be available at all, or on commercially reasonable terms. In some cases, litigation or other proceedings may be necessary to defend against or assert claims of infringement or to determine the scope and validity of the proprietary rights of third-parties. Any potential litigation could result in substantial costs to, and diversion of, our resources and could have a material and adverse impact on us. An adverse outcome in any such litigation or proceeding could subject us to significant liabilities, require us to cease using the subject technology or require us to license the subject technology from the third-party, all of which could have a material adverse effect on our business.

***If we fail to comply with our obligations in the agreements under which we license intellectual property rights from third-parties or otherwise experience disruptions to our business relationships with our licensors, we could lose license rights that are important to our business.***

We are a party to a number of intellectual property license agreements that are important to our business and we expect to enter into additional license agreements in the future. Our existing license agreements impose, and we expect that future license agreements will impose, various diligence, milestone payment, royalty and other obligations on us. If we fail to comply with our obligations under these agreements, or we are subject to a bankruptcy, the licensor may have the right to terminate the license, in which event we would not be able to market products covered by the license.

We may need to obtain licenses from third-parties to advance our research, and we have done so from time to time. We may fail to obtain any of these licenses at a reasonable cost or on reasonable terms, if at all. In that event, we may be required to expend significant time and resources to develop or license replacement technology. If we are unable to do so, we may be unable to develop the affected drug candidates, which could harm our business significantly. We cannot provide any assurances that third-party patents do not exist which might be enforced against our current drug candidates or future products, resulting in either an injunction prohibiting the sales, or, with respect to the sales, an obligation on our part to pay royalties and/or other forms of compensation to third-parties.

In many cases, patent prosecution of our licensed technology is controlled solely by the licensor. If our licensors fail to obtain and maintain patent or other protection for the proprietary intellectual property we license from them, we could lose our rights to the intellectual property or our exclusivity with respect to those rights, and our competitors could market competing products using the intellectual property. In certain cases, we control the prosecution of patents resulting from licensed technology. In the event we breach any of our obligations related to such prosecution, we may incur significant liability to our licensing partners. Licensing of intellectual property is of critical importance to our business and involves complex legal, business and scientific issues and is complicated by the rapid pace of scientific discovery in our industry. Disputes may arise regarding intellectual property subject to a licensing agreement, including:

- The scope of rights granted under the license agreement and other interpretation-related issues;
- The extent to which our technology and processes infringe on intellectual property of the licensor that is not subject to the licensing agreement;
- The sublicensing of patent and other rights under our collaborative development relationships;
- Our diligence obligations under the license agreement and what activities satisfy those diligence obligations;
- The ownership of inventions and know-how resulting from the joint creation or use of intellectual property by our licensors and us and our partners; and
- The priority of invention of patented technology.

If disputes over intellectual property that we have licensed prevent or impair our ability to maintain our current licensing arrangements on acceptable terms, we may be unable to successfully develop and commercialize the affected drug candidates, which could have a material adverse effect on our business.

***We may be involved in lawsuits to protect or enforce our patents or the patents of our licensors, which could be expensive, time-consuming and unsuccessful.***

Competitors may infringe our patents or the patents of our licensors. To counter infringement or unauthorized use, we may be required to file infringement claims, which can be expensive and time-consuming. In addition, in an infringement proceeding, a court may decide that a patent of ours or our licensors is not valid, is unenforceable and/or is not infringed, or may refuse to stop the other party from using the technology at issue on the grounds that our patents do not cover the technology in question. An adverse result in any litigation or defense proceedings could put one or more of our patents at risk of being invalidated or interpreted narrowly and could put our patent applications at risk of not issuing.

Interference proceedings provoked by third-parties or brought by us may be necessary to determine the priority of inventions with respect to our patents or patent applications or those of our licensors. An unfavorable outcome could require us to cease using the related technology or to attempt to license rights to it from the prevailing party. Our business could be harmed if the prevailing party does not offer us a license on commercially reasonable terms. Our defense of litigation or interference proceedings may fail and, even if successful, may result in substantial costs and distract our management and other employees. We may not be able to prevent, alone or with our licensors, misappropriation of our intellectual property rights, particularly in countries where the laws may not protect those rights as fully as in the United States.

Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation. There could also be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have a material adverse effect on the price of our Common Stock underlying the units.

***Changes in U.S. patent law could diminish the value of patents in general, thereby impairing our ability to protect our products.***

As is the case with other biopharmaceutical companies, our success is heavily dependent on intellectual property, particularly patents. Obtaining and enforcing patents in the biotechnology industry involve both technological and legal complexity and is, therefore, costly, time-consuming and inherently uncertain. In addition, the United States has recently enacted and is currently implementing wide-ranging patent reform legislation. Recent U.S. Supreme Court rulings have narrowed the scope of patent protection available in certain circumstances and weakened the rights of patent owners in certain situations. In addition to increasing uncertainty with regard to our ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of patents, once obtained. Depending on decisions by the U.S. Congress, the federal courts, and the USPTO, the laws and regulations governing patents could change in unpredictable ways that would weaken our ability to obtain new patents or to enforce our existing patents and patents that we might obtain in the future.

Patent reform legislation could increase the uncertainties and costs surrounding the prosecution of our and our licensors' patent applications and the enforcement or defense of our or our licensors' issued patents. Provisions of the Leahy-Smith America Invents Act, or the Leahy-Smith Act, adopted in September 2011, which includes a number of significant changes to U.S. patent law, are still being implemented through the adoption of new regulations. The Leahy-Smith Act and its implementation, in addition to any new regulation, could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents, all of which could have a material adverse effect on our business and financial condition.

***We may be subject to claims that our employees, consultants or independent contractors have wrongfully used or disclosed confidential information of third-parties or that our employees have wrongfully used or disclosed alleged trade secrets of their former employers.***

We employ individuals who were previously employed at universities or other biotechnology or pharmaceutical companies, including our competitors or potential competitors. We may be subject to claims that we or our employees, consultants or independent contractors have inadvertently or otherwise used or disclosed intellectual property, including trade secrets or other proprietary information, of any of our employee's former employers or other third-parties. Litigation may be necessary to defend against these claims. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel, which could adversely impact our business. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management and other employees.

***We may be subject to claims challenging the inventorship or ownership of our patents and other intellectual property.***

We may also be subject to claims that former employees, collaborators or other third-parties have an ownership interest in our patents or other intellectual property. We may have in the future ownership disputes arising, for example, from conflicting obligations of consultants or others who are involved in developing our drug candidates. Litigation may be necessary to defend against these and other claims challenging inventorship or ownership. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights, such as exclusive ownership of, or right to use, valuable intellectual property. Such an outcome could have a material adverse effect on our business. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management and other employees.

***Our inability to protect our confidential information and trade secrets would harm our business and competitive position.***

In addition to seeking patents for some of our technology and products, we also rely on trade secrets, including unpatented know-how, technology and other proprietary information, to maintain our competitive position. We seek to protect these trade secrets, in part, by entering into non-disclosure and confidentiality agreements with parties who have access to them, such as our employees, corporate collaborators, outside scientific collaborators, contract manufacturers, consultants, advisors and other third-parties. We also enter into confidentiality and invention or patent assignment agreements with our employees and consultants. Any of these parties may breach the agreements and disclose our proprietary information, including our trade secrets, and we may not be able to obtain adequate remedies for such breaches. Enforcing a claim that a party illegally disclosed or misappropriated a trade secret is difficult, expensive and time-consuming, and the outcome is unpredictable. In addition, some courts both within and outside the United States may be less willing or unwilling to protect trade secrets. If a competitor lawfully obtained or independently developed any of our trade secrets, we would have no right to prevent such competitor from using that technology or information to compete with us, which could harm our competitive position and our business.

***Obtaining and maintaining our patent protection depends on compliance with various procedural, document submission, fee payment and other requirements imposed by governmental patent agencies, and our patent protection could be reduced or eliminated for non-compliance with these requirements.***

Periodic maintenance fees, renewal fees, annuity fees and various other governmental fees on patents and/or applications will be due to be paid to the USPTO and various governmental patent agencies outside of the United States in several stages over the lifetime of the patents and/or applications. The USPTO and various non-U.S. governmental patent agencies require compliance with a number of procedural, documentary, fee payment and other similar provisions during the patent application process. Non-compliance may result in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. In such an event, our competitors might be able to enter the market and this circumstance would have a material adverse effect on our business.

**Risks Related to Our Business Operations**

***We operate in an extremely competitive environment and there can be no assurances that competing technologies would not harm our business development.***

We are engaged in a rapidly evolving field. Competition from numerous pharmaceutical companies is intense and expected to increase. The large and rapidly growing market for oncology treatments is likely to attract new entrants. Numerous biotechnology and pharmaceutical companies are focused on developing cancer treatments and I-O technologies including CAR T. Many, if not all, of these companies have greater financial and other resources and development capabilities than we do. Many of our competitors also have greater collective experience in undertaking preclinical and clinical testing of products, obtaining regulatory approvals and manufacturing and marketing prescription pharmaceutical products. There can be no assurance that our under-development drug candidates will be more effective or achieve greater market acceptance than competitive products, or that our competitors will not succeed in developing products and technologies that are more effective than those being developed by us or that would render our products and technologies less competitive or obsolete. Additionally, there can be no assurance that the development by others of new or improved drugs will not make our pharmaceutical products superfluous or obsolete.

***We are a party to collaboration agreements and other significant agreements which contain complex commercial terms that could result in disputes, litigation or indemnification liability that could adversely affect our business, results of operations and financial condition.***

We currently derive, and expect to derive in the foreseeable future, all or much of our revenue from collaboration agreements with biotechnology and pharmaceutical companies. These collaboration agreements contain complex commercial terms, including:

- Clinical development and commercialization obligations that are based on certain commercial reasonableness performance standards that can often be difficult to enforce if disputes arise as to adequacy of our partner's performance;
- Research and development performance and reimbursement obligations for our personnel and other resources allocated to partnered drug candidate development programs;
- Clinical and commercial manufacturing agreements, some of which are priced on an actual cost basis for products supplied by us to our partners with complicated cost allocation formulas and methodologies;
- Intellectual property ownership allocation between us and our partners for improvements and new inventions developed during the course of the collaboration;
- Royalties on drug sales based on a number of complex variables, including net sales calculations, geography, scope of patent claim coverage, patent life, generic competitors, bundled pricing and other factors; and
- Indemnity obligations for intellectual property infringement, product liability and certain other claims.

From time to time, we have informal dispute resolution discussions with third-parties regarding the appropriate interpretation of the complex commercial terms contained in our agreements. One or more disputes may arise or escalate in the future regarding our collaboration agreements, transaction documents, or third-party license agreements that may ultimately result in costly litigation and unfavorable interpretation of contract terms, which would have a material adverse effect on our business, financial condition and results of operations.

***Governments may impose price controls, which may adversely affect our future profitability.***

We intend to seek approval to market our drug candidates in both the United States and in foreign jurisdictions. In some foreign countries and jurisdictions, particularly in the European Union, the pricing of prescription pharmaceuticals is subject to governmental control. In these countries, pricing negotiations with governmental authorities can take considerable time after the receipt of marketing approval for a drug candidate. To obtain reimbursement or pricing approval in some countries, we may be required to conduct clinical trials to compare the cost effectiveness of our drug candidates to other available therapies, which is time consuming and costly. If reimbursement of our future products is unavailable or limited in scope or amount, or if pricing is set at unsatisfactory levels, we may be unable to achieve or sustain profitability.

***Write-offs related to the impairments of our long-lived assets, including goodwill and indefinite-lived intangible assets, and other non-cash charges such as share-based payments may adversely impact our results of operations.***

We may incur significant non-cash charges related to impairments of our long-lived assets, including goodwill and indefinite-lived intangible assets. Although we did not record any such charges during 2018, we are required to perform periodic impairment reviews of those assets at least annually. The carrying value of goodwill on our balance sheet that is subject to impairment reviews was approximately $3.3 million at December 31, 2018 and December 31, 2017 and the carrying value of our indefinite-lived assets was $9.2 million at December 31, 2018 and December 31, 2017. To the extent future reviews conclude that the expected future cash flows generated from our business activities are not sufficient to recover the carrying value of these assets, we will be required to measure and record an impairment charge to write-down these assets to their realizable values and those impairment charges could be equal to the entire carrying value.

We completed our last review during the fourth quarter of 2018 and determined that goodwill and indefinite-lived intangible assets were not impaired as of December 31, 2018. However, there can be no assurance that upon completion of subsequent reviews a material impairment charge will not be recorded. If future periodic reviews determine that our assets are impaired and a write-down is required, it will adversely impact our operating results.

In addition, we recorded non-cash charges of approximately $1.4 million and $1.8 million for share-based expense during the years ended December 31, 2018 and 2017, respectively. In the future, this amount could fluctuate materially as the Company expects to continue to issue share-based payments awards.

***Potential new accounting standards or legislative actions may adversely impact our future financial position or results of operations.***

Future changes in financial accounting standards may cause adverse, unexpected fluctuations in the timing of the recognition of revenues or expenses, and may affect our financial position or results of operations. New standards may occur in the future and may cause us to be required to make changes in our accounting policies. Compliance with changing regulation of corporate governance and public disclosure may result in additional expenses. Changing laws, regulations and standards relating to corporate governance and public disclosure, including the Sarbanes-Oxley Act of 2002, or the Sarbanes-Oxley Act, new SEC regulations, Public Company Accounting Oversight Board, or PCAOB, standards and NASDAQ rules, are creating uncertainty for companies such as ours and insurance, accounting and auditing costs are high as a result of this uncertainty and other factors.

We have limited capital resources and currently have only one full time employee in our finance department. We rely on outside consultants to supplement our internal expertise and are committed to maintaining high standards of corporate governance and public disclosure. As a result, we intend to invest all reasonably necessary resources to comply with evolving standards, and this investment may result in increased general and administrative expenses and a diversion of management time and attention from revenue-generating activities to compliance activities.

***Varying interpretations of existing standards and rules have occurred with frequency and may cause us to have to restate previously reported result of operations.***

Varying interpretations of existing standards of accounting policies or accounting treatments of existing transactions may cause us to have to restate previously reported result of operations.

For example, in January 2014 we completed a transaction that we determined to be a reverse merger business combination. We allocated the purchase price consideration to the assets acquired and liabilities assumed at their estimated fair values as of the date of acquisition. Our determination that the transaction met the criteria for a business combination was based on our best knowledge of the facts and circumstances surrounding the transaction, and required the application of our judgment. Changes to this determination would result in the transaction to be accounted for as a recapitalization, with no goodwill recorded, which could cause a material change in our reported results of operations and could cause the Company to have to amend prior periodic or other filings with the SEC, at further expense to the Company. We may be subject to similar varying interpretations of existing standards of accounting policies or accounting treatments in the future.

In addition, we do not consider the Company to be a development stage entity for financial reporting presentation purposes. A determination that the Company is a development stage entity could cause a material change in our reported results of operations and could cause the Company to have to amend prior periodic or other filings with the SEC, at further expense to the Company.

***Tax reform may significantly affect the Company and its stockholders.***

On December 22, 2017, the TCJA, which significantly reforms the Internal Revenue Code of 1986, as amended (the "Code"), was signed into law. The TCJA, among other things, includes changes to U.S. federal tax rates, including reduction of the corporate tax rate from a top marginal rate of 35% to a flat rate of 21%, limitations of the tax deduction for interest expense to 30% of adjusted earnings (except for certain small businesses), limitations of the deduction for net operating losses ("NOLs") to 80% of current year taxable income and elimination of NOL carrybacks, one time taxation of offshore earnings at reduced rates regardless of whether they are repatriated, elimination of U.S. tax on foreign earnings (subject to certain important exceptions), immediate deductions for certain new investments instead of deductions for depreciation expense over time, modifying or repealing many business deductions and credits and putting into effect the migration from a "worldwide" system of taxation to a territorial system. Notwithstanding the reduction in the corporate income tax rate, the overall impact of the new federal tax law is uncertain and our business and financial condition could be adversely affected. In addition, it is uncertain if and to what extent various states will adjust their policies in response to the newly enacted federal tax law. The impact of this tax reform on holders of our Common Stock is uncertain and could be adverse.

Due to the potential for changes to tax laws and regulations or changes to the interpretation thereof (including regulations and interpretations pertaining to the TCJA), the ambiguity of tax laws and regulations, the subjectivity of factual interpretations and other factors, our estimates of effective tax rate and income tax assets and liabilities may be incorrect and our financial statements could be adversely affected. The impact of these factors referenced in the first sentence of this paragraph may be substantially different from period-to-period.

In addition, the amount of income taxes we pay is subject to ongoing audits by U.S. federal, state and local tax authorities and by non-U.S. tax authorities. If audits result in payments or assessments different from our reserves, our future results may include unfavorable adjustments to our tax liabilities and our financial statements could be adversely affected. Any further significant changes to the tax system in the United States or in other jurisdictions (including changes in the taxation of international income as further described below) could adversely affect our financial statements.

***Our ability to use potential future operating losses and our federal and state NOL carryforwards to offset taxable income from revenue generated from operations or corporate collaborations could be limited.***

The use of our NOL carryforwards may have limitations resulting from certain future ownership changes or other factors under the Code and other taxing authorities. The TCJA changed both the federal deferred tax value of the NOL carryforwards and the rules of utilization of federal NOL carryforwards. The TCJA lowered the corporate tax rate from 35% to 21% effective for our 2018 fiscal year. For NOL carryforwards generated in years prior to 2018, there is no annual limitation on the utilization and the carryforward period remains at 20 years. However, NOL carryforwards generated in years after 2017 will only be available to offset 80% of future taxable income in any single year but will not expire.

If our NOL carryforwards are limited, and we have taxable income which exceeds the available NOL carryforwards for that period, we would incur an income tax liability even though NOL carryforwards may be available in future years prior to their expiration. Any such income tax liability may adversely affect our future cash flow, financial position and financial results.

***Our future success depends on our ability to retain key employees, consultants and advisors and to attract, retain and motivate qualified personnel.***

We are highly dependent on principal members of our executive team and key employees, the loss of whose services may adversely impact the achievement of our objectives. Recruiting and retaining other qualified employees, consultants and advisors for our business, including scientific and technical personnel, will also be critical to our success. There is currently a shortage of skilled executives in our industry, which is likely to continue. As a result, competition for skilled personnel is intense and the turnover rate can be high. We may not be able to attract and retain personnel on acceptable terms given the competition among numerous pharmaceutical and biotechnology companies for individuals with similar skill sets. In addition, failure to succeed in preclinical or clinical studies may make it more challenging to recruit and retain qualified personnel. The inability to recruit or loss of the services of any executive, key employee, consultant or advisor may impede the progress of our research and development objectives.

***We will need to expand our organization and we may experience difficulties in managing this growth, which could disrupt our operations.***

As of December 31, 2018, we had four full-time employees. As we mature, we may need to expand our full-time employee base and to hire more consultants and contractors. Our management may need to divert a disproportionate amount of its attention away from our day-to-day activities and devote a substantial amount of time to managing these growth activities. We may not be able to effectively manage the expansion of our operations, which may result in weaknesses in our infrastructure, operational mistakes, loss of business opportunities, loss of employees and reduced productivity among remaining employees, all of which may have a material adverse effect on our business, results of operations and prospects. Any future growth could require significant capital expenditures and may divert financial resources from other projects, such as the development of additional drug candidates. If our management is unable to effectively manage our growth, our expenses may increase more than expected, our ability to generate and/or grow revenues could be reduced, and we may not be able to implement our business strategy. Our future financial performance and our ability to commercialize drug candidates and compete effectively will depend, in part, on our ability to effectively manage any future growth.

***Our employees, principal investigators, consultants and commercial partners may engage in misconduct or other improper activities, including non-compliance with regulatory standards and requirements and insider trading.***

We are exposed to the risk of fraud or other misconduct by our employees, principal investigators, consultants and commercial partners. Misconduct by these parties could include intentional failures to comply with the regulations of the FDA and non-U.S. regulators, provide accurate information to the FDA and non-U.S. regulators, comply with healthcare fraud and abuse laws and regulations in the United States and abroad, report financial information or data accurately or disclose unauthorized activities to us. In particular, sales, marketing and business arrangements in the healthcare industry are subject to extensive laws and regulations intended to prevent fraud, misconduct, kickbacks, self-dealing and other abusive practices. These laws and regulations may restrict or prohibit a wide range of pricing, discounting, marketing and promotion, sales commission, customer incentive programs and other business arrangements. Such misconduct could also involve the improper use of information obtained in the course of clinical studies, which could result in regulatory sanctions and cause serious harm to our reputation or could cause regulatory agencies not to approve our drug candidates. It is not always possible to identify and deter employee misconduct, and the precautions we take to detect and prevent this activity may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to comply with these laws or regulations. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business, including the imposition of significant fines or other sanctions.

***We face potential product liability, and, if successful claims are brought against us, we may incur substantial liability and costs. If the use of our drug candidates harms patients, or is perceived to harm patients even when such harm is unrelated to our drug candidates, our regulatory approvals could be revoked or otherwise negatively impacted and we could be subject to costly and damaging product liability claims.***

The use of our drug candidates in clinical studies and the sale of any products for which we obtain marketing approval exposes us to the risk of product liability claims. Product liability claims might be brought against us by consumers, healthcare providers, pharmaceutical companies or others selling or otherwise coming into contact with our products. There is a risk that our drug candidates may induce adverse events. If we cannot successfully defend against product liability claims, we could incur substantial liability and costs. In addition, regardless of merit or eventual outcome, product liability claims may result in:

- Impairment of our business reputation;
- Withdrawal of clinical study participants;
- Costs due to related litigation;
- Distraction of management's attention from our primary business;
- Substantial monetary awards to patients or other claimants;
- The inability to commercialize our drug candidates; and
- Decreased demand for our drug candidates, if approved for commercial sale,

all of which may have a material adverse effect on our business, results of operations and prospects.

***If we fail to comply with environmental, health and safety laws and regulations, we could become subject to fines or penalties or incur costs that could have a material adverse effect on the success of our business.***

We are subject to numerous environmental, health and safety laws and regulations, including those governing laboratory procedures and the handling, use, storage, treatment and disposal of hazardous materials and wastes. Our operations involve the use of hazardous and flammable materials, including chemicals and biological materials. Our operations also produce hazardous waste products. We generally contract with third-parties for the disposal of these materials and wastes. We cannot eliminate the risk of contamination or injury from these materials. In the event of contamination or injury resulting from our use of hazardous materials, we could be held liable for any resulting damages, and any liability could exceed our resources. We also could incur significant costs associated with civil or criminal fines and penalties.

The workers' compensation insurance we maintain to cover us for costs and expenses we may incur due to injuries to our employees resulting from the use of hazardous materials or other work-related injuries may not provide adequate coverage against potential liabilities. In addition, we may incur substantial costs in order to comply with current or future environmental, health and safety laws and regulations. These current or future laws and regulations may impair our research, development or production efforts. Failure to comply with these laws and regulations also may result in substantial fines, penalties or other sanctions, which may have a material adverse effect on our business and results of operations.

***Our disclosure controls and procedures may not prevent or detect all errors or acts of fraud.***

We are subject to the periodic reporting requirements of the Exchange Act. Any disclosure controls and procedures or internal controls and procedures, no matter how well-conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met. These inherent limitations include the realities that judgments in decision-making can be faulty, and that breakdowns can occur because of simple error or mistake. Additionally, controls can be circumvented by the individual acts of some persons, by collusion of two or more people or by an unauthorized override of the controls. Accordingly, because of the inherent limitations in our control system, misstatements due to error or fraud may occur and not be detected, which may have material adverse effect on our business and results of operations.

***Failure in our information technology systems, including by cybersecurity attacks or other data security incidents, could significantly disrupt our operations.***

Our operations depend, in part, on the continued performance of our information technology systems. Our information technology systems are potentially vulnerable to physical or electronic break-ins, computer viruses and similar disruptions. Failure of our information technology systems could adversely affect our business, profitability and financial condition.

A successful cybersecurity attack or other data security incident could result in the misappropriation and/or loss of confidential or personal information, create system interruptions, or deploy malicious software that attacks our systems. It is possible that a cybersecurity attack might not be noticed for some period of time. The occurrence of a cybersecurity attack or incident could result in business interruptions from the disruption of our information technology systems, or negative publicity resulting in reputational damage with our clinical trial participants, customers, stockholders and other stakeholders and/or increased costs to prevent, respond to or mitigate cybersecurity events. In addition, the unauthorized dissemination of sensitive personal information or proprietary or confidential information could expose us or other third-parties to regulatory fines or penalties, litigation and potential liability, or otherwise harm our business.

## PROPOSAL ONE

## PROPOSAL ONE: THE TRANSACTION PROPOSAL

On March 4, 2019, the Company announced its agreement to acquire the novel CAR T platform technology, called "XCART," a proximity-based screening platform capable of identifying CAR constructs that can target patient-specific tumor neoantigens, with a demonstrated proof of mechanism in B-cell non-Hodgkin lymphomas. The XCART technology, developed by the Institute in collaboration with IBCH, is believed to have the potential to significantly enhance the safety and efficacy of cell therapy for B-cell lymphomas by generating patient- and tumor-specific CAR T cells.

The XCART technology platform was designed by its originators to utilize an established screening technique to identify peptide ligands that bind specifically to the unique B-cell receptor ("BCR") on the surface of an individual patient's malignant tumor cells. The peptide is then inserted into the antigen-binding domain of a CAR, and a subsequent transduction/transfection process is used to engineer the patient's T cells into a CAR T format which redirects the patient's T cells to attack the tumor. Essentially, the XCART screening platform is the inverse of a typical CAR T screening protocol wherein libraries of highly specific antibody domains are screened against a given target. In the case of XCART screening, the target is itself an antibody domain, and hence highly specific by its nature. The XCART technology creates the possibility of personalized treatment of lymphomas utilizing a CAR with an antigen-binding domain that should only recognize, and only be recognized by, the unique BCR of a particular patient's B-cell lymphoma. An expected result for XCART is limited off-tumor toxicities, such as B-cell aplasia. Xenetic's clinical development program will seek to confirm the early preclinical results, and to demonstrate a more attractive safety profile than existing therapies.

A description of the Transaction Documents and the transactions contemplated thereby are set forth below. Subject to the satisfaction of the closing conditions, the Transaction is expected to close in the first half of 2019.

**The Share Purchase Agreement**

The following includes a summary of the material provisions of the Share Purchase Agreement, a copy of which is attached to this proxy statement/prospectus as Appendix A. This summary may not contain all of the information about the Share Purchase Agreement and Hesperix Acquisition that is important to you. We encourage you to read carefully the Share Purchase Agreement in its entirety, as the rights and obligations of the parties thereto are governed by the express terms of the Share Purchase Agreement and not by this summary or any other information contained in this proxy statement/prospectus.

On the Signing Date, the Company entered into the Share Purchase Agreement with Hesperix, the Sellers, and the Sellers' Representative. Pursuant to the terms and subject to the conditions set forth in the Share Purchase Agreement, the Company has agreed to purchase, and the Sellers have agreed to sell to the Company, all of the issued and outstanding shares of Hesperix in exchange for the Company issuing to Sellers an aggregate of Four Million Eight Hundred Seventy-Five Thousand (4,875,000) shares of Common Stock, regardless of the trading price per share of the Common Stock at the time of the closing.

*Closing*

We are working towards completing the transaction as soon as possible. The closing is required to take place no later than two business days after the last of the conditions set forth in the Share Purchase Agreement (other than those conditions that by their nature are to be satisfied at the closing, but subject to the satisfaction or waiver of those conditions) have been satisfied or, to the extent permissible, waived by the party or parties entitled to the benefit of such conditions, or at such other time or on such other date or at such other place as the Company and Hesperix may mutually agree.

As described below, if the Share Purchase Agreement has not closed on or prior to July 1, 2019, the Share Purchase Agreement may be terminated by the Company or by Sellers' Representative.

*Representations and Warranties*

The Share Purchase Agreement contains representations and warranties made by (a) each Seller to the Company; (b) Hesperix and each Seller to the Company; and (c) by the Company to Sellers. Certain of the representations and warranties in the Share Purchase Agreement are subject to knowledge qualifications, which means that those representations and warranties would not be deemed untrue, inaccurate or incorrect as a result of matters of which any director, managing member, manager, or officer, as may be applicable, of the party making the representation did not and do not have actual knowledge, or the knowledge that such person would have reasonably obtained in the due exercise of care in the performance of their duties to such person without having made any search or investigation. In addition, the representations and warranties contained in the Share Purchase Agreement are subject to specified exceptions and qualifications and the confidential disclosure schedules that Sellers have provided to the Company in connection with signing the Share Purchase Agreement, which such disclosures are not reflected in the Share Purchase Agreement or otherwise publicly disclosed. You should not rely on the representations, warranties, covenants or any description thereof as actual characterizations of the actual state of facts or conditions of the Company, Hesperix, or any of their respective subsidiaries or affiliates. Moreover, the information concerning the subject matter of the representations and warranties may change after the Signing Date. The representations and warranties should not be read alone but, instead, should be read only in conjunction with the information provided elsewhere in this proxy statement/prospectus.

For purposes of the Share Purchase Agreement, a "material adverse effect" with respect to Hesperix means any event, occurrence, fact, condition or change that is, or could reasonably be expected to become, individually or in the aggregate, materially adverse to (a) the business, results of operations, condition (financial or otherwise), or assets of Hesperix and/or its subsidiaries, or (b) the ability of Sellers to consummate the transaction; provided, however, that none "material adverse effect" will not include any event, occurrence, fact, condition or change, directly or indirectly, arising out of or attributable to:

- general economic or political conditions (except such event, occurrence, fact, condition or change will be taken into account in determining whether a material adverse effect has occurred or could reasonably be expected to occur to the extent such event, occurrence, fact, condition or change disproportionately effects Hesperix and/or any of its subsidiaries compared to other companies in the industries in which Hesperix and/or its subsidiaries conduct their respective businesses);
- general conditions affecting the industries in which Hesperix and/or any of its subsidiaries operate (except such event, occurrence, fact, condition or change will be taken into account in determining whether a material adverse effect has occurred or could reasonably be expected to occur to the extent such event, occurrence, fact, condition or change disproportionately effects Hesperix and/or any of its subsidiaries compared to other companies in the industries in which Hesperix and/or its subsidiaries conduct their respective businesses);
- any changes in financial or securities markets in general (except such event, occurrence, fact, condition or change will be taken into account in determining whether a material adverse effect has occurred or could reasonably be expected to occur to the extent such event, occurrence, fact, condition or change disproportionately effects Hesperix and/or any of its subsidiaries compared to other companies in the industries in which Hesperix and/or its subsidiaries conduct their respective businesses);
- acts of war (whether or not declared), armed hostilities or terrorism, or any escalation or worsening thereof (except such event, occurrence, fact, condition or change will be taken into account in determining whether a material adverse effect has occurred or could reasonably be expected to occur to the extent such event, occurrence, fact, condition or change disproportionately effects Hesperix and/or any of its subsidiaries compared to other companies in the industries in which Hesperix and/or its subsidiaries conduct their respective businesses); or
- changes in applicable laws or accounting rules, including the Internal Financial Reporting Standards (the "IFRS") (except such event, occurrence, fact, condition or change will be taken into account in determining whether a material adverse effect has occurred or could reasonably be expected to occur to the extent such event, occurrence, fact, condition or change disproportionately effects Hesperix and/or any of its subsidiaries compared to other companies in the industries in which Hesperix and/or its subsidiaries conduct their respective businesses).

The Share Purchase Agreement contains representations and warranties made by each Seller, severally but not jointly, to the Company relating to a number of matters, including, among other things, the following:

- requisite corporate authority of each Seller, and in the case of any Seller that is an individual, the requisite legal capacity, relating to the execution, delivery and performance of the Share Purchase Agreement and each of the other Transaction Documents, the consummation of the contemplated transactions, and the enforceability of the Share Purchase Agreement and each of the other Transaction Documents;
- the absence of conflicts with, or violations of, organizational documents, contracts or applicable laws as a result of the execution, delivery and performance of the Share Purchase Agreement and each of the other Transaction Documents and the transactions contemplated by the Share Purchase Agreement and each of the other Transaction Documents;
- the number of Shares held and beneficially owned by each Seller, and each such Share being owned free and clear of any encumbrances, subscriptions, commitments and restrictions of any kind; and
- brokers' or similar fees payable in connection with the Hesperix Acquisition.

The Share Purchase Agreement also contains representations and warranties by Hesperix and each Seller, severally but not jointly, made to the Company, relating to a number of matters, including, the following:

- organization, good standing, and qualification to do business of Hesperix;
- requisite corporate authority relating to the execution, delivery and performance of the Share Purchase Agreement and each of the other Transaction Documents, and the consummation of the contemplated transactions and the enforceability of the Share Purchase Agreement and each of the other Transaction Documents;
- capital structure of Hesperix and matters relating to the shares of Hesperix stock being acquired by the Company;
- the organization and existence of any subsidiaries;
- consents and approvals relating to the execution, delivery and performance of the Share Purchase Agreement and each of the other Transaction Documents, including required filings with, and the consents and approvals of, government entities in connection with the transactions contemplated by the Share Purchase Agreement and each of the other Transaction Documents;
- financial statements compliance with the IFRS and fair representation of consolidated financial positions and results of operations of Hesperix and its subsidiaries;
- the ownership of no other assets other than certain patent applications held by Hesperix and no other activities or liabilities other than those contained in the Hesperix Assignment Agreement;
- conduct of business and absence of a material adverse effect since December 31, 2017;
- matters with respect to certain material contracts;
- intellectual property matters;

- compliance with applicable regulatory laws, including anti-bribery and data protection and privacy laws;
- absence of certain litigation, governmental orders, injunctions by or before any governmental entity;
- compliance with applicable law and permits;
- tax matters;
- the books and records of Hesperix and its subsidiaries;
- brokerage, finder's or other fee or commission payable in connection with the Hesperix Acquisition;
- related party transaction matters;
- absence of any untrue statement of material fact or omission to state any material fact necessary to make the statements therein, in light of the circumstances in which they are made, not misleading; and
- the independent investigation, review and analysis of the business, results of operation, and condition of the Company by each Seller.

The Share Purchase Agreement also contains representations and warranties made by the Company to the Sellers relating to a number of matters, including, the following:

- the organization, good standing and qualification to do business of the Company;
- requisite corporate authority relating to the execution, delivery and performance of the Share Purchase Agreement and the consummation of the contemplated transactions and the enforceability of the Share Purchase Agreement;
- the absence of conflicts with, or violations of, organizational documents, contracts or applicable laws as a result of the execution, delivery and performance of the Share Purchase Agreement and the other transactions contemplated by the Share Purchase Agreement;
- broker, finder and investment banker fees payable in connection with the Hesperix Acquisition;
- absence of certain litigation;
- the issuance of the Hesperix Transaction Shares;
- matters relating to the reports, financial statements, schedules, forms, statements and other documents required to be filed by the Company under the Securities Act and the Exchange Act (the "Exchange Act");
- tax matters; and
- the independent investigation, review and analysis of the business, results of operation, and condition of Hesperix by the Company.

Subject to the limitations and other provisions in the Share Purchase Agreement, the representations and warranties in the Share Purchase Agreement will survive the closing and remain in full force and effect until the date that is twenty-four (24) months from the closing date; *provided*, *however*, certain representations and warranties, including, among others, (i) with respect to the Sellers and Hesperix, those relating to the organization and authority of Sellers and Hesperix, conflicts and approvals of third parties, the capitalization of Hesperix and ownership by the Sellers of Hesperix, subsidiaries of Hesperix, no activities or liabilities of Hesperix, the Hesperix intellectual property, brokers and related party transactions (collectively, the "Hesperix Fundamental Representations"), and (ii) with respect to the Company, the organization and authority of the Company, conflicts and approvals of third parties and brokers (collectively the "Company Fundamental Representations" and together with Hesperix Fundamental Representations, the "Fundamental Representations"), all of which will survive indefinitely. If the Share Purchase Agreement is validly terminated, there will be no liability under the representations and warranties of the parties, except with respect to any willful breach or material breach of any provision, or for fraud or criminal misconduct of any party.

*Conduct of Hesperix's Business*

Sellers have agreed as to itself, Hesperix and its subsidiaries that, except as otherwise expressly required by the Share Purchase Agreement or approved in writing by the Company, after the Signing Date, and until the earlier to occur of the termination of the Share Purchase Agreement or the closing of the transactions contemplated thereby, the business of Hesperix and its subsidiaries will be conducted in the ordinary and usual course consistent with past practice and, to the extent consistent therewith, Hesperix and its subsidiaries will use their commercially reasonable efforts to (i) maintain and preserve intact the current organization, business, Hesperix intellectual property and franchise of Hesperix and its subsidiaries, and (ii) maintain the existing relationships and goodwill of Hesperix and its subsidiaries.

In addition to the general covenants above, Sellers have agreed that after the Signing Date, and prior to the earlier of the termination of the Share Purchase Agreement or the closing of the transactions contemplated thereby, except as expressly required by the Share Purchase Agreement or as otherwise approved in writing by the Company (such approval not to be unreasonably withheld or delayed), Sellers will cause Hesperix and/or its subsidiaries to:

- preserve and maintain all of their permits;
- pay all of their debts, taxes and other obligations when due;
- maintain their properties and assets and the intellectually property owned, operated or used by Hesperix and its subsidiaries, in the same condition as they were on the Signing Date, subject to reasonably wear and tear;
- defend and protect their properties and assets from infringement or usurpation;
- perform all their obligations under all contracts relating to or affecting its properties, assets or business;
- maintain their books and records in accordance with past practice;
- comply in all material respects with all applicable laws; and
- not take any action that would cause any of the foregoing changes, events or conditions.

*No Solicitation of Other Bids*

Sellers and Hesperix were required upon the execution of the Share Purchase Agreement to, and to cause its affiliates and representatives to, immediately cease and cause to be terminated any discussions and negotiations with any person, other than the Company, concerning any acquisition proposal.

*Non-competition; Non-solicitation*

For a period of five (5) years commencing on the closing date (the "Restricted Period"), each Seller has agreed to not, and will not permit and of its affiliates to, directly, or indirectly (i) engage in or assist others in engaging in the inventing, developing, use or commercialization of any process or product covered by any claim as filed as part of Hesperix's patents (the "Restricted Business"); (ii) have an interest in any person that engages directly or indirectly in the Restricted Business in any capacity, including as partner, stockholder, member, manager, inventor, employee, or consultant; and (iii) intentionally interfere in any material respect with the business relationships (past or present) of Hesperix, the Company or any of their subsidiaries.

During the Restricted Period, each Seller will not, and will not permit any of its affiliates to, directly or indirectly, hire or solicit any inventor or scientist of Hesperix or any affiliate or any party involved in the creation or development of Hesperix's intellectual property (irrespective of whether any such party performed work on behalf of Hesperix or any affiliate), or interfere with the relationship between any such party and Hesperix or any affiliate or hire any such party who is no longer involved with Hesperix or any affiliate; however, these provisions will not prevent a Seller or affiliate from hiring (i) an inventor or scientist whose employment has been terminated by Hesperix or the Company, or (ii) after 180 days from termination, any inventor or scientist who has terminated his employment with Hesperix or the Company.

IBCH and Pharmsynthez who are each being provided royalties by Hesperix pursuant that certain Assignment Agreement with IBCH, Pharmsynthez, and certain other parties thereto will each execute separate non-competition and non-solicitation agreements at the closing containing the same or similar language (the "Royalty Restrictive Covenant Agreement").

*Other Covenants and Agreements*

The Share Purchase Agreement contains certain other covenants and agreements, including, among others, covenants relating to:

- Hesperix affording the Company reasonable access to Hesperix's intellectual property, premises, books and records as well as information concerning itself and its subsidiaries;
- the resignation of certain officers and managers of Hesperix effective as of the closing upon the prior written request of the Company;
- press releases and public statements relating to the Share Purchase Agreement or the transactions contemplated by the Share Purchase Agreement;
- the availability of Hesperix scientist or inventors for any "road show" and/or presentation;
- the retention of Hesperix's books and records; and
- tax matters.

*Conditions to Each Party's Obligations*

The respective obligations of each of the parties to consummate the transactions contemplated by the Share Purchase Agreement are subject to the satisfaction or waiver at or prior to closing of the following conditions:

- no governmental entity having enacted, issued, promulgated, enforced or entered into any law or any action having been instituted by a governmental entity or order effected, in any case, having the effect of restraining, conditioning, challenging the legality or validity of, or making the transaction contemplated by the Share Purchase Agreement illegal or otherwise prohibited;
- the Company having received approval of its listing application to have the Transaction Shares listed on NASDAQ, subject to official notification;
- the approvals from all governmental authorities required for the consummation of the transactions contemplated by the Share Purchase Agreement;
- the approval by the stockholders of the Company of Proposals 1, 2 and 3; and
- the proxy statement/prospectus becoming effective under the Securities Act and no stop order suspending the effectiveness of the proxy statement/prospectus has been issued by the SEC and no proceedings for that purpose and no similar proceeding in respect of the proxy statement/prospectus have been initiated or, to the knowledge of Buyer, threatened by the SEC.

*Conditions to Obligations of the Company*

The obligations of the Company to consummate the transactions contemplated by the Share Purchase Agreement are also subject to the satisfaction or waiver by the Company at or prior to the closing of the following conditions:

- Hesperix or Sellers, as applicable, have effected the transactions contemplated by the lock-up agreement, duly executed by each of the Sellers and the stockholder's agreement pursuant to which certain stockholders of Hesperix agreed to vote or cause to be voted, or consent or cause to be consented, with respect to the election of the Company's directors;
- other than the Hesperix Fundamental Representations, the representations and warranties of Hesperix and each Seller contained in the Share Purchase Agreement, the representations and warranties of Hesperix and each Seller must be true and correct in all respects (in the case of any representation or warranty qualified by materiality or material adverse effect) or in all material respects (in the case of any representation or warranty not qualified by materiality or material adverse effect), both on the Signing Date and at the closing date with the same effect as though made at and as of such date (except those representations and warranties that address matters only as of a specified date, the accuracy of which would be determined as of that specified date in all respects);
- the Hesperix Fundamental Representations must, both on the Signing Date and at the closing date (except those representations and warranties that address matters only as of a specified date, the accuracy of which shall be determined as of that specified date in all respects), be true and correct in all respects;
- Hesperix and Sellers have each duly performed and complied in all material respects with all agreements, covenants and conditions required by the Share Purchase Agreement and each of the other Transaction Documents to be performed or complied with by them prior to or on the closing date;
- all necessary approvals, consents and waivers shall have been received, and executed counterparts thereof shall have been delivered to the Company in form and substance acceptable to the Company at or prior to the closing;
- there not having occurred any change, event, circumstance or development that individually or in the aggregate, has had or would reasonably be expected to have a material adverse effect between the Signing Date and the closing date;
- the Company's board of directors having received the fairness opinion supporting the enterprise valuation of Hesperix indicated by the consideration paid under the Share Purchase Agreement for the Shares;

- the Company having received adequate financing, as reasonably determined by the Company, whether in the form of a private or public offering of debt or equity securities to fund future working capital obligations of the Company and Hesperix following the closing;
- IBCH having executed the sponsored research agreement and delivered the same to the Company;
- the Royalty Restrictive Covenant Agreements having been executed by the appropriate parties thereto and delivered to the Company;
- the Company having received a certificate on behalf of Hesperix signed by a duly authorized officer of Hesperix and each Seller, that each of the conditions set forth in the Share Purchase Agreement have been satisfied;
- the Company having received a certificate on behalf of Hesperix signed by the secretary of Hesperix, certifying the following: (i) a correct and complete copy of all resolutions duly adopted by the board of directors and shareholders authorizing the execution, delivery and performance of the Share Purchase Agreement and the consummation of the transactions contemplated and (ii) the incumbency of all of the officers of Hesperix executing the Share Purchase Agreement and any document executed and delivered in connection therewith;
- Hesperix delivering to the Company a good standing certificate (or its equivalent) for Hesperix and each of its subsidiaries from the secretary of state or similar governmental authority of the jurisdiction under the laws in which Hesperix and each subsidiary is organized; and
- the OPKO Assignment Agreement and the transactions contemplated thereunder being consummated.

*Conditions to Obligations of Hesperix and each Seller*

The obligations of Hesperix and each Seller to consummate the transactions contemplated by the Share Purchase Agreement is also subject to the satisfaction or waiver by the Seller Representative at or prior to the closing of the following conditions:

- the Company having delivered to the Seller's Representative the Hesperix Transaction Shares;
- other than the Company Fundamental Representations, the representations and warranties of the Company must, both on the Signing Date and at the closing date, be true and correct in all respects (in the case of any representation or warranty qualified by materiality) or in all materials respects (in the case of any representation or warranty not qualified by materiality) (except those representations and warranties that address matters only as of a specified date, the accuracy of which would be determined as of that specified date in all respects);
- the Company Fundamental Representations must be true and correct in all respects on and as of the Signing Date and as of the closing date with the same effect as though made at and as of such date;
- the Company having duly performed and complied in all material respects with all agreements, covenants and conditions required by the Share Purchase Agreement and each of the other transaction documents to be performed or complied with by it prior to or on the closing date;
- Hesperix having received a certificate on behalf of the Company signed by the secretary of the Company, certifying the following: (i) resolutions adopted by stockholders evidencing the Stockholder Approval and (ii) the incumbency of all of the officers of the Company executing the Share Purchase Agreement and any document executed and delivered in connection therewith; and
- Hesperix receiving a certificate on behalf of the Company signed by a duly authorized officer of the Company, that each of the conditions set forth in the Share Purchase Agreement have been satisfied.
- the Company delivering to Dmitry Genkin an amount equal to the outstanding amount actually advanced by Dmitry Genkin under his loan agreement with Hesperix, not to exceed $150,000; and
- the Company financing shall have been completed.

*Indemnification*

From and after the closing, the Sellers will indemnify and defend each of the Company and its affiliates (including Hesperix) and their respective representatives against, and will hold each of them harmless, including the reimbursement for any and all losses, damages, liabilities, awards, including reasonable attorneys' fees and the cost of enforcing any right of indemnification ("Losses"), arising out of, with respect to or by reason of (i) any inaccuracy in or breach of any of the representations or warranties of Hesperix or any Seller contained in the Share Purchase Agreement or in any certificate or instrument delivered by or on behalf of the Company pursuant to the Share Purchase Agreement (other than such representations or warranties relating to taxes as the sole remedy for any such breach are pursuant to such tax covenants contained in the Share Purchase Agreement); (ii) any breach, alleged breach or non-fulfillment of any covenant, agreement or obligation to be performed by Hesperix or any Seller pursuant to the Share Purchase Agreement (other than any breach or violation of, or failure to perform, any covenant, agreement, undertaking or obligation relating to taxes as the sole remedy for any such breach are pursuant to such tax covenants contained in the Share Purchase Agreement); and (iii) any Hesperix indebtedness and transaction expenses to the extent not paid at closing.

From and after the closing, the Company will indemnify and defend Sellers and its affiliates and their respective representatives against, and will hold each of them harmless, including the reimbursement for all Losses, arising out of, with respect to or by reason of (i) any inaccuracy in or breach of any of the representations or warranties of the Company contained in the Share Purchase Agreement or in any certificate or instrument delivered by or on behalf of the Company pursuant to the Share Purchase Agreement; or (ii) any breach, alleged breach or non-fulfillment of any covenant, agreement or obligation to be performed by the Company pursuant to the Share Purchase Agreement.

The indemnification provided for in the Share Purchase Agreement are subject to the following limitations:

- Sellers will not be liable to the Company indemnitees for indemnification until the aggregate amount of all Losses under the Share Purchase Agreement exceeds Fifty Thousand Dollars ($50,000), in which event Seller will be required to pay or be liable for all such Losses in excess of Fifty Thousand Dollars ($50,000) (except such limitation shall not apply to Losses based upon, arising out of, or by reason of (i) any inaccuracy in or breach of any Hesperix Fundamental Representations; or (ii) intentional breach, intentional misrepresentation, criminal misconduct or fraud). The total aggregate amount of all Losses for which Sellers will be liable under the Share Purchase Agreement will not exceed fifteen percent (15%) of the Hesperix Transaction Shares, based on the volume weighted average closing trading price of the Common Stock over a ten day period (the "Closing Price") (except such limitation shall not apply to Losses based upon, arising out of, or by reason of (i) any inaccuracy in or breach of any Hesperix Fundamental Representations; or (ii) intentional breach, intentional misrepresentation, criminal misconduct or fraud).
- The Company will not be liable to the Seller indemnities for indemnification under the Share Purchase Agreement until the aggregate amount of all Losses exceeds Fifty Thousand Dollars ($50,000), in which event the Company will be required to pay or be liable for all such Losses in excess of Fifty Thousand Dollars ($50,000) (except such limitation shall not apply to Losses based upon, arising out of, or by reason of (i) any inaccuracy in or breach of any Company Fundamental Representations; or (ii) intentional breach, intentional misrepresentation, criminal misconduct or fraud). The total aggregate amount of all Losses for which the Company will be liable under the Share Purchase Agreement will not exceed fifteen percent (15%) of the Hesperix Transaction Shares, based on the Closing Price (except such limitation shall not apply to Losses based upon, arising out of, or by reason of (i) any inaccuracy in or breach of any Company Fundamental Representations; or (ii) intentional breach, intentional misrepresentation, criminal misconduct or fraud).

*Termination of the Share Purchase Agreement*

The Share Purchase Agreement may be terminated at any time prior to the closing:

- by mutual written consent of the Company and Sellers' Representative;
- by the Company, subject to certain conditions, if: (i) any of the representations and warranties of Hesperix or any Seller fails to be true and correct as of the date made; or (ii) there is a breach by Hesperix or any Seller of any covenant or agreement of Hesperix or any Seller that is not curable or, if curable, is not cured within the cure period;
- by the Company, subject to certain conditions, if any of the conditions set forth in the Share Purchase Agreement of Hesperix or any Seller to effect the closing will not have been, or becomes apparent that any such condition will not be, fulfilled by July 1, 2019, unless such failure is due to the failure of the Company to perform or comply with any of the covenants, agreements or conditions therein;
- by Sellers' Representative, subject to certain conditions, if: (i) any of the representations and warranties of the Company fails to be true and correct as of the date made; or (ii) there is a breach by the Company of any covenant or agreement of the Company that is not curable or, if curable, is not cured within the cure period;
- by Sellers' Representative, subject to certain conditions, if any of the conditions set forth in the Share Purchase Agreement of the Company to effect the closing will not have been, or becomes apparent that any such condition will not be, fulfilled by July 1, 2019, unless such failure is due to the failure of Hesperix or any Seller to perform or comply with any of the covenants, agreements or conditions therein; or
- by the Company or Sellers' Representative in the event that (i) there is any law that makes the consummation of the transactions contemplated by the Share Purchase Agreement illegal or otherwise prohibited, or (ii) any governmental authority has issued a governmental order (that is final and non-appealable) restraining or enjoining the transactions contemplated by the Share Purchase Agreement.

*Effect of Termination*

If the Share Purchase Agreement is terminated, the Share Purchase Agreement will become void and of no effect with no liability to any person on the part of any party except that the provisions of the Share Purchase Agreement relating to termination and certain technical provisions will continue in effect. The effect of the termination of the Share Purchase Agreement will not relieve any party from any liability for any willful breach or material breach of any provision therein, or for fraud or criminal misconduct.

*Amendments and Waivers*

Subject to the limitations of the Share Purchase Agreement, the Share Purchase Agreement may be amended or modified by a written instrument executed by the Company and the Sellers' Representative on behalf of the Sellers, or in the case of a waiver, any such extension or waiver will be valid only if set forth in an instrument in writing signed by Buyer or Sellers' Representative on behalf of Sellers, as the case may be.

*Specific Performance*

If for any reason any of the provisions of the Share Purchase Agreement are not performed in accordance with their specific terms or are otherwise breached or threatened to be breached, each party to the Share Purchase Agreement will be entitled to seek equitable relief, including an injunction or injunctions or orders for specific performance to prevent breaches of the Share Purchase Agreement and to enforce specifically the terms and provisions of the Share Purchase Agreement, in addition to any other remedy such party would be entitled to at law or in equity as a remedy for any such breach or threatened breach.

**The Hesperix Assignment Agreement**

Upon completion of the Hesperix Acquisition, Hesperix will be a wholly-owned subsidiary of the Company and as such, the Company will assume the rights and obligations of the Hesperix Assignment Agreement. The following includes a summary of the material provisions of the Hesperix Assignment Agreement, a copy of which is attached to this proxy statement/prospectus as Appendix B. This summary may not contain all of the information about the Hesperix Assignment Agreement and related transactions that is important to you. We encourage you to read carefully the Hesperix Assignment Agreement in its entirety, as the rights and obligations of the parties thereto are governed by the express terms of the Hesperix Assignment Agreement and not by this summary or any other information contained in this proxy statement/prospectus. Certain portions of the exhibit have been omitted pursuant to a confidential treatment request. Omitted information has been filed separately with the SEC.

On the Signing Date, Hesperix entered into the Hesperix Assignment Agreement with Alexey Vyacheslavovich Stepanov, Alexander Gabibovich Gabibov, Ivan Vitalievich Smirnov, Dmitry Dmitrievich Genkin, Richard A. Lerner, Alexey Anatolievich Belogurov, Alexey Vinogradov, IBCH, and Pharmsynthez (Stepanov, Gabibov, Genkin, Belogurov, and Pharmsynthez, collectively "Assignors"). Pursuant to the terms and subject to the conditions set forth in the Hesperix Assignment Agreement, Assignors have agreed, among other things, to sell, assign, transfer, and convey unto Hesperix all of their individual right, title, and interest throughout the world in and to the following patents relating to the "Articles And Methods Directed To Personalized Therapy Of Cancer," (the "Assignor Patent Rights") and the related know-how: (i) RU2017134483 filed October 4, 2017 (C1256.70030RU00); (ii) RU2018112009 filed April 4, 2018 (C1256.70031RU00); (iii) RU2018134321 filed October 1, 2018 (C1256.70033RU00); and (iv) PCT/RU2018/000653 filed October 4, 2018 (C1256.70030WO00), in exchange for Hesperix paying each of IBCH and Pharmsynthez a running royalty in the low single digit range based on net sales of products in each country in which, in absence of the Hesperix Assignment Agreement, the manufacture, use, offer for sale, sale, or importation of such product would infringe a valid claim of an issued patent; provided, that the running royalty would be reduced by one half (1/2) in each country in which, the manufacture, use, offer for sale, sale or importation of such product would infringe a valid claim of a pending patent application, if such claim were a claim of an issued patent.

*Assignments; Certain Representations*

Prior to the Hesperix Assignment Effective Date, each of Stepanov, Gabibov and Belogurov will have granted to IBCH an irrevocable assignment of certain patents owned by each relating to the Assignor Patent Rights and Genkin will have granted to Pharmsynthez an irrevocable assignment of certain Assignor Patent Rights owned by him.

Collectively, the Assignors own all right, title, and interest, throughout the word in all inventions in and to the Assignor Patent Rights and the related know-how, free and clear of all liens or other encumbrances of any nature whatsoever other than those rights, title and interests that the Institute has in the Assignor Patent Rights and related know-how (the "Institute Rights"). Subject to the terms and the conditions set forth in the Hesperix Assignment Agreement, Hesperix will purchase all of the Assignor's collective rights, title, interests in and to the Assignor Patent Rights, and each Assignor will irrevocably, sell, assign, transfer, and convey unto Hesperix all of their individual right, title, and interest throughout the world in and to the Assignor Patent Rights and related know-how (including the right to sue for past infringement), including any patent application whether conventional, design, divisional, continuation, continuation-in-part, and continued prosecution applications, requests for continued examination, substitutions, patents of additions, reissues, renewals, or re-exams thereof, and in and to all inventions, preparatory to obtaining Letters Patent of the United States and patents throughout the world.

In addition, Assignors have each authorized the United States Commissioner of Patents and Trademarks, and will request that all patent authorities throughout the world, to issue any and all patents, including in or resulting from the Assignor Patent Rights, to Hesperix for its interest and for the sole use and benefit of Hesperix and its assigns and representative, in each case provided that the parties acknowledge and agree that their respective rights, title, interests and obligations pursuant to the assignment and the Hesperix Assignment Agreement are subject to the rights of the United States government, which may arise from the Institute's and the Institute's assignors receipt of research support from the United States government.

*No Other Technology Rights*

Each of the parties to the Hesperix Assignment Agreement have agreed that the Hesperix Assignment Agreement does not grant any party thereto any license, covenant, or other right in the intellectual property of any other party other than as expressly provided in the Hesperix Assignment Agreement.

*Further Acts; Cooperation*

Each Assignor has agreed, at no further cost or expense to Hesperix other than as provided by the Hesperix Assignment Agreement, that he/she/it will undertake all legal acts at any time necessary to:

- vest all right, title, and interest in the Assignor Patent Rights and know-how in Hesperix or Hesperix's designee;
- enable Hesperix or Hesperix's designee to prosecute the patents and to issue patents from the Assignor Patent Rights;
- enable Hesperix or Hesperix's designee to enforce the Assignor Patent Rights against any infringers or to defend against any challenges to the validity or enforceability of the Assignor Patent Rights; and
- do all other acts as any be reasonable or necessary to satisfy the intent of the parties of the Hesperix Assignment Agreement.

The Assignors have also agreed to cooperate with Hesperix and its counsel in connection with prosecuting and maintaining the Assignor Patent Rights by providing all pertinent information and data with respect to the Assignor Patent Rights, assisting in reviewing and responding to any actions issued by any patent office, and executing applications, specifications, declarations, and all similar instruments which Hesperix may deem necessary.

*Running Royalties*

In consideration of the assignments by IBCH and Pharmsynthez of the Assignor Patent Rights and subject to the terms and conditions of the Hesperix Assignment Agreement, Hesperix has agreed to pay each of IBCH and Pharmsynthez during the term of the Hesperix Assignment Agreement, a running royalty rate in the low single-digit range based on the net sales of any active pharmaceutical, chemical or biological ingredient, or any component thereof disclosed in an Assignor Patent Right or encompassed by the claims of the Assignor Patent Rights (the "Product"), in each country in which the absence of the Hesperix Assignment Agreement, the manufacture, use, offer for sale, sale, or importation of the Product would infringe on a claim of an issued and unexpired patent or a claim of a pending patent application within the Assignor Patent Rights which has not been held un-patentable, invalid or unenforceable by a court or other government agency of competent jurisdiction (a "Valid Claim"). The running royalty to each of IBCH and Pharmsynthez, would be reduced by one half in each country in which, the manufacture, use, offer for sale, sale or importation of such product would infringe a valid claim of a pending patent application, if such claim were a claim of an issued patent. The running royalty to each of IBCH and Pharmsynthez would be further reduced for any royalty term in which neither of the foregoing running royalty rates applicable. The running royalty rate will be paid only once for each unit of Product no matter how many times such unit is sold or how many Assignor Patent Rights, absent of the Hesperix Assignment Agreement, would be infringed by the manufacture, use, offer for sale, sale, or importation of such Product.

*Royalty Term*

The running royalties due under the Hesperix Assignment Agreement will commence on the Signing Date through, Product-by-Product and country-by-country bases, the later of (i) the expiration of the last-to-expire Assignor Patent Right, a Valid Claim of which, absent the Hesperix Assignment Agreement, be infringed by the manufacture, use, offer for sale, sale or import of a Product, or (ii) ten (10) years from the date of first commercial sale by Hesperix or any licensee of any of Hesperix's right, title or interest in the Assignor Patent Rights to a third party.

*Royalty Payments and Reports*

The running royalties under the Hesperix Assignment Agreement will be due forty-five (45) calendar days after the end of each calendar quarter. Each payment of the running royalty will be accompanied by a report setting forth, on a Product-by-Product and country-by-country bases, the amount of gross sales of each Product, a calculation of corresponding net sales and the information used to make such calculation, the currency conversion rate used, if applicable, the United States dollar equivalent of such net sales, and a calculation of the royalty payment due on the such net sales.

*Interest on Late Payments*

Any payments or portions due under the Hesperix Assignment Agreement which are not paid when such payment is due will bear interest at the lower of (a) the U.S. Prime Rate in effect on the due date plus one (1) percentage point, or (b) the maximum rate permitted by applicable law, calculated on the number of calendar days such payment is delinquent.

*Currency*

The royalty payments due under the Hesperix Assignment Agreement will be paid in U.S. dollars by bank wire transfer of immediately available funds to such bank account as designated in writing by IBCH and Pharmsynthez.

*Other Agreements regarding Payments and Payment Terms*

The Hesperix Assignment Agreement contains certain other agreements relating to the payment and payments terms of the running royalty, including, among others, agreements relating to:

- IBCH and Pharmsynthez being responsible for any and all of their respective income or other similar taxes owed by them and required by applicable law to be withheld or deducted from any payments made by or on behalf of Hesperix to each of them;
- IBCH and Pharmsynthez agreeing to take all lawful acts and sign all lawful deeds and documents as may be reasonably requested to enable Hesperix, IBCH, and Pharmsynthez to take advantage of any applicable legal provision or double taxation treaties;
- Hesperix agreeing to maintain complete and accurate books, records, and accounts used for the determination of expenses, deductions, credits or other relevant factors in connection with the calculation of the net sales;
- Hesperix agreeing to allow IBCH and Pharmsynthez the right to have an independent certified public accounting firm have access during normal business hours, and upon reasonable prior written notice, to the records of Hesperix as such independent certified public accounting firm deems reasonably necessary to verify the accuracy of the calculation of net sales by Hesperix; and
- Hesperix agreeing to promptly making any such additional payments owed to IBCH or Pharmsynthez as of the result of any audit.

*Allocation of Shares in Hesperix*

Each of Hesperix, Gabibov, Stepanov, Smirnov, Belogurov, Genkin, Vinogradov, and Lerner have agreed that upon executing the Hesperix Assignment Agreement, to reallocate the ownership of all the issued and outstanding shares of Hesperix in all classes, whether by issuance of additional shares or otherwise, in which Gabibov, Stepanov, Smirnov, Belogurov, Genkin, Vinogradov, and Lerner will receive approximately 12.3%, 4.6%, 3.1%, 3.1%, 23.1%, 46.1%, and 7.7% of the issued and outstanding shares of Hesperix, respectively. These Hesperix shares will be exchanged pro rata and on a one-for-one basis for the Hesperix Transaction Shares upon closing of the Hesperix Acquisition.

*Representations and Warranties*

The Hesperix Assignment Agreement contains representations and warranties made by Hesperix to the other parties relating to a number of matters, including, the following:

- the organization, good standing and qualification to do business;
- requisite corporate authority relating to the execution, delivery and performance of the Share Purchase Agreement, the consummation of the contemplated transactions;
- the enforceability of the Hesperix Assignment Agreement against Hesperix in accordance with its terms, except to the extent enforceability is limited by bankruptcy, insolvency or similar laws affecting creditors rights and remedies or equitable principals;
- the performance of Hesperix's obligations under the Hesperix Assignment Agreement will not conflict with its organizational documents, as amended, and will not result in a breach of any material agreement to which it is party; and
- Hesperix not have entering and will not be entering into any material agreements that would be inconsistent with its obligations under the Hesperix Assignment during the term of the Hesperix Assignment Agreement.

The Hesperix Assignment Agreement also contains representations and warranties made by each Assignor to the other parties relating to a number of matters, including, the following:

- the requisite legal capacity, relating to the execution, delivery and performance of the Hesperix Assignment Agreement, and the enforceability of the Hesperix Assignment Agreement;
- to the knowledge of such Assignor, the making, having made, using, or selling or products claimed in the Assignor Patent Rights as of the Hesperix Assignment Effective Date, or the practicing of any technology or inventions claimed in the Assignor Patent Rights as of the Hesperix Assignment Effective Date, will not infringe any patent or any other right of any third party (other than the Institute Rights) or contribute to the infringement of other rights of any Third Party (other than the Institute Rights) in the United States or elsewhere;
- with respect to Stepanov, Gabibov, and Belogurov, each of their assignments to IBCH of their right, title, and interest in to the Assignor Patent Rights is valid and binding;
- with respect to Genkin, his assignment to Pharmsynthez of his right, title, and interest in and to the Assignor Patent Rights is valid and binding;
- with respect to Lerner, his assignment to the Institute of his right, title, and interest in and to the Assignor Patent Rights is valid and binding;
- the enforceability of the Hesperix Assignment Agreement against Hesperix in accordance with its terms, except to the extent enforceability is limited by bankruptcy, insolvency or similar laws affecting creditors rights and remedies or equitable principals;
- the performance of such Assignor's obligations under the Hesperix Assignment Agreement will not result in a breach of any material agreement to which such Assignor is party to; and
- each Assignor not having entered and will not be entering into any material agreements that would be inconsistent with its obligations under the Hesperix Assignment Agreement during the term of the Hesperix Assignment Agreement.

The Hesperix Assignment Agreement also contains representations and warranties made by IBCH to the other parties relating to a number of matters, including, the following:

- the organization, good standing and qualification to do business;
- to the knowledge of IBCH, it does not own any patents or patent applications other than its ownership interest in the Assignor Patent Rights that would be infringed by the making, having made, using or selling of products claimed in the Assignor Patent Rights as of the Hesperix Assignment Effective Date;
- to the knowledge of IBCH, the making, having made, using, or selling or products claimed in the Assignor Patent Rights as of the Hesperix Assignment Effective Date, or the practicing of any technology or inventions claimed in the Assignor Patent Rights as of the Hesperix Assignment Effective Date, will not infringe any patent or any other right of any third party (other than the Institute Rights) or contribute to the infringement of other rights of any Third Party (other than the Institute Rights) in the United States or elsewhere;
- to the knowledge of IBCH, IBCH is unaware of any inventions that were invented or may be invented by members of its faculty, or other employees, other than the Assignors;
- requisite corporate authority relating to the execution, delivery and performance of the Share Purchase Agreement, the consummation of the contemplated transactions;
- the enforceability of the Hesperix Assignment Agreement against IBCH in accordance with its terms, except to the extent enforceability is limited by bankruptcy, insolvency or similar laws affecting creditors rights and remedies or equitable principals;
- the performance of IBCH's obligations under the Hesperix Assignment Agreement will not conflict with its organizational documents, as amended, and will not result in a breach of any material agreement to which it is party; and
- IBCH not having entered and will not be entering into any material agreements that would be inconsistent with its obligations under the Hesperix Assignment during the term of the Hesperix Assignment Agreement.

The Hesperix Assignment Agreement also contains representations and warranties made by Pharmsynthez to the other parties relating to a number of matters, including, the following:

- the organization, good standing and qualification to do business;
- to the knowledge of Pharmsynthez, it does not own any patents or patent applications other than its ownership interest in the Assignor Patent Rights that would be infringed by the making, having made, using or selling of products claimed in the Assignor Patent Rights as of the Hesperix Assignment Effective Date;
- to the knowledge of Pharmsynthez, the making, having made, using, or selling or products claimed in the Assignor Patent Rights as of the Hesperix Assignment Effective Date, or the practicing of any technology or inventions claimed in the Assignor Patent Rights as of the Hesperix Assignment Effective Date, will not infringe any patent or any other right of any third party (other than the Institute Rights) or contribute to the infringement of other rights of any Third Party (other than the Institute Rights) in the United States or elsewhere;
- to the knowledge of Pharmsynthez, Pharmsynthez is unaware of any inventions that were invented or may be invented by its employees, other than the Assignors;
- requisite corporate authority relating to the execution, delivery and performance of the Share Purchase Agreement, the consummation of the contemplated transactions;
- the enforceability of the Hesperix Assignment Agreement against Pharmsynthez in accordance with its terms, except to the extent enforceability is limited by bankruptcy, insolvency or similar laws affecting creditors rights and remedies or equitable principals;
- the performance of Pharmsynthez's obligations under the Hesperix Assignment Agreement will not conflict with its organizational documents, as amended, and will not result in a breach of any material agreement to which it is party; and
- Pharmsynthez not having entered and will not be entering into any material agreements that would be inconsistent with its obligations under the Hesperix Assignment during the term of the Hesperix Assignment Agreement.

*Warranty Disclaimer*

Except as expressly set forth in the Hesperix Assignment Agreement, no party thereto has made any representations or extends any warranties of any kind, either express or implied, including any express or implied warranties of merchantability or fitness for a particular purpose with respect to the Assignor Patent Rights, technology, or any materials or information provided with respect to any Product or services.

*Limitation of Liability*

Except for any breach of confidentiality, no party to the Hesperix Assignment Agreement will be liable to any other party for special, indirect, incidental, or punitive damages, or consequential damages, including damages resulting from loss of use, loss of profits, or interruption or loss of business or other similar economic loss arising out of the Hesperix Assignment Agreement or with a party's performance or non-performance of its obligations under the Hesperix Assignment Agreement.

*Termination without Cause*

Hesperix may exclusively terminate the Hesperix Assignment Agreement with any or all parties thereto without cause immediately upon written notice to the appropriate party(ies). No other party will be able to terminate the Hesperix Assignment Agreement without cause.

*Termination for Financial Reasons*

To the extent permitted by applicable law, upon the filing or institution of bankruptcy, reorganization, liquidation or receivership proceedings by and party to the Hesperix Assignment Agreement, Hesperix may terminate the Hesperix Assignment Agreement, provided, that, in the case of an involuntary bankruptcy, the right to terminate will only become effective if the subject party consents to the involuntary bankruptcy or such proceeding is not dismissed within ninety (90) days after the filing thereof.

*Assignment*

Under the Hesperix Assignment Agreement, Hesperix will have the right to assign the Hesperix Assignment Agreement, without the consent of any other Party, to (i) any Affiliate; (ii) any successor in interest by reason of any merger, acquisition, partnership, or license agreement, or (iii) any other third party, where the assignee would succeed to such rights and would assume the obligations of Hesperix under the Hesperix Assignment Agreement to the same extent if such assignee was an original party to the Hesperix Assignment Agreement.

**The OPKO Assignment Agreement**

The following includes a summary of the material provisions of the OPKO Assignment Agreement, a copy of which is attached to this proxy statement/prospectus as Appendix C. This summary may not contain all of the information about the OPKO Assignment Agreement and related transactions that is important to you. We encourage you to read carefully the OPKO Assignment Agreement in its entirety, as the rights and obligations of the parties thereto are governed by the express terms of the OPKO Assignment Agreement and not by this summary or any other information contained in this proxy statement/prospectus.

On the Signing Date the Company entered into the OPKO Assignment Agreement with OPKO. Pursuant to the terms and subject to the conditions set forth in the OPKO Assignment Agreement, the Company has agreed to acquire and accept, all of OPKO's right, title, and interest in and to that certain Intellectual Property License Agreement (the "IP License Agreement"), entered into between the Institute and OPKO regarding certain patents related to "Articles And Methods Directed To Personalized Therapy of Cancer" and pursuant to which the Institute agreed to grant an exclusive royalty-bearing license, to the patent rights owned by the Institute to OPKO and OPKO has agreed to pay the Institute a running royalty in the low single-digit range based on net sales of products in each country in which, in absence of the IP License Agreement, the manufacture, use, offer for sale, sale, or importation of such product would infringe a valid claim of a patent or pending application.

Under the terms of the OPKO Assignment Agreement, the Company will issue to OPKO the OPKO Transaction Shares, and to the Institute the Institute Transaction Shares, regardless of the trading price per share of the Common Stock at the time of the closing.

*Closing*

We are working towards completing the transaction as soon as possible. The closing is required to take place no later than two business days after the last of the conditions set forth in the OPKO Assignment Agreement (other than those conditions that by their nature are to be satisfied at the closing, but subject to the satisfaction or waiver of those conditions) have been satisfied or, to the extent permissible, waived by the party or parties entitled to the benefit of such conditions, or at such other time or on such other date or at such other place as the Company and OPKO may mutually agree.

As described below, if the OPKO Assignment Agreement has not closed on or prior to July 1, 2019, the OPKO Assignment Agreement may be terminated by the Company or by OPKO.

*Representations and Warranties*

The OPKO Assignment Agreement contains representations and warranties made by, on the one hand, OPKO to the Company, and on the other hand, by the Company to OPKO. Certain of the representations and warranties in the OPKO Assignment Agreement are subject to knowledge qualifications, which means that those representations and warranties would not be deemed untrue, inaccurate or incorrect as a result of matters of which the Chief Patent Counsel or its executive officers, as may be applicable, did not and do not have actual knowledge. In addition, the representations and warranties contained in the OPKO Assignment Agreement are subject to specified exceptions and qualifications in connection with signing the OPKO Assignment Agreement, which such disclosures are not reflected in the OPKO Assignment Agreement or otherwise publicly disclosed. You should not rely on the representations, warranties, covenants or any description thereof as actual characterizations of the actual state of facts or conditions of the Company, OPKO, or any of their respective subsidiaries or affiliates. Moreover, the information concerning the subject matter of the representations and warranties may change after the Signing Date. The representations and warranties should not be read alone but, instead, should be read only in conjunction with the information provided elsewhere in this proxy statement/prospectus.

For purposes of the OPKO Assignment Agreement, a “material adverse effect” with respect to OPKO means any event, occurrence, fact, condition or change that is, or could reasonably be expected to become, individually or in the aggregate, materially adverse to the IP License Agreement or the OPKO intellectual property licensed thereunder, or the ability of OPKO to consummate the transaction; provided, however, that none of the following, will be deemed to constitute a material adverse effect nor be considered in determining whether a material adverse effect has occurred:

- changes in economic or political conditions (except such event, occurrence, fact, condition or change will be taken into account in determining whether a material adverse effect has occurred or could reasonably be expected to occur to the extent such event, occurrence, fact, condition or change disproportionately effects OPKO and/or any of its subsidiaries compared to other companies in the industries in which OPKO and/or its subsidiaries conduct their respective businesses);

- general conditions affecting the industries in which OPKO and/or any of its Subsidiaries conduct their respective businesses (except such event, occurrence, fact, condition or change will be taken into account in determining whether a material adverse effect has occurred or could reasonably be expected to occur to the extent such event, occurrence, fact, condition or change disproportionately effects OPKO and/or any of its subsidiaries compared to other companies in the industries in which OPKO and/or its subsidiaries conduct their respective businesses);
- any changes in financial or securities markets in general (except such event, occurrence, fact, condition or change will be taken into account in determining whether a material adverse effect has occurred or could reasonably be expected to occur to the extent such event, occurrence, fact, condition or change disproportionately effects OPKO and/or any of its subsidiaries compared to other companies in the industries in which OPKO and/or its subsidiaries conduct their respective businesses);
- any acts of war (whether or not declared), armed hostilities or terrorism, or any escalation or worsening thereof (except such event, occurrence, fact, condition or change will be taken into account in determining whether a material adverse effect has occurred or could reasonably be expected to occur to the extent such event, occurrence, fact, condition or change disproportionately effects OPKO and/or any of its subsidiaries compared to other companies in the industries in which OPKO and/or its subsidiaries conduct their respective businesses); or
- changes in applicable laws or accounting rules, (except such event, occurrence, fact, condition or change will be taken into account in determining whether a material adverse effect has occurred or could reasonably be expected to occur to the extent such event, occurrence, fact, condition or change disproportionately effects OPKO and/or any of its subsidiaries compared to other companies in the industries in which OPKO and/or its subsidiaries conduct their respective businesses).

The OPKO Assignment Agreement contains representations and warranties by OPKO, made to the Company, relating to a number of matters, including, the following:

- the organization and requisite corporate authority relating to the execution, delivery and performance of the OPKO Assignment Agreement, and the consummation of the contemplated transactions and the enforceability of the OPKO Assignment Agreement;
- consents and approvals relating to the execution, delivery and performance of the OPKO Assignment Agreement, including required filings with, and the consents and approvals of, government entities in connection with the transactions contemplated by the OPKO Assignment Agreement;
- intellectual property matters, including the intellectual property licensed to OPKO pursuant to the IP License Agreement;
- absence of certain litigation, governmental orders, injunctions by or before any governmental entity;
- compliance with applicable law and permits;
- absence of any untrue statement of material fact or omission to state any material fact necessary to make the statements therein, in light of the circumstances in which they are made, not misleading;
- the independent investigation, review and analysis of the business, results of operation, and condition of the Company; and
- customary investor representations.

The OPKO Assignment Agreement also contains representations and warranties made by the Company to OPKO relating to a number of matters, including, the following:

- the organization, good standing and qualification to do business;
- requisite corporate authority relating to the execution, delivery and performance of the OPKO Assignment Agreement and the consummation of the contemplated transactions and the enforceability of the OPKO Assignment Agreement;
- the absence of conflicts with, or violations of, organizational documents, contracts or applicable laws as a result of the execution, delivery and performance of the OPKO Assignment Agreement and the other transactions contemplated by the OPKO Assignment Agreement;
- broker, finder and investment banker fees payable in connection with the transaction;
- absence of certain litigation;
- the issuance of the OPKO Transaction Shares;
- matters relating to the reports, financial statements, schedules, forms, statements and other documents required to be filed by the Company under the Exchange Act;
- tax matters; and
- the independent investigation, review and analysis of the business, results of operation, and condition of OPKO by the Company.

Subject to the limitations and other provisions in the OPKO Assignment Agreement, the representations and warranties in the OPKO Assignment Agreement will survive the closing and remain in full force and effect until the date that is eighteen (18) months from the closing date; *provided*, *however*, certain representations and warranties, including, among others, those relating to the organization and authority of OPKO and the Company and conflicts and approvals of third parties and issuance of OPKO Transaction Shares will survive indefinitely. If the OPKO Assignment Agreement is validly terminated, there will be no liability under the representations and warranties of the parties, except with respect to any willful breach or material breach of any provision, or for fraud or criminal misconduct of any party.

*Conduct of OPKO's Business*

OPKO has agreed as to itself and its subsidiaries that, except as otherwise expressly required by the OPKO Assignment Agreement or approved in writing by the Company, after the Signing Date, and until the earlier to occur of the termination of the OPKO Assignment Agreement or the closing of the transactions contemplated thereby, OPKO and its subsidiaries will (i) maintain and preserve intact the IP License Agreement and the licensed intellectual property (without any amendments thereto or modifications thereof) and any permits therewith; (ii) pay any obligations thereunder when due; (iii) defend and protect their properties and assets relating to the IP License Agreement and the licensed intellectual property from infringement or usurpation; and (iv) comply in all material respects with all applicable laws relating to the IP License Agreement and the licensed intellectual property.

*Conditions to Each Party's Obligations*

The respective obligations of each of the parties to consummate the transactions contemplated by the OPKO Assignment Agreement are subject to the satisfaction or waiver at or prior to closing of the following conditions:

- no governmental entity having enacted, issued, promulgated, enforced or entered into any law or any action having been instituted by a governmental entity or order effected, in any case, having the effect of restraining, conditioning, challenging the legality or validity of, or making the transaction contemplated by the OPKO Assignment Agreement illegal or otherwise prohibited;
- the Company having received approval of its listing application to have the OPKO Transaction Shares listed on NASDAQ, subject to official notification;
- the approvals from all governmental authorities required for the consummation of the transactions contemplated by the OPKO Assignment Agreement;
- the receipt of the Stockholder Approval; and
- the proxy statement/prospectus becoming effective under the Securities Act.

*Conditions to Obligations of the Company*

The obligations of the Company to consummate the transactions contemplated by the OPKO Assignment Agreement are also subject to the satisfaction or waiver by the Company at or prior to the closing of the following conditions:

- OPKO has effected the transactions contemplated by (i) the lock-up agreement, duly executed by OPKO, which includes OPKO agreeing to vote or cause to vote or consenting or causing to be consented, with respect to the election of directors, and (ii) the confirmatory assignment;
- certain representations and warranties of OPKO with respect to its licensed intellectual property, legal proceedings and compliance with laws and permits, contained in the OPKO Assignment Agreement, the other transaction documents and any certificate or other writing delivered pursuant to the OPKO Assignment Agreement must be true and correct in all respects (in the case of any representation or warranty qualified by materiality or material adverse effect) or in all material respects (in the case of any representation or warranty not qualified by materiality or material adverse effect), both on the Signing Date and at the closing date with the same effect as though made at and as of such date (except those representations and warranties that address matters only as of a specified date, the accuracy of which would be determined as of that specified date in all respects);
- certain representations and warranties of OPKO with respect to its organization, good standing, corporate authority, and approvals, must, both on the Signing Date and at the closing date (except those representations and warranties that address matters only as of a specified date, the accuracy of which shall be determined as of that specified date in all respects), be true and correct in all respects;
- OPKO duly performed and complied in all material respects with all agreements, covenants and conditions required by the OPKO Assignment Agreement and each of the other transaction documents to be performed or complied with by them prior to or on the closing date;
- there not having occurred any change, event, circumstance or development that individually or in the aggregate, has had or would reasonably be expected to have a material adverse effect between the Signing Date and the closing date;
- the Company having received adequate financing, as reasonably determined by the Company, whether in the form of a private or public offering of debt or equity securities to fund future working capital obligations of the Company and Hesperix following the closing; and
- the Share Purchase Agreement and the transactions contemplated thereunder being consummated.

*Conditions to Obligations of OPKO*

The obligations of OPKO to consummate the transactions contemplated by the OPKO Assignment Agreement is also subject to the satisfaction or waiver by OPKO at or prior to the closing of the following conditions:

- the Company having delivered to OPKO the OPKO Transaction Shares;
- the representations and warranties of the Company with respect to legal proceedings, the issuance of the OPKO Transaction Shares, its SEC reports and financial statement, and taxes, must, both on the Signing Date and at the closing date, be true and correct in all respects (in the case of any representation or warranty qualified by materiality) or in all materials respects (in the case of any representation or warranty not qualified by materiality);

- the representations and warranties of the Company with respect to its organization, good standing, corporate authority and brokers and finders must, be true and correct in all respects on and as of the Signing Date and as of the closing date with the same effect as though made at and as of such date;
- the Company having duly performed and complied in all material respects with all agreements, covenants and conditions required by the OPKO Assignment Agreement and each of the other transaction documents to be performed or complied with by it prior to or on the closing date.
- the Share Purchase Agreement and the transactions contemplated thereunder being consummated; and
- the Company having received adequate financing, as reasonably determined by the Company, to fund future working capital obligations of the Company and Hesperix following the closing.

*Indemnification*

From and after the closing, the OPKO will indemnify and defend each of the Company and its affiliates and their respective representatives against, and will hold each of them harmless, including the reimbursement for any and all losses, damages, liabilities, awards, including reasonable attorneys' fees and the cost of enforcing any right of indemnification ("Losses"), arising out of, with respect to or by reason of (i) any inaccuracy in or breach of any of the representations or warranties of OPKO contained in the OPKO Assignment Agreement or in any certificate or instrument delivered by or on behalf of the Company pursuant to the OPKO Assignment Agreement; (ii) any breach, alleged breach or non-fulfillment of any covenant, agreement or obligation to be performed by OPKO to the OPKO Assignment Agreement; (iii) any amounts owed under the IP License Agreement and any OPKO transaction expenses to the extent not paid at closing; and (iv) any taxes of OPKO arising from the transfer of the IP License Agreement to the Company.

From and after the closing, the Company will indemnify and defend OPKO and its affiliates and their respective representatives against, and will hold each of them harmless, including the reimbursement for all Losses, arising out of, with respect to or by reason of (i) any inaccuracy in or breach of any of the representations or warranties of the Company contained in the OPKO Assignment Agreement or in any certificate or instrument delivered by or on behalf of the Company pursuant to the OPKO Assignment Agreement; (ii) any breach, alleged breach or non-fulfillment of any covenant, agreement or obligation to be performed by the Company pursuant to the OPKO Assignment Agreement; or (iii) any amounts owed under the IP License Agreement following the closing date.

The indemnification provided for in the OPKO Assignment Agreement are subject to the following limitations:

- OPKO will not be liable to the Company indemnitees for indemnification until the aggregate amount of all Losses under the OPKO Assignment Agreement exceeds Fifty Thousand Dollars ($50,000), in which event OPKO will be required to pay or be liable for all such Losses in excess of Fifty Thousand Dollars ($50,000) (except such limitation shall not apply to Losses based upon, arising out of, or by reason of (i) any inaccuracy in or breach of certain representations and warranties, including, among others, those relating to the organization and authority, and conflicts and approvals of third parties; or (ii) intentional breach, intentional misrepresentation, criminal misconduct or fraud). The total aggregate amount of all Losses for which OPKO will be liable under the OPKO Assignment Agreement will not exceed fifteen percent (15%) of the OPKO Transaction Shares, based on the Closing Price (except such limitation shall not apply to Losses based upon, arising out of, or by reason of (i) any inaccuracy in or breach of certain representations and warranties, including, among others, those relating to the organization and authority, and conflicts and approvals of third parties; or (ii) intentional breach, intentional misrepresentation, criminal misconduct or fraud).

- The Company will not be liable to OPKO indemnitees for indemnification under the OPKO Assignment Agreement until the aggregate amount of all Losses exceeds Fifty Thousand Dollars ($50,000), in which event the Company will be required to pay or be liable for all such Losses in excess of Fifty Thousand Dollars ($50,000) (except such limitation shall not apply to Losses based upon, arising out of, or by reason of (i) any inaccuracy in or breach of certain representations and warranties, including, those relating to the organization and authority, conflicts and approvals of third parties, and issuance of OPKO Transaction Shares; or (ii) intentional breach, intentional misrepresentation, criminal misconduct or fraud). The total aggregate amount of all Losses for which the Company will be liable under the OPKO Assignment Agreement will not exceed fifteen percent (15%) of the OPKO Transaction Shares, based on the Closing Price (except such limitation shall not apply to Losses based upon, arising out of, or by reason of (i) any inaccuracy in or breach of certain representations and warranties, including, those relating to the organization and authority, conflicts and approvals of third parties, and issuance of OPKO Transaction Shares; or (ii) intentional breach, intentional misrepresentation, criminal misconduct or fraud).

*Termination of the OPKO Assignment Agreement*

The OPKO Assignment Agreement may be terminated at any time prior to the closing:

- by mutual written consent of the Company and OPKO;
- by the Company, subject to certain conditions, if: (i) any of the representations and warranties of OPKO fails to be true and correct as of the date made; or (ii) there is a breach by OPKO of any covenant or agreement of OPKO that is not curable or, if curable, is not cured within the cure period;
- by the Company, subject to certain conditions, if any of the conditions set forth in the OPKO Assignment Agreement of OPKO to effect the closing will not have been, or becomes apparent that any such condition will not be, fulfilled by July 1, 2019, unless such failure is due to the failure of the Company to perform or comply with any of the covenants, agreements or conditions therein;
- by OPKO, subject to certain conditions, if: (i) any of the representations and warranties of the Company fails to be true and correct as of the date made; or (ii) there is a breach by the Company of any covenant or agreement of the Company that is not curable or, if curable, is not cured within the cure period;
- by OPKO, subject to certain conditions, if any of the conditions set forth in the OPKO Assignment Agreement of the Company to effect the closing will not have been, or becomes apparent that any such condition will not be, fulfilled by July 1, 2019, unless such failure is due to the failure of OPKO to perform or comply with any of the covenants, agreements or conditions therein; or
- by the Company or OPKO in the event that (i) there is any law that makes the consummation of the transactions contemplated by the OPKO Assignment Agreement illegal or otherwise prohibit, or (ii) any governmental authority has issued a governmental order (that is final and non-appealable) restraining or enjoining the transactions contemplated by the OPKO Assignment Agreement.

*Effect of Termination*

If the OPKO Assignment Agreement is terminated, the OPKO Assignment Agreement will become void and of no effect with no liability to any person on the part of any party except that the provisions of the OPKO Assignment Agreement relating to termination and certain technical provisions will continue in effect. The effect of the termination of the OPKO Assignment Agreement will not relieve any party from any liability for any willful breach or material breach of any provision therein, or for fraud or criminal misconduct.

*Amendments and Waivers*

Subject to the limitations of the OPKO Assignment Agreement, the OPKO Assignment Agreement may be amended or modified by a written instrument executed by the Company and OPKO, or in the case of a waiver, any such extension or waiver will be valid only if set forth in an instrument in writing signed by Buyer or OPKO, as the case may be.

*Specific Performance*

If for any reason any of the provisions of the OPKO Assignment Agreement are not performed in accordance with their specific terms or are otherwise breached or threatened to be breached, each party to the OPKO Assignment Agreement will be entitled to seek equitable relief, including an injunction or injunctions or orders for specific performance to prevent breaches of the OPKO Assignment Agreement and to enforce specifically the terms and provisions of the OPKO Assignment Agreement, in addition to any other remedy such party would be entitled to at law or in equity as a remedy for any such breach or threatened breach.

**The IP License Agreement**

The following includes a summary of the material provisions of the IP License Agreement, a copy of which is attached to this proxy statement/prospectus as Appendix D. This summary may not contain all of the information about the IP License Agreement and related transactions that is important to you. We encourage you to read carefully the IP License Agreement in its entirety, as the rights and obligations of the parties thereto are governed by the express terms of the IP License Agreement and not by this summary or any other information contained in this proxy statement/prospectus. Upon completion of the Transaction, Xenetic will assume all of the rights and obligations of OPKO under the IP License Agreement. Certain portions of the exhibit have been omitted pursuant to a confidential treatment request. Omitted information has been filed separately with the SEC.

On February 25, 2019 (the "IP License Effective Date"), OPKO entered into the IP License Agreement with the Institute. Pursuant to the terms and subject to the conditions set forth in the IP License Agreement, the Institute has agreed to grant an exclusive worldwide royalty-bearing license to OPKO of the Institute's interest in and to certain patents related to the "Articles And Methods Directed To Personalized Therapy Of Cancer" (PCT/RU2018/000653) and the priority applications of the same title having Russian Application No. 2017134483 filed October 4, 2017; Russian Application No. 2018112009 filed April 4, 2018 and Russian Application No. 2018134321 filed October 1, 2018 and all applications claiming priority to such filings (collectively, the "Institute Patent Rights") and the technology that is described therein (the "Institute Technology") in exchange for OPKO paying the Institute a running royalty in the low single digit range based on net sales of products in each country in which, in absence of the IP License Agreement, the manufacture, use, offer for sale, sale, or importation of such product would infringe a valid claim of a patent or pending application.

*Warranty and Limitation of Liability*

The Institute makes no representations or warranties with respect to Institute Patent Rights or the Institute Technology, including express, implied, or statutory warranties of merchantability, fitness for a particular purpose, non-infringement of third party rights, title, accuracy, or arising out of course of conduct or trade customs. In addition, the Institute makes no representations or warranties as to the validity, scope, or enforceability of the Institute Patent Rights or the Institute Technology, or that any licensed product, licensed process, Institute Patent Rights or the Institute Technology would be free of infringement on patents or other intellectual property rights of third parties, or that no third party are in any way infringing upon any Parent Right or Institute Technology.

The Institute's aggregate liability, if any, under the IP License Agreement or relating to the subject therein will not exceed the amount paid by OPKO to the Institute under the IP License Agreement.

*License*

The Institute has agreed to grant to OPKO (A) an exclusive, worldwide, royalty-bearing license to the Institute Patent Rights to develop, make use, offer to sell, and import products that (i) the manufacture, importation, sale, offer for sale or use would, but for the IP License Agreement, infringe on the Institute Patent Rights, (ii) comprises of, utilizes, or incorporates any Institute Technology, or (iii) is made using any process or method claimed in the Institute Patent Rights (collectively, the "Licensed Product"), and (B) a non-exclusive worldwide license to the Institute Technology, each subject to:

- the rights of the United States Government which may arise or result from the Institute's receipt of support from the United States Government, including but not limited to, 37 CFR 401, the National Institutes of Health (the "NIH") Grants Policy Statement, and the NIH Guidelines for Obtaining and Disseminating Biomedical Research Resources;
- the Institute's rights to use the Institute Patent Rights and the Institute Technology for any internal, non-commercial, research or educational purposes without the Institute being obligated to pay OPKO any royalties or other compensation, provided that the Institute and the non-exclusive licensees are prohibited from developing, making having made, using, exporting, distributing, selling or offering for sale the Licensed Product; and
- the Institute's right to grant non-exclusive licenses to use the Institute Patent Rights or the Institute Technology for internal, non-commercial research and education purposes to other nonprofit or academic institutions, without the other nonprofit or academic institution being obligated to pay OPKO any royalties or other compensation, provided that the Institute and the non-exclusive licensees are prohibited from developing, making having made, using, exporting, distributing, selling or offering for sale the Licensed Product.

OPKO may grant sublicenses to any party with respect to the rights conferred upon OPKO under the IP License Agreement. Any sublicenses granted by OPKO will not have the right to further sublicense without the Institute's prior written consent, which shall not be unreasonably withheld, and will be subject in all respects to the applicable provisions contained in the IP License Agreement.

*Payments and Reports*

In consideration of the rights granted to OPKO by the Institute, OPKO has agreed to pay or deliver to the Institute a royalty in the low single-digit range based on net sales for all Licensed Products. In consideration of the sublicense rights granted to OPKO under the IP License Agreement, OPKO has agreed to pay or deliver the Institute a non-creditable, non-refundable percentage of the sublicense revenues.

In connection with the transactions contemplated by the OPKO Assignment Agreement, OPKO has directed that the Company issue to the Institute the Institute Transaction Shares as the sole sublicense payment for the OPKO Assignment Agreement. The Institute has agreed to execute a lock-up agreement in favor of the Company, which will restrict such recipient's sale or transfer of any of the Company's common shares ultimately received by such recipient as provided therein and as otherwise required by law.

OPKO has agreed to make payments to the Institute upon the attainment of certain milestones.

OPKO has agreed to keep complete and accurate records of its and its sublicensees' net sales under the license granted pursuant to the IP License Agreement in sufficient detail to enable the royalties and milestones payable thereunder to be determined. Beginning after the first commercial sale of a Licensed Product or licensed process, OPKO must deliver to the Institute a written report, even if no payments are due, giving the particulars of the business conducted by OPKO and its sublicensees, if any, during certain preceding times.

*Payment Increase in the Event of a Challenge*

In the event that OPKO or its sublicensee directly (a) institutes or maintains any interference, opposition, re-examination, post-grant review or similar proceeding with respect to any Institute Patent Right with the U.S. Patent and Trademark Office, or (b) makes any filing or institutes any action or legal proceeding with a court or other governmental body (including the U.S. Patent and Trademark Office or any foreign patent office) (collectively, a "Challenge") alleging that any Institute Patent Rights are invalid or unenforceable, the royalty obligations will be increased from the date the challenging party first institutes or makes such Challenge and during the pendency of such Challenge, and will continue to apply after the conclusion of such Challenge in the event that at least one (1) claim of the Institute Patent Rights being challenged that covers a Licensed Product or licensed process is held to be valid and enforceable.

*Diligence; Regulatory Matters*

OPKO has agreed to use (whether directly or through its sublicensees) commercially reasonable efforts to develop and commercialize, or have developed and commercialized, the Licensed Products throughout the world.

*Term; Termination*

The IP License Agreement will become effective on the IP License Effective Date and will continue until the later of (a) the IP License Agreement is terminated, (b) the expiration of the last-to-expire patent within the Institute Patent Rights, or (c) an agreed upon number of years from the first commercial sale of a Licensed Product, in each case on a country-by-country basis.

The IP License Agreement may be terminated, subject to temporal limitations:

- automatically if OPKO becomes bankrupt and/or if the business of OPKO is placed in the hands of a receiver, assignee, or trustee, whether by a voluntary act of OPKO or otherwise, OPKO makes an assignment for the benefit of creditors, or has any other proceeding filed against it under any bankruptcy or insolvency laws;
- upon written notice from the Institute, if OPKO becomes insolvent, unless OPKO provides the Institute evidence of its solvency within a specified period of time;
- upon written notice from the Institute if OPKO breaches or defaults on its obligations to make payments or reports in accordance with the terms of the IP License Agreement, unless OPKO has cured the breach or default within a specified period of time;
- upon written notice from the Institute if OPKO breaches or defaults on any other obligation under the IP License Agreement, unless OPKO has cured the breach or default within a specified period of time;
- at any time by mutual written agreement between OPKO and the Institute;
- if OPKO defaults upon its indemnification or insurance requirements under the IP License Agreement, unless OPKO has contested and/or cured the default and notifies the Institute of such cure;
- if OPKO is convicted of a felony relating to the development, manufacture, use, marketing, distribution or sale of the Licensed Product.
- at any time upon within a specified period of time written notice by OPKO to the Institute, provided that OPKO pays an agreed upon termination fee to the Institute before the expiration of such time period.

If the IP License Agreement is terminated, the IP License Agreement will be deemed to release either party of any obligations matured prior to the effective date of the termination. After the effective date of the termination, OPKO has agreed to provide the Institute with a written inventory of Licensed Products in process of manufacture, in use or in stock. OPKO may sell any such Licensed Product following the termination of the IP License Agreement provided that OPKO pays the Institute any earned royalties any other amount due pursuant to the terms of the IP License Agreement.

*Assignment*

OPKO may not assign the IP License Agreement without the prior written consent of the Institute; provided, however, OPKO will be able to assign the IP License Agreement in connection with (i) the assignment of the IP License Agreement to an affiliate; (ii) as part of a sale, regardless of whether such sale occurs through an asset sale, stock sale, merger or other combination or transfer of OPKO's entire business; or (iii) the assignment of the IP License Agreement to the Company.

*Patent Markings*

OPKO has agreed to permanently and legibly mark all products, packaging and documentation manufactured or sold under the IP License Agreement with a patent notice as may be permitted or required under Title 25, United States Code.

*Indemnification and Insurance*

OPKO has agreed to indemnify, defend, and hold harmless the Institute and any parent, subsidiary, or other affiliated entity of the Institute and their respective trustees, officers, directors, employees, scientist, students, and other representatives from and against and all losses, damages, liabilities, awards, including reasonable attorneys' fees and the cost of enforcing any right of indemnification, arising out of, with respect to, or resulting from (a) the exercise or practice of the license granted under the IP License Agreement by OPKO and its sublicensees and affiliates; (b) alleged defects or other problems with any of the Licensed Product, licensed processes, or manufactured, sold, distributed, or rendered by or on behalf of OPKO or any sublicensee; (c) the research, development, manufacture, use, marketing, advertising, distribution, sale or importation of any Licensed Product, licensed process, by on or behalf of OPKO or any of its sublicensees; (d) the negligent or willful acts or omissions of OPKO or any of its sublicensees; (e) any allegations that the Licensed Product, licensed processes, by or on behalf of OPKO or any sublicensee and/or any trademarks, service marks, logos symbols, slogans, or other materials used in connection with or to market the Licensed Products, licensed processes, violate or infringe upon the trademarks, service marks, trade dress, trade names, copyrights, patents or any other intellectual or industrial property right of any third party; (f) OPKO's or any of its affiliate's or sublicensee's failure to comply with any applicable laws, rules or regulations, and/or (g) OPKO's or any of its affiliate's or sublicensee's labeling, packaging or patent marking of the any Licensed Product or containers thereof by or on behalf of OPKO or any sublicensee.

*Use of Name*

OPKO has agreed to not use any name of the Institute, without the Institute's prior written consent except in such instances required by governmental law, rule or regulation.

*Export Control*

OPKO has agreed to abide by the United States laws and regulations (including the Export Administration Act of 1979 and Arms Export Control Act) controlling the export of technical data, computer software, laboratory prototypes, biological material and other commodities.

*Alternative Dispute Resolution*

The Institute and OPKO have agreed that any controversy or claiming arising out of the IP License Agreement, or the breach thereof, will first be referred to senior management of each party for resolution. In the event that senior management fails to resolve such controversy or claim within thirty (30) days, then such controversy or claim will be submitted to mediation in San Diego County, California in which the mediator will be a retired judge or other neutral third party mutually selected by OPKO and the Institute who has at least ten (10) years' experience in mediating or arbitrating cases in the biopharmaceutical industry and regarding the same or substantially similar subject matter as the dispute between OPKO and the Institute if such dispute is not resolved through mediation, either party may refer the dispute to a court of competent jurisdiction in San Diego County, California.

**Parties to the Hesperix Acquisition**

*The Company*

Xenetic Biosciences, Inc., a Nevada corporation, was originally incorporated as General Aircraft, Inc. on August 9, 2011. In 2013, the Company changed its name to "General Sales and Leasing, Inc.," and in 2014 the Company changed its name "Xenetic Biosciences, Inc." Our principal executive offices are located at 40 Speen Street, Suite 102, Framingham, Massachusetts 01701 and our telephone number is (781) 778-7720. The Company's securities trade on the Nasdaq Capital Markets under the symbol "XBIO."

The Company is a clinical - stage biopharmaceutical company focused on the discovery, research and development of next -generation biologic drugs and novel orphan oncology therapeutics. Xenetic's lead investigational product candidate is oncology therapeutic XBIO-101 (sodium cridanimod) for the treatment of progesterone resistant endometrial cancer. Xenetic is also developing a proprietary drug development platform, PolyXen, which enables next –generation biologic drugs by improving their half - life and other pharmacological properties. The Company has ongoing business development activities to explore partnerships utilizing its PolyXen delivery platform.

*Hesperix SA*

Hesperix SA, a Swiss corporation, is a biotechnology company created as a holding company with assets recently assigned specifically for this transaction. These assets consist primarily of the intellectual property supporting a new CAR T technology, which is capable of addressing multiple tumor types (including but not limited to B-cell lymphomas and leukemias) through targeting of personalized patient specific tumor neoantigens. Hesperix does not have executive offices, but its mailing address is Agus Corporate Services SA, Via Luganetto 4, P.O. Box 433, CH-6962.

**Background of the Hesperix Acquisition and the Transaction**

Highlighted below is a detailed chronology of events leading up to and subsequent to the execution of the Share Purchase Agreement and the Transaction Documents.

On July 11, 2017, Dr. Dmitry Dmitrievich Genkin met with Dr. Phillip Frost and Steven Rubin of OPKO. Jeffrey Eisenberg was also invited to join the meeting where one of the agenda items was Genkin describing a new CAR T technology.

On July 13, 2017, Genkin contacted Frost, Rubin, Dr. Alexander Gabibov, Dr. Richard Lerner and Aleksei Stepanov indicating that Genkin would begin work on a development plan for the new technology. Around that time Genkin suggested to Eisenberg that perhaps the Company was the right vehicle to acquire and develop the technology and provided Eisenberg with additional information on CAR T development generally.

In July 2017, OPKO's patent counsel began working with Genkin and the inventor group to prepare a draft patent application.

On October 9, 2017, Genkin contacted Frost and Rubin to discuss a proposed preclinical development plan for the new CAR T technology.

From October 2017 until March 2018, there was no activity relating to the CAR T technology involving the Company.

On March 16, 2018, Company's Board formed the Strategic Alternatives Committee (the "SAC") to evaluate an alternative transaction (the "Alternative Transaction") and other strategic alternatives for the Company should they arise. James Callaway, an independent outside director of the Company, was appointed Chair of the SAC.

On March 20, 2018, the Company engaged Akerman LLP ("Akerman") to represent the SAC in connection with the Alternative Transaction.

On April 2, 2018, the SAC signed (i) an engagement letter with Maxim Group LLC ("Maxim") to serve as exclusive advisor in connection with a potential transaction and (ii) a separate engagement letter with Maxim to issue a fairness opinion in connection with the potential transaction.

On April 16, 2018, Genkin discussed with Mr. Eisenberg a proposed structure for a transaction in which Company would acquire Hesperix. The proposal contemplated a financing by the Company to fund development of the CAR T technology. Genkin discussed this proposal with Maxim, who would serve as financial advisor. On the same day, Eisenberg scheduled a call with Jim Alfaro and Chris Avery of Maxim to discuss the proposal.

On April 17, 2018, Genkin and Eisenberg held a webconference with Alfaro and Avery to review the proposal. Eisenberg requested that Maxim propose a fee structure for the Hesperix Acquisition and any related financing.

Also on April 17, 2018, the SAC convened a meeting and discussed the potential transaction. Immediately following the SAC meeting a Board meeting was convened, and the Board discussed the Hesperix Acquisition and potential need for additional financing.

On April 27, 2018, Eisenberg provided the chairs of the SAC and Board a general update on the potential transactions.

On April 30, 2018, the Company began working with Akerman to set up an electronic data room (the "Data Room") to facilitate the due diligence process.

Between April and May 2018, Genkin discussed the allocation of share ownership in Hesperix by the inventor/ownership group of the CAR T technology with OPKO.

On May 3, 2018, Maxim sent drafts of revised engagement letters relating to a potential acquisition and any related financing, respectively, to Eisenberg and Callaway. Over the next two weeks, Akerman negotiated the new engagement letters with Maxim and on May 21, 2018, the SAC approved the new engagement letters with Maxim. Both engagement letters were executed on May 22, 2018, and became effective as of May 16, 2018.

On June 14, 2018, Company and Hesperix entered into a Non-Disclosure Agreement, effective as of June 1, 2018, to commence due diligence on Hesperix and its technology. Over the next two weeks, the Data Room was populated and the Company began its due diligence review.

On July 11, 2018, Genkin and Eisenberg discussed at a high level the process required to complete pre-clinical development of the new technology.

In late July 2018, Company management and Maxim engage in discussions regarding financing working capital and development costs in connection with the Hesperix Acquisition. The Company's due diligence process continued through August 2018.

In late August 2018, Company, Akerman and Maxim prepared a draft letter of intent ("LOI") for the Hesperix Acquisition, which reflected a purchase price of up to $13 million, payable in shares of Company, with a stipulation that if Company's share price remained at or above $2 per share at the Closing, then Hesperix's equity holders would receive shares equaling a value of $13 million; provided however, if Company's share price falls below $2 per share, then Hesperix's equity holders would receive 6.5 million shares with a value equal to the product of 6.5 million multiplied by the current share price, which is an aggregate value of less than $13 million (with the exact consideration to be received dependent on the actual Company share price at the Closing).

On August 29, 2018, Company's SAC and Board convened meetings to discuss, among other things, the terms of the draft LOI, potential financing, the Company's forecast for the remainder of the year, and certain other matters relating to the 2018 annual stockholder meeting.

On August 30, 2018, Eisenberg sent the draft of the LOI for the Hesperix Acquisition to Genkin.

From August 2018 to September 2018, Company's advisors accessed the Data Room to assist with the due diligence review of Hesperix.

On September 7, 2018, Genkin informed Eisenberg by email that the ownership group was expected to meet on September 17, 2018 to review the proposed LOI. Genkin told Eisenberg to expect a counterproposal on two points: (1) consideration would be $15 million and (2) the exclusivity period would be reduced from 120 to 60 days. Eisenberg informed Callaway of the communication. Following this communication, Akerman began drafting Transaction Documents, including a first draft of the Share Purchase Agreement.

On September 24, 2018, Genkin sent a counterproposal to the LOI to Eisenberg by email. The Sellers proposed a purchase price of $15 million in Common Stock based on the trailing four week stock price of Company or 6.5 million shares, whichever is greater. In addition, the Sellers proposed an aggregate royalty at a low single-digit rate of net sales, potential board representation, and a sponsored research agreement in the amount of $1.5 million per year for three years. Eisenberg shared this counterproposal with Callaway.

On September 24, 2018, Eisenberg discussed the counterproposal with Genkin, and on September 25, 2018, Eisenberg met with Callaway to discuss the latest proposals. Akerman revised the LOI accordingly to include, among other things (i) exclusivity by Hesperix for 90 days rather than 120 days, (ii) changes to the value of Hesperix and the ultimate amount of Common Stock to be issued in the transaction regardless of the trading price of the Common Stock at closing, (iii) a royalty arrangement, (iv) the entering into of a sponsored research agreement with IBCH upon the receipt by the Company of a certain level of capital, and (v) the Board composition post-closing.

On September 28, 2018, Eisenberg sent the revised LOI to Genkin, which was largely accepted with certain minor changes including (i) IBCH as one of the parties receiving the royalty arrangement, (ii) that following the closing, the Company would use commercially reasonable efforts to develop the technology subject to the Company raising adequate capital to do so, and (iii) making certain changes to the terms of the proposed sponsored research agreement**.** Akerman makes such changes and Eisenberg sent the LOI back to Genkin for his final review and approval.

On October 5, 2018, Genkin sent Eisenberg the LOI executed on behalf of the Sellers.

On October 5, 2018, the SAC met to review and approve the final LOI, after which Eisenberg executed the LOI and sent a fully executed version to Genkin.

On October 12, 2018, Eisenberg began drafting a Company investor presentation deck with Maxim.

In October 2018, OPKO began negotiations with the Institute on an exclusive license of the Institute's rights in the technology and associated intellectual property. These negotiations continue through January 2019.

Between October 2018 and January 2019, the Company and its advisors continued to work on the Company investor presentation, which was intended to support the bridge financing efforts after signing the Transaction Documents.

On November 5, 2018, Genkin sent the first draft of the Hesperix Assignment Agreement to Eisenberg and, at Genkin's request, shared the draft with OPKO.

In early November 2018, Jim Parslow, Chief Financial Officer of the Company, and Genkin corresponded and coordinated on Hesperix financial statement requirements for proposed acquisition.

From November 20, 2018 to November 27, 2018, Akerman and Troutman exchanged drafts of the Share Purchase Agreement and Hesperix Assignment Agreement.

On November 30, 2018, Maxim sent a draft Letter of Engagement for the proposed bridge financing (the "LOE") to Eisenberg and Parslow.

During the week of December 3, 2018, Akerman and Troutman met via teleconference to review open issues on the Transaction Documents.

On December 6, 2018, Maxim provided Eisenberg and Parslow with due diligence requests prepared by its counsel Ellenoff, Grossman & Schole LLP ("EGS"), in connection with the proposed financing (the "Bridge Financing"). The following week, Company, Maxim, and EGS had several teleconferences related to due diligence items.

On December 12, 2018, Parslow negotiated the final terms of bridge financing LOE with Maxim.

On December 19, 2018, Company engaged BodmerFischer Ltd. as Swiss counsel to work with Akerman on the Hesperix Acquisition.

On December 20, 2018, Eisenberg contacted Genkin, requesting details on, among other things, a loan Genkin advanced to Hesperix, which Genkin was requesting to be repaid at closing of the Transaction, and potential Board representation.

During December 2018, Akerman's tax counsel determined that there may be a tax issue with the proposed transaction structure that would cause the Hesperix Acquisition to be taxable to US shareholders.

Between December 2018 and January 2019, Troutman and Akerman exchanged additional drafts of the various Transaction Documents, such revisions primarily relating to (i) holdback provisions, representation and warranties, tax structure, consideration, indemnification and the definition of restricted business, with respect to the Share Purchase Agreement, (ii) royalty payments and liability limitations, (iii) the OPKO Assignment Agreement, and (iv) exclusivity, royalty and termination payments, and assignment consent, with respect to the IP License Agreement.

On January 3, 2019, Eisenberg and Genkin met via webconference to resolve open issues on the Share Purchase Agreement, primarily related to definition of "Restricted Business." Over the next few weeks, Eisenberg and Genkin exchanged several emails on this issue, and reached an agreement as reflected in the Final Share Purchase Agreement. In those email exchanges, Eisenberg and Genkin also discussed issues regarding the lockup, holdback, tax treatment, and post-closing development efforts standards.

On January 9, 2019, the Expense Management and Financing Oversight Committee of the Board received an update from Akerman on the material changes to the Share Purchase Agreement, the Hesperix Assignment Agreement, and the IP License Agreement discussed below.

On January 10, 2019, the SAC and the Board each convened a meeting, regarding the material changes or issues to the (i) Share Purchase Agreement, which included, among other things, a reduced hold back of Hesperix Transaction Shares to secure indemnification claims and reduced indemnification obligations of Hesperix and the Sellers and changes to the intellectual property representations; (ii) the Hesperix Assignment Agreement, which included the Company's desire to mirror royalty provisions with the IP License Agreement, the limitation on liability provisions and the Company's desire to remove certain parties from the Hesperix Assignment Agreement; and (iii) the IP License Agreement, which included further negotiations regarding the amount of the sublicense revenue fee percentage and milestones of net sales, the Institute's termination fee request, the Institute's consent rights on assignments and equity share allocations between OPKO and the Institute.

Also, on January 16, 2019, the Company executed the Maxim bridge financing LOE.

In late January 2019, Akerman begins drafting the proxy statement/prospectus to be filed in connection with the Hesperix Transaction.

On January 30, 2019, OPKO informed Akerman that it is not be part of the Hesperix Acquistion. During that week, the holdback provision was removed from the OPKO Assignment Agreement as a result of the Institute objection and Akerman and Troutman exchanged drafts of disclosure schedules.

Also, on January 30, 2019, IP Counsel commenced due diligence of the Company.

On February 1, 2019, the Company's management and Akerman met with Callaway via teleconference to review the final Share Purchase Agreement and secure Callaway's approval.

On February 5, 2019, Eisenberg and other members of Xenetic management discussed with the Pharmsynthez board of directors, Xenetic's plans for the XCART technology.

On February 6, 2019, Maxim provided the Company with a target list of potential investors in the Bridge Financing.

On February 7, 2019, Genkin informed Troutman that the sellers have signed off on the final changes to the Share Purchase Agreement and the Hesperix Assignment Agreement.

On February 8, 2019, EGS provided initial drafts of documents in connection with the proposed Bridge Financing.

On February 9, 2019, the Company, Maxim, Akerman, and EGS met via teleconference to discuss the process for the Bridge Financing.

During the week of February 11, 2019, OPKO agreed to enter into the OPKO Assignment Agreement which is separate from the Hesperix Assignment Agreement. The parties also finalized disclosure schedules to the Share Purchase Agreement during that week.

On February 14, 2019, the Hesperix Sellers agreed on the final share allocation in connection with the Hesperix Acquisition.

On February 19, 2019, the Expense Management and Financing Oversight Committee of the Board convened a meeting and discussed and recommended to the Board for approval, the terms of the Securities Purchase Agreement to be entered into in connection with Bridge Financing (the "Bridge SPA").

Also on February 19, 2019, the Company's Board convened a meeting and discussed, among other things, the Hesperix Acquisition, Bridge SPA, and the registration of shares in connection with the Transaction. The Board approved the form of Bridge SPA, subject to the final approval of the Pricing Committee of the Board (the "Pricing Committee"), which was established at the Board meeting.

One February 25, 2019, Eisenberg, Akerman, and Callaway met via teleconference to review drafts of the Transaction Documents.

Between February 18, 2019 and March 1, 2019, the Company, Hesperix Sellers, OPKO, and the Institute finalized the Transaction Documents and exchanged signature pages to be held in escrow.

On February 26, 2019, Akerman and EGS met via teleconference to discuss the Bridge Financing, and Akerman sent drafts of the disclosure schedules to the Bridge SPA.

The signature pages to the Transaction Documents were released, effective March 1, 2019.

Between March 1, 2019 and March 5, 2019, EGS and Akerman exchanged drafts of the Bridge SPA and the warrants to be issued in connection with the Bridge Financing.

On March 4, 2019, the Company issued a press release announcing the Hesperix Acquisition and filed a Current Report on Form 8-K in connection with the signing of the Hesperix Acquisition.

On March 5, 2019, the Pricing Committee met via teleconference and, among other things, approved the Bridge SPA and priced the securities to be issued in the Bridge Financing. On the same day, the Company entered into the Bridge SPA and the parties agreed to close the Bridge Financing "T+2."

Also on March 5, 2019, the Company issued a press release announcing the pricing of Bridge Financing and filed a Current Report on Form 8-K in connection with the pricing of the Bridge Financing.

On March 7, 2019, the Bridge Financing closed, and the Company filed a Current Report on Form 8-K in connection with the closing of the Bridge Financing.

**Reasons for the Transaction**

By acquiring this novel and differentiated CAR T technology, the Company will be positioned in a field that is at the forefront in the development of new oncology therapeutics, which the Company believes has the potential to drive significant value for shareholders. The XCART platform was designed to target personalized, patient-specific tumor neoantigens and has demonstrated proof of mechanism in B-cell lymphoma, an area of significant unmet medical need. In addition, the acquisition of XCART fits with the Company's current strategy of focusing on research addressing unmet needs in oncology. The Company's R&D efforts will focus initially on leveraging the XCART platform to develop cell-based therapeutics for the treatment of B-cell Non-Hodgkin lymphomas, an initial global market opportunity estimated to exceed $5 billion per year.

We believe that our development efforts with XCART should benefit from the fact that the approvals of Kymriah™ and Yescarta™ have validated CAR T as a clinical therapeutic option. As a result, there are a significant number of companies advancing CAR T research, and the field is attracting large amounts of capital. Given the variety and, often, complementary nature of technical and clinical approaches under investigation, the Company also believes that early successes in development of XCART should generate significant collaboration potential.

**Anticipated Accounting Treatment**

The Transaction is expected to be treated as an asset acquisition by the Company. To determine the accounting for this transaction under United States (U.S.) generally accepted accounting principles (GAAP), a company must assess whether an integrated set of assets and activities should be accounted for as an acquisition of a business or an asset acquisition. Substantially all of the fair value is included in in-process research and development and no substantive processes are being acquired. As such, the Transaction is expected to be treated as an asset acquisition. Asset acquisitions are to be accounted for by allocating costs, including transaction costs, of the acquisition to the acquired assets based on their relative fair value basis.

**Opinion of Xenetic's Financial Advisor**

On May 22, 2018, Xenetic retained Maxim to act as financial adviser to Xenetic in connection with the Transaction. As part of this engagement, Xenetic requested that Maxim evaluate the fairness of the Transaction consideration to be paid by Xenetic pursuant to the Share Purchase Agreement, from a financial point of view, to Xenetic. As discussed in the following paragraph, on January 10, 2019, Maxim delivered to the Xenetic Board its oral opinion, confirmed by its delivery of a written opinion dated January 10, 2019, that as of the date thereof, and subject to the assumptions, limitations, qualifications and conditions set forth in Maxim's written opinion, the Transaction consideration being paid to Hesperix stockholders in accordance with the Share Purchase Agreement is fair from a financial point of view to Xenetic and its stockholders.

The full text of Maxim's written opinion, dated January 10, 2019, which sets forth, among other things, the assumptions made, procedures followed, matters considered and qualifications and limitations on the scope of review undertaken by Maxim in delivering its opinion, is attached as Appendix E to this proxy statement/prospectus and is incorporated herein by reference in its entirety. The description of Maxim's written opinion set forth in this proxy statement/prospectus is qualified in its entirety by the full text of such opinion. Maxim's opinion does not constitute a recommendation to the Xenetic Board or to any other persons in respect of the Transaction, including as to how any holder of Xenetic Common Shares should vote or act with respect to the Transaction and Share Issuance Proposal. We encourage you to read Maxim's opinion carefully and in its entirety.

Maxim's opinion was provided for the information and benefit of the Strategic Alternatives Committee and was delivered to the Strategic Alternatives Committee in connection with their evaluation of whether the Transaction consideration to be paid by Xenetic pursuant to the Share Purchase Agreement is fair, from a financial point of view to Xenetic, and did not address any other aspect of the Share Purchase Agreement or the transactions contemplated thereby, including the Transaction. Maxim's opinion did not address the relative merits of the Transaction as compared to other business or financial strategies that might be available to Xenetic, nor did it address the underlying business decision of Xenetic to engage in the Transaction. Maxim also provided the Xenetic Board with a presentation in connection with their evaluation.

Maxim's opinion necessarily was based upon information made available to Maxim as of January 10, 2019 and financial, economic, monetary, market, regulatory and other conditions and circumstances as they existed and as could be evaluated on such date. Maxim has no obligation to update, revise or reaffirm its opinion based on subsequent developments. Maxim's opinion did not express any opinion as to the price at which the shares of Xenetic Common Shares will trade at any time.

The following is a summary of Maxim's opinion, and is qualified in its entirety by the full text of such opinion attached asAppendix E to this proxy statement/prospectus. We encourage you to read Maxim's written opinion carefully in its entirety:

In connection with delivering its opinion, Maxim, among other things:

- Reviewed certain publicly available filings relating to Xenetic, including Annual Reports on Form 10-K of Xenetic; certain interim reports to stockholders and Quarterly Reports on Form 10-Q of Xenetic;
- Reviewed certain business agreements;

- Reviewed certain non-public financial analyses and projected cash-based data relating to Hesperix under alternative business assumptions that were provided to Maxim by Xenetic (and were prepared by Xenetic and the Sellers and further revised and adjusted by the Xenetic management team, as approved for use by the Xenetic Strategy Alternatives Committee) (the "Forecasts").
- Reviewed the reported prices and the historical trading activity for Xenetic common shares;
- compared certain financial and stock market information for Xenetic with similar information for certain other companies the securities of which are publicly traded; Maxim did not include publicly traded comparable companies in its analysis since there were no relevant companies utilizing a comparable technology and in the same stage of development
- reviewed the financial terms of certain recently completed Series A Venture Capital Investment, strategic transactions, business combinations, and acquisitions within the Biotechnology industry;
- reviewed a draft of the Share Purchase Agreement dated November 20, 2018, which Maxim assumed was in substantially final form and from which Maxim assumed the final form would not vary in any respect material to its analysis; and
- performed such other analyses and examinations and considered such other factors that Maxim deemed appropriate.

For purposes of its analysis and opinion, Maxim assumed and relied upon, without undertaking any independent verification of, the accuracy and completeness of all of the information publicly available, and all of the information supplied or otherwise made available to, discussed with, or reviewed by Maxim, and Maxim assumes no liability therefor. Maxim was not requested to, and did not, explore alternatives to the Transaction or solicit interest of any other parties in pursuing transactions with Xenetic.

Maxim was not asked to pass upon, and expressed no opinion with respect to, any matter other than the fairness of the Transaction consideration to be paid by Xenetic pursuant to the Share Purchase Agreement, from a financial point of view, to Xenetic. Maxim did not express any view on, and its opinion did not address, the fairness of the Transaction to, or any consideration received in connection therewith by, the holders of any other securities, creditors or other constituencies of Xenetic or Hesperix, or as to the fairness of the amount or nature of any compensation to be paid or payable to any of the officers, directors or employees of Xenetic or Hesperix or any of the other parties to the Share Purchase Agreement or any affiliates thereof, or any class of such persons, whether relative to the Transaction consideration or otherwise. Maxim assumed that any modification to the structure of the Transaction would not vary in any respect material to its analysis. Maxim's opinion did not address the relative merits of the Transaction as compared to other business or financial strategies that might be available to Xenetic, nor did it address the underlying business decision of Xenetic to engage in the Transaction. Maxim's opinion does not constitute a recommendation to the Xenetic Board, or Strategic Alternatives Committee or to any other persons in respect of the Transaction, including as to how any holder of shares of Xenetic Common Stock should vote or act in respect of the Transaction. Maxim expressed no opinion as to the price at which Xenetic Common Stock will trade at any time. Maxim is not a legal, regulatory, accounting or tax expert and assumed the accuracy and completeness of assessments by the management of Xenetic and its advisors with respect to legal, regulatory, accounting and tax matters.

Maxim provides a multitude of financial services including investment banking; private wealth management; and global institutional equity, fixed-income and derivatives sales and trading as well as equity research. Maxim and its affiliates, or other related entities or individuals, may at any time purchase, sell, hold or vote long or short positions and investments in securities, derivatives, loans, commodities, currencies, credit default swaps and other financial instruments of the Company, and any of their respective affiliates and third parties, or any currency or commodity that may be involved in the Transaction. Maxim will receive a fee from the Company for delivering the Opinion as well as reimbursement of certain expenses. Maxim's fee will be due in its entirety upon the delivery of the Opinion, irrespective of whether the Transaction is completed. The Company has agreed to indemnify Maxim against certain liabilities, and to reimburse it for certain liabilities in connection with Maxim providing the Opinion. No controlling person of Maxim is directly personally receiving compensation or other remuneration from any of the Parties. On March 5, 2019, Xenetic Biosciences announced pricing of $3.1 million registered direct offering and Maxim acted as the exclusive placement agent for the offering.

In rendering its opinion, Maxim relied upon and assumed, without assuming any responsibility for independent verification, the accuracy and completeness of all the financial, legal, regulatory, tax, accounting and other documentation and information provided to, discussed with, or reviewed by Maxim and has relied on such information as being complete and accurate in all material respects, including any documentation and information originally produced by Xenetic or Hesperix and provided by Xenetic to Maxim. In that regard, Maxim assumed that the Forecasts have been reasonably prepared on a basis reflecting the best currently available estimates and judgments of the management of Xenetic and those financial projections originally produced by Xenetic and Hesperix and provided by Xenetic to Maxim. Maxim assumed that there were no material changes in the assets, liabilities, financial condition, results of operations, reserves, business operations since the date of the financial statements referenced herein. Moreover, it is understood that the Forecasts are based on numerous variables and assumptions that are inherently uncertain, including without limitation, factors related to general economic, market and competitive conditions. Accordingly, actual results could vary significantly from those set forth in such Forecasts, and as noted previously, Maxim has relied on these Forecasts without independent verification or analyses and does not in any respect assume any responsibility for the accuracy or completeness thereof. Maxim has not made an independent evaluation or appraisal of the assets and liabilities (including any joint ventures, contingent, derivative or other off-balance-sheet assets and liabilities) of Xenetic or any of its subsidiaries, Hesperix or any of its subsidiaries, joint ventures and Maxim has not been furnished with any such evaluation or appraisal. Maxim has assumed that all governmental, regulatory or other consents and approvals necessary for the consummation of the Transaction will be obtained without any adverse effect on the expected benefits of the Transaction in any way meaningful to their analysis. Maxim is not an actuary and its services did not include any actuarial determination or evaluation by Maxim or any attempt to evaluate actuarial assumptions, and Maxim has relied on Xenetic with respect to the appropriateness and adequacy of reserves of Xenetic and forecast assumptions used by Xenetic in connection with the Forecasts. In that regard, Maxim has made no analysis of, and expressed no opinion as to, the appropriateness or adequacy of reserves or forecast assumptions. Maxim has relied upon assurances by Xenetic and Hesperix that they are unaware of any facts that would make their respective information incomplete or misleading. Maxim has no obligation to update or modify its opinion.

Maxim was not requested to, and did not, explore alternatives to the transaction or solicit interest of any other parties in pursuing transactions with Xenetic.

**Maxim's Analysis of Hesperix**

Maxim performed a series of analyses to derive indicative valuation ranges for Hesperix' Common Stock.

***Series A Venture Valuation Analysis***

Maxim analyzed precedent Series A investments in preclinical oncology and immunotherapy companies that were announced between January 1, 2015 and December 17, 2018. Given the nature of this type of investment, many transactions do not disclose a valuation. Transactions that did not disclose any deal size or valuation details were not considered as part of this analysis.

The analysis of the pre-market valuation of the peer group yielded an implied equity value of $18.7 million using the mean of the peer group and an implied equity valuation of $20.0 million using the median of the peer group.

***Discounted Cash Flow Analysis***

Maxim performed a discounted cash flow analysis of XCART to calculate the present value of XCART based on the sum of the present values of the projected available cash flow streams and the terminal value of the equity using the Forecasts.

Maxim's discounted cash flow analysis is based on Xenetic management's and Hesperix management's clinical stage & commercial financial cash flow projections up to 2037, year of peak sales. Maxim has assumed that the financial projections have been reasonably prepared on a basis reflecting the best currently available estimates and judgments of Xenetic Management and Hesperix and provided by Xenetic to Maxim. Maxim applied risk adjustments for clinical Probability of Success ("PoS") using Maxim's assumption for the risk of achieving positive clinical outcomes and obtaining regulatory approval. Different PoSs are applied to the entirety of the cash flows for the corresponding stage of the development when the cash flow incurs. The derivation of PoSs is based on multiple literature: Schuhmacher, Grassmann, Hinder 2016, Wong, Siah, Lo 2018, Clinical Development Success Rates 2006-2015 – BIO, Biomedtracker, Amplion 2016. Maxim applied the success rates that are most relevant to Xenetic's pathway to FDA approval.

The projected values were discounted using a Maxim derived discount rate of 24.86% to 27.48%. Given the Target's current capital structure, Maxim assumes no debt. Therefore, the weighted average cost of capital ("WACC") equals the cost of equity ranging from 12.76% to 14.28% plus size risk premium 11.63% (Zanni 2017, Duff & Phelps, 2017 Valuation Handbook: U.S. Guide to Cost of Capital). Maxim also determined the terminal value assuming a perpetuity growth rate of 3.0% at the end of the forecast period (ending in 2037) reflecting the historical inflation rate of 3%.

Maxim utilized a discounted cash flow analysis that calculates the present value of XCART based on the sum of the present values of the probability weighted projected available cash flow streams and the terminal value of the equity. The range of implied equity value is driven by the range of WACC.

The result of the analysis yielded an equity value of $13.8 million to $19.3 million.

Maxim received additional information provided by the Xenetic management on January 21, 2019 and did not consider it to have a material impact on the valuation.

***Precedent M&A Transactions Analysis***

The universe of pure-play comparable M&A precedent transactions for pre-clinical biotech companies is limited. Hence, Maxim included all pre-clinical biotechology precedents and not limiting our analysis to purely oncology and immunotherapy. The analysis covers the period January 1, 2012 to December 17, 2018. In order to ensure that the right precedent transactions for comparison were selected, only transactions including pre-clinical drugs were selected, and all others including drugs in clinical trial were excluded. In addition, 6 out of 10 selected transactions were structured to pay an upfront payments upon closing of the transaction and additional contingent payment upon the achievement of certain development, regulatory and sales milestones ("Earnout") and some include additional royalties. Maxim conservatively has utilized only the upfront payment as the implied enterprise value of the transactions, and Maxim notes that the Transaction does not have any additional contingent payment other than the previously mentioned royalties.

***Public Comparable Companies Valuation***

Maxim analyzed comparable companies listed on the NASDAQ and NYSE in the biotechnology sector. The peer group was then condensed to only include biotechnology companies that have not yet entered clinical stage of development for any of their drug candidate(s).

Maxim believes the selected public comparable companies are not relevant to the overall analysis due to their outsized valuations, as a result of having somewhat of a self-selected ability to go public due to their unique position in the marketplace.

| Company | Ticker | Exchange |
|---|---|---|
| Anixa Biosciences, Inc. | ANIX | NasdaqCM |
| Arvinas Holding Company, LLC | ARVN | NasdaqGS |
| Cue Biopharma, Inc. | CUE | NasdaqCM |
| Editas Medicine, Inc. | EDIT | NasdaqGS |
| Homology Medicines, Inc. | FIXX | NasdaqGS |
| Intellia Therapeutics, Inc. | NTLA | NasdaqGM |
| LogicBio Therapeutics, Inc. | LOGC | NasdaqGM |
| Rubius Therapeutics, Inc. | RUBY | NasdaqGS |

***Other Factors***

In arriving at its opinion, Maxim did not draw, in isolation, conclusions from or with regard to any factor or analysis considered by it. Rather, Maxim made its determination as to fairness on the basis of its experience and professional judgment after considering the results of all of the analyses. The order of the analyses and reviews described in the summary above and the results thereof do not represent the relative importance or weight given to these analyses and reviews by Maxim. Considering selected portions of the analyses and reviews in the summary set forth above, without considering the analyses and reviews as a whole, could create an incomplete or misleading view of the analyses and reviews underlying Maxim's opinion. Maxim may have considered various assumptions more or less probable than other assumptions, so the range of valuations resulting from any particular analysis or combination of analyses described above should not be taken to represent Maxim's view with respect to the actual value of XCART or Xenetic Common Share.

For purposes of its analyses and reviews, Maxim considered industry performance, general business, economic, market and financial conditions and other matters, many of which are beyond the control of Hesperix, Xenetic and their advisors. No company or business used in Maxim's analyses and reviews as a comparison is identical to Hesperix or Xenetic, and an evaluation of the results of those analyses and reviews is not entirely mathematical. Rather, the analyses and reviews involve complex considerations and judgments concerning financial and operating characteristics and other factors that could affect the acquisition, public trading or other values of the companies, businesses or transactions used in Maxim's analyses and reviews. The estimates contained in Maxim's analyses and reviews and the ranges of valuations resulting from any particular analysis or review are not necessarily indicative of actual values or predictive of future results or values, which may be significantly more or less favorable than those suggested by Maxim's analyses and reviews. In addition, analyses and reviews relating to the value of companies, businesses or securities do not purport to be appraisals or to reflect the prices at which companies, businesses or securities actually may be sold. Accordingly, the estimates used in, and the results derived from, Maxim's analyses and reviews are inherently subject to substantial uncertainty, and Maxim assumes no responsibility if future results or values are materially different from those forecasted in such estimates.

From 2016 to early 2018, no material relationship existed between Maxim and its affiliates and Xenetic or Hesperix pursuant to which compensation was received by Maxim or its affiliates as a result of such a relationship. On May 22, 2018, Maxim was retained by Xenetic to serve as financial advisor to Xenetic and to assist the Strategic Alternatives Committee of the Board of Directors in its evaluation of potential strategic alternatives. Maxim will receive a fee in the form of $275,000 cash or $300,000 of Xenetic Common Stock upon the successful close of the Transaction. On March 5$^{th}$ 2019, Maxim acted as the exclusive placement agent for $3.1 million registered directed offering by Xenetic and received compensation. In the future, Maxim may provide financial advisory or other services to Hesperix, Xenetic or their respective affiliates, and in connection with any such services Maxim may receive compensation.

With respect to the Transaction, Maxim did not recommend any specific transaction consideration to the Xenetic Board or Xenetic management or that any specific consideration constituted the only appropriate consideration in the Transaction.

In the ordinary course of business, Maxim or its affiliates may actively trade the securities, or related derivative securities, or financial instruments of Xenetic, Hesperix and their respective affiliates, for its own account and for the accounts of its customers and, accordingly, may at any time hold a long or short position in such securities or instruments.

**Certain Financial Forecasts**

Xenetic does not publicly disclose long-term forecasts as to future revenue, earnings or other results due to, among other reasons, the uncertainty and subjectivity of the underlying assumptions and estimates. As a result, Xenetic does not provide the unaudited forecast financial information as a reliable indication of future results. Xenetic is including certain unaudited forecast financial information in this document solely because it was among the financial information made available to the Xenetic Board of Directors and the SAC and used by Xenetic's financial advisor in connection with its evaluation of the Transaction. The unaudited forecast financial information presented below includes forecasts for XCART prepared by Xenetic management in consultation with certain of the Sellers as part of Transaction process. Except to the extent required by applicable law, Xenetic undertakes no obligation to update the forecast financial information included in this proxy statement/prospectus and has not done so and does not intend to do so. The inclusion of this information should not be regarded as an indication that any of Xenetic, Xenetic's financial advisor, Hesperix, or any other recipient of this information considered, or now considers, it in any way predictive of actual future results. There can be no assurance that the forecast results will be realized or that actual results will not be significantly higher or lower than set forth below.

Since the unaudited forecast financial information covers multiple years beginning in 2026, such information, by its nature, is in no way predictive at the start, and becomes less predictive with each successive year. The unaudited forecast financial information was not prepared with a view toward public disclosure, nor was it prepared with a view toward compliance with applicable securities laws, published guidelines of the SEC, or the guidelines established by the American Institute of Certified Public Accountants for preparation and presentation of forecast financial information. Neither Xenetic's independent registered public accounting firm, nor any other independent accounting firm has audited, reviewed, compiled, or performed any procedures with respect to the unaudited forecast financial information for the purpose of its inclusion herein and, accordingly, neither Xenetic's independent registered public accounting firm nor any other independent accounting firm express an opinion or provide any form of assurance with respect thereto for the purpose of this proxy statement/prospectus. The report of Xenetic's independent registered public accounting firm included in this proxy statement/prospectus, relates only to the historical financial information of Xenetic. Such report does not extend to the unaudited forecast financial information set forth below and should not be read to do so. Furthermore, the unaudited forecast financial information does not take into account any circumstances or events occurring after the date it was prepared.

**XCART Unaudited Forecast Financial Information [(1)]**

| | (amounts in millions) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Year Ending December 31, | | | | | | | | | | | |
| | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 |
| Revenue | $ 291.1 | $ 585.7 | $ 882.9 | $ 1,183.1 | $ 1,486.2 | $ 1,792.4 | $ 1,801.4 | $ 1,819.4 | $1,819.4 | $1,828.5 | $1,837.7 | $1,846.9 |
| Total Expenses | 179.1 | 344.9 | 453.0 | 591.7 | 725.1 | 853.8 | 842.0 | 827.8 | 831.5 | 835.3 | 839.2 | 843.1 |
| Net Income [(2)] | 100.8 | 187.8 | 335.3 | 461.3 | 593.7 | 732.1 | 748.3 | 766.5 | 770.5 | 774.7 | 778.8 | 783.0 |
| Free Cash Flows from Operations | 100.8 | 187.8 | 335.3 | 461.3 | 593.7 | 732.1 | 748.3 | 766.5 | 770.5 | 774.7 | 778.8 | 783.0 |

(1) The Unaudited Forecast Financial Information was further adjusted at an assumed probability of success rate of 9.7%.
(2) Assuming an effective tax rate of 22%, net of NOLs.

**Vote Required**

The affirmative vote of a majority of the votes cast affirmatively or negatively at the Special Meeting by the holders of our Common Stock is required to approve the Transaction Proposal.

**THE BOARD OF DIRECTORS RECOMMENDS THAT YOU VOTE "FOR" THE TRANSACTION PROPOSAL**

## PROPOSAL TWO

## PROPOSAL TWO: THE SHARE ISSUANCE PROPOSAL

The Share Issuance Proposal is a proposal to approve under the listing rules of NASDAQ the issuance of shares of Common Stock in connection with the Transaction to be voted on in the Transaction Proposal.

The Company's Common Stock is listed on the NASDAQ Capital Market and, as such, the Company is subject to the NASDAQ listing rules.

Under NASDAQ listing rules, a company whose stock is listed on NASDAQ, such as the Company, is required to obtain stockholder approval prior to certain issuances of common stock or securities convertible into or exchangeable for common stock, in connection with an acquisition, if such issuance (i) equals 20% or more of the common stock or voting power of the company outstanding before the transaction or (ii) in connection with the acquisition of assets of another company where any director, officer or a "substantial shareholder" (generally defined as a 5% or greater shareholder) has a 5% or greater interest (or such persons collectively have a 10% or greater interest), directly or indirectly, in the consideration to be paid in the transaction, and the present or potential issuance of common shares could result in an increase in outstanding common shares or voting power of 5% or more.

Immediately after the completion of the Transaction, the number of outstanding shares of Common Stock and the outstanding voting power of the Company will exceed 20% of the shares of Common Stock outstanding before such issuance and issuances to certain stockholders will result in an increase in such stockholders' outstanding common shares or voting power of 5% or more. For this reason, the Company must obtain the approval of its stockholders, in accordance with the NASDAQ listing rules, for the issuance of shares of Common Stock in connection with such conversion. Accordingly, the Company is asking its stockholders to approve the issuance of shares of Common Stock in the Transaction.

**Effects of the Share Issuance Proposal on Stockholders**

The issuance of the Transaction Shares will result in (i) an additional 7,500,000 shares of Common Stock and (ii) additional shares of Common Stock valuing $300,000 which, based on closing per share price on the Record Date would result in an additional [●] shares. After giving effect to all shares of Common Stock issued in or in connection with the Transaction, Company stockholders immediately before completion of the Transaction will hold approximately [●]% of the issued and outstanding Common Stock and Sellers will hold approximately [●]% of the issued and outstanding Common Stock.

Because the shares of Common Stock issued to the Sellers will be issued in a transaction registered under the Securities Act, the Sellers, other than the Sellers who are affiliates of the Company, may be able to resell their shares. Subsequent resales of such shares of Common Stock may cause the market price of our Common Stock to decline. The issuance would also increase the number of shares of Common Stock outstanding, which may have the effect of reducing the Company's loss per share.

The OPKO Transaction Shares and Institute Transaction Shares will be issued in a transaction exempt from the registration requirements of the Securities Act. We have agreed, as soon as practicable after closing the Transaction, to register for resale the Transaction Shares issued to OPKO and the Institute.

**Consequences if Stockholder Approval is Not Obtained**

If the Company's stockholders do not approve the Share Issuance Proposal, the shares of Common Stock will not be issued unless the Company's stockholders subsequently approve the Share Issuance Proposal by the required vote under the NASDAQ listing rules.

The Share Issuance Proposal is conditioned upon and subject to the approval of the Transaction Proposal. If the Transaction Proposal is not approved, the Share Issuance Proposal will have no effect, even if approved by our stockholders.

**Vote Required**

The affirmative vote of a majority of the votes cast at the Special Meeting by the holders of our Common Stock is required to approve the Share Issuance Proposal.

**THE BOARD OF DIRECTORS RECOMMENDS THAT YOU VOTE "FOR" THE SHARE ISSUANCE PROPOSAL**

## PROPOSAL THREE

## PROPOSAL THREE: THE DIRECTOR PROPOSAL

At the Special Meeting, one director will be voted on to serve until the 2020 annual meeting of stockholders or until a successor for such director is elected and qualified, or until the death, resignation or removal of such director. There is only one nominee for the Board of Directors in this special election.

Mr. Vinogradov has agreed to serve, if elected, and the Board has no reason to believe that the nominee will be unavailable or will decline to serve. In the event, however, that the nominee is unable or declines to serve as a director at the time of the annual meeting, the proxies will be voted for any nominee who is designated by the current Board. Unless otherwise instructed, the proxy holders will vote the proxies received by them "FOR" the following nominee:

***Alexey Vinogradov***, 48, currently serves as Business Development Director and Operations Director at Cantreva LLC, a Russian company with extensive specialized experience of delivering services in the field of renewable energy (solar, wind, hydro power), performing works on a "turnkey" basis, since September 2017. Mr. Vinogradov previously served as General Manager at Togas Middle East LLC in Dubai, UAE from May 2015 to May 2017. Prior to that, Mr. Vinogradov served as branch manager at Togas Group LLC in Russia from March 2012 to November 2016. We believe Mr. Vinogradov's experience in business communication, international business development and financial analytics provides him with the appropriate set of skills to serve as a member of our Board. Mr. Vinogradov has been nominated pursuant to the terms of the Share Purchase Agreement.

The following is a biographical description of each of the members of our board of directors and our executive officers:

| Name | Age | Position |
|---|---|---|
| Jeffrey Eisenberg | 53 | Chief Executive Officer and Director |
| Dr. James E. Callaway | 62 | Director (1), (2), (3) |
| Firdaus Jal Dastoor, FCS | 66 | Director (1), (2) |
| Dr. Dmitry Genkin | 50 | Director |
| Roman Knyazev | 38 | Director |
| Dr. Roger Kornberg | 71 | Director (3) |
| Mr. Adam Logal | 40 | Director (1), (2), (3) |

(1) Member of the Audit Committee

(2) Member of the Compensation Committee

(3) Member of the Nominating and Corporate Governance Committee

***Jeffrey F. Eisenberg*** was appointed our Chief Executive Officer on October 26, 2017, after serving as Chief Operating Officer since December 2, 2016, and has served as a member of our Board since July 2016. Mr. Eisenberg previously worked at Noven Pharmaceuticals, Inc. ("Noven"), a subsidiary of Hisamitsu Pharmaceutical, Inc., where he held various positions of increasing responsibility, most recently serving from 2009-2016 as Noven's president, chief executive officer and as a member of its board of directors. Mr. Eisenberg obtained his J.D. at Columbia University Law School and a B.S. in Economics from the Wharton School, University of Pennsylvania. We believe Mr. Eisenberg's significant life science executive experience and leadership experience in the areas of R&D, operations, manufacturing/quality, business development, strategic partnering, product development, commercialization, and human resources provides him with the appropriate set of skills to serve as a member of our Board.

***James E. Callaway*** was appointed to the Board on August 14, 2017. Dr. Callaway has over 30 years of experience in the execution of product development operations for biotherapeutics. Dr. Callaway is a seasoned CEO within the venture-backed biotech community and over the course of his career he has built and operated two companies, transforming each from research companies to clinical stage operating entities. Since 2016, he has served as a Corporate Strategy Consultant at Callaway Innovations. From 2012 until 2016, Dr. Callaway was President and Chief Executive Officer of ArmaGen, Inc. and from 2008 until 2012, served as President and CEO of CEBIX, Inc. Prior to these efforts, Dr. Callaway held multiple senior leadership positions at Elan Pharmaceuticals, including simultaneously acting as Head of Development and overseeing the complex partnership with Wyeth Pharmaceuticals in the Alzheimer's disease immunotherapy program. He has developed antibodies for a wide-range of therapeutic applications over the past two decades, including treatments of multiple sclerosis (Tysabri®: pharmaceutical development), Alzheimer's disease (bapineuzumab: Program Executive), and blood-brain barrier transport, and has worked with the United States Food and Drug Administration on multiple orphan drug development programs. We believe Dr. Callaway's significant life sciences executive, leadership and strategic experience in the area of biotherapeutics provides him with the appropriate set of skills to serve as a member of our Board.

***Firdaus Jal Dastoor, FCS*****,** was initially appointed as a member of our Board in January 2014 pursuant to terms of the agreement of our acquisition of Xenetic U.K. He has been employed by the Cyrus Poonawalla Group, a conglomerate in India with interests in horse racing and breeding, biotech, engineering and hotels, in business development strategies and operational roles since October 1981. Mr. Dastoor is currently a Group Director in charge of Finance and Corporate Affairs and Company Secretary of the Serum Institute of India Private Limited at the Cyrus Poonawalla Group, one of our significant stockholders. He is a Fellow Member of The Institute of Company Secretaries of India since 1990. Mr. Dastoor is on the board of several private companies operating in the fields of engineering products, life sciences and biotech, international trade, financial services and quality standards certifications. Mr. Dastoor received a B.A. in Commerce from the University of Poona. We believe Mr. Dastoor's knowledge of investments in the life sciences and biotechnology industries, and his finance and business development background provide him with the appropriate set of skills to serve as a member of our Board.

***Dmitry Genkin*** was appointed to the Board on August 14, 2017. Dr. Genkin currently serves on the Company's Scientific Advisory Board and previously served on the Company's Board of Directors from 2004-2016. He has the Russian equivalent of an MD in Internal Therapy and studied drug delivery under Professor Gregory Gregoriadis at The School of Pharmacy, University of London in 1992, as well as the Department of Clinical Pharmacology at Karolinska Hospital, Stockholm from 1992 until 1993. Since 2005, Dr. Genkin has served as Executive Chairman of PJSC Pharmsynthez, a public company and Xenetic's majority stockholder. Prior to that time, Dr. Genkin headed a number of Russia's largest pharmaceutical companies including Pharmavit, which had 27% of the Russian pharmaceutical market. In 1998, he was awarded the silver medal by the Russian Natural Science Academy. We believe Dr. Genkin's significant life sciences, biotechnology and international background provide him with the appropriate set of skills to serve as a member of our Board.

***Roman Knyazev*** has served as a member of our Board since April 2014. Mr. Knyazev has served in various positions at Rusnano Moscow since 2009, most recently as its Investment Director. He also serves on the boards of directors of Nanolek, PETAR, PJSC Pharmsynthez, and SynBio LLC. Mr. Knyazev is a Fellow of the Kauffman Fellows Program. We believe Mr. Knyazev's experience investing in clinical stage biotechnology companies provides him with the appropriate set of skills to serve as a member of our Board.

***Dr. Roger Kornberg*** has served as a member of our Board since February 2016. Dr. Kornberg is a member of the U.S. National Academy of Sciences and the Winzer Professor of Medicine in the Department of Structural Biology at Stanford University. He earned his B.S. in chemistry from Harvard University in 1967 and his Ph.D. in chemical physics from Stanford in 1972. He became a postdoctoral fellow at the Laboratory of Molecular Biology in Cambridge, England and then an assistant professor of biological chemistry at Harvard Medical School in 1976, before moving to his present position as professor of structural biology at Stanford Medical School in 1978. In 2006, Dr. Kornberg was awarded the Nobel Prize in Chemistry in recognition for his studies of the molecular basis of Eukaryotic Transcription, the process by which DNA is copied to RNA. Dr. Kornberg is also the recipient of several awards, including the 2001 Welch Prize, the highest award granted in the field of chemistry in the United States, and the 2002 Leopald Mayer Prize, the highest award granted in the field of biomedical sciences from the French Academy of Sciences. We believe Dr. Kornberg's prior experience serving on the boards of directors of large organizations as well as his scientific background provides him with the appropriate set of skills to serve as a member of our Board.

***Mr. Adam Logal*** was appointed to the Board in August 2017. Mr. Logal has over 16 years of experience in the biopharmaceuticals industry. Since April 2014, Mr. Logal has served as Senior Vice President, Chief Financial Officer, Chief Accounting Officer and Treasurer of OPKO Health, Inc. and from March 2007 until April 2014 served as OPKO's Vice President of Finance, Chief Accounting Officer and Treasurer. Mr. Logal served as a director of VBI Vaccines, Inc., a publicly-traded company, from May 2015 through October 2018 and served as its Audit Committee Chairman. Prior to joining OPKO, Mr. Logal served in various financial management roles at Nabi Biopharmaceuticals, a commercial stage biopharmaceutical company. Mr. Logal is a strategic finance executive with extensive experience in SEC compliance and reporting, domestic and international finance, strategic planning, cash flow management, budgeting, taxation, treasury and business development. We believe Mr. Logal's extensive financial experience with public companies in the life sciences industry provides him with appropriate set of skills to serve as a member of our Board.

There are no family relationships among any of our directors, the director nominee and executive officers and, to the best of our knowledge, none of our directors, the director nominee or executive officers has, during the past ten years, been involved in any legal proceedings which are required to be disclosed pursuant to the rules and regulations of the SEC.

**Committees of the Board**

The Board has three standing committees: an Audit Committee, a Compensation Committee, and a Nominating and Corporate Governance Committee. The Board also has two special committees: an Expense Management and Financing Oversight Committee and a Strategic Alternatives Committee. The Expense Management and Financing Oversight Committee was formed in October 2017. The Strategic Alternatives Committee was formed in March 2018. The Company has adopted charters to govern the conduct, authority and responsibilities of each of the Audit Committee, Compensation Committee and Nominating and Corporate Governance Committee. The Board has not determined, if elected at the Special Meeting, on what committees Mr. Vinogradov will serve.

**Audit Committee**

The Audit Committee of the Board of Directors was established by the Board in accordance with Section 3(a)(58)(A) of the Exchange Act, to oversee the Company's corporate accounting and financial reporting processes and audits of its financial statements. For this purpose, the Audit Committee performs several functions. The Audit Committee evaluates the performance of and assesses the qualifications of the independent auditors; determines and approves the engagement of the independent auditors; determines whether to retain or terminate the existing independent auditors or to appoint and engage new independent auditors; reviews and approves the retention of the independent auditors to perform any proposed permissible non-audit services; monitors the rotation of partners of the independent auditors on the Company's audit engagement team as required by law; reviews and approves or rejects transactions between the Company and any related persons; confers with management and the independent auditors regarding the effectiveness of internal control over financial reporting; establishes procedures, as required under applicable law, for the receipt, retention and treatment of complaints received by the Company regarding accounting, internal accounting controls or auditing matters and the confidential and anonymous submission by employees of concerns regarding questionable accounting or auditing matters; and meets to review the Company's annual audited financial statements and quarterly financial statements with management and the independent auditor, including a review of the Company's disclosures under the "Management's Discussion and Analysis of Financial Condition and Results of Operations" section of the Company's Annual Report to Stockholders on Form 10-K.

For the fiscal year 2018, the Audit Committee was composed of three directors: Mr. Dastoor, Dr. Callaway, and Mr. Logal (chair). The Audit Committee met five times during fiscal year 2018. The Board has adopted a written Audit Committee charter that is available to stockholders on the Company's website at http://ir.xeneticbio.com/.

The Board of Directors reviews the NASDAQ listing standards definition of independence for Audit Committee members on an annual basis and has determined that all current members of our Audit Committee are independent (as independence is currently defined in Rule 5605(c)(2)(A)(i) and (ii) of the NASDAQ listing standards).

The Board of Directors has also determined that Mr. Logal qualifies as an "audit committee financial expert," as defined in applicable SEC rules. The Board made a qualitative assessment of Mr. Logal's level of knowledge and experience based on a number of factors, including his formal education and experience as a chief financial officer.

***Report of the Audit Committee of the Board of Directors***

The Audit Committee has reviewed and discussed the audited financial statements for the fiscal year ended December 31, 2018 with management of the Company. The Audit Committee has discussed with the independent registered public accounting firm the matters required to be discussed by Auditing Standard No. 1301, *Communications with Audit Committees,* as adopted by the Public Company Accounting Oversight Board ("PCAOB"). The Audit Committee has also received the written disclosures and the letter from the independent registered public accounting firm required by applicable requirements of the PCAOB regarding the independent accountants' communications with the audit committee concerning independence, and has discussed with the independent registered public accounting firm the accounting firm's independence. Based on the foregoing, the Audit Committee has recommended to the Board of Directors that the audited financial statements be included in the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2018.

Mr. Adam Logal, Chairman
Dr. James E. Callaway
Mr. Firdaus Jal Dastoor, FCS

**Compensation Committee**

For the fiscal year 2018, the Compensation Committee was composed of three directors: Mr. Dastoor, Dr. Callaway (chair), and Mr. Logal. All current members of our Compensation Committee are independent (as independence is currently defined in Rule 5605(d)(2) of the NASDAQ listing standards). The Board has adopted a written Compensation Committee charter that is available to stockholders on the Company's website at http://ir.xeneticbio.com/. The Compensation Committee of the Board acts on behalf of the Board to review, recommend for adoption and oversee our compensation strategy, policies, plans and programs, including:

- establishment of corporate and individual performance objectives relevant to the compensation of our executive officers and directors and evaluation of performance in light of these stated objectives;
- review and approval of the compensation and other terms of employment or service of our Chief Executive Officer; and
- administration of our equity compensation plans, pension and profit-sharing plans, deferred compensation plans and other similar plan and programs.

The Compensation Committee determines salaries, incentives and other forms of compensation for the Chief Executive Officer and our executive officers and reviews and makes recommendations to the Board with respect to director compensation. The Compensation Committee meets without the presence of executive officers when approving or deliberating on executive officer compensation, but may invite the Chief Executive Officer to be present during the approval of, or deliberations with respect to, other executive officer compensation. The Compensation Committee reviews and approves the terms of offer letters, employment agreements, severance agreements, change-in-control agreements, indemnification agreements and other material agreements between us and our executive officers. In addition, the Compensation Committee administers our stock incentive compensation and equity-based plans.

**Nominating and Corporate Governance Committee**

The Nominating and Corporate Governance Committee of the Board is responsible for identifying, reviewing and evaluating candidates to serve as directors of the Company (consistent with criteria approved by the Board), reviewing and evaluating incumbent directors, recommending to the Board for selection candidates for election to the Board of Directors, making recommendations to the Board regarding the membership of the committees of the Board, and developing a set of corporate governance principles for the Company. For the fiscal year 2018, the Nominating and Corporate Governance Committee was composed of three directors: Dr. Kornberg, Dr. Callaway (chair), and Mr. Logal. All current members of the Nominating and Corporate Governance Committee are independent (as independence is currently defined in Rule 5605(a)(2) of the NASDAQ listing standards). The Nominating and Corporate Governance Committee met once during 2018. The Board has adopted a written Nominating and Corporate Governance Committee charter that is available to stockholders on the Company's website at http://ir.xeneticbio.com/.

The Nominating and Corporate Governance Committee believes that candidates for director should have certain minimum qualifications, including the ability to read and understand basic financial statements, being over 21 years of age and having the highest personal integrity and ethics. The Nominating and Corporate Governance Committee also intends to consider such factors as possessing relevant expertise upon which to be able to offer advice and guidance to management, having sufficient time to devote to the affairs of the Company, demonstrated excellence in his or her field, having the ability to exercise sound business judgment and having the commitment to rigorously represent the long-term interests of the Company's stockholders. However, the Nominating and Corporate Governance Committee retains the right to modify these qualifications from time to time. Candidates for director nominees are reviewed in the context of the current composition of the Board, the operating requirements of the Company and the long-term interests of stockholders. In conducting this assessment, the Nominating and Corporate Governance Committee typically considers diversity, age, skills and such other factors as it deems appropriate, given the current needs of the Board and the Company, to maintain a balance of knowledge, experience and capability.

While we do not have a formal diversity policy with respect to Board composition, the Board believes it is important for the Board to have diversity of knowledge base, professional experience and skills, and the Nominating and Corporate Governance Committee takes these qualities into account when considering director nominees for recommendation to the Board.

The Nominating and Corporate Governance Committee will consider director candidates recommended by stockholders. A stockholder who wishes to suggest a prospective nominee for the Board of Directors should notify the Company's Secretary or any member of the Nominating and Corporate Governance Committee in writing and include any supporting material the stockholder considers appropriate. In addition, the Company's Amended and Restated Bylaws contain provisions addressing the process by which a stockholder may nominate an individual to stand for election to the Board of Directors at its Annual Meeting of Stockholders. In order to nominate a candidate for director, a stockholder must give timely notice in writing to the Company's Secretary and otherwise comply with the provisions of our Amended and Restated Bylaws. To be timely, our Amended and Restated Bylaws provide that we must have received the notice not less than 90 days or more than 120 days prior to the one-year anniversary of the date of the previous year's Annual Meeting of Stockholders (the "Anniversary"); provided, however, that in the event that the date of next year's Annual Meeting is more than 30 days before or more than 30 days after the Anniversary, notice must be delivered not earlier than the close of business on the 120th day prior to next year's Annual Meeting and not later than the close of business on the later of (i) the 90th day prior next year's Annual Meeting or (ii) the close of business on the 10th day following the day on which public announcement of the date of next year's Annual Meeting is first made by us. Information required by our Amended and Restated Bylaws to be in the notice includes: (A) all information relating to such person that is required to be disclosed in solicitations of proxies for election of directors, or is otherwise required, in each case, pursuant to Regulation 14A under the Securities Exchange Act of 1934, as amended (including such person's written consent to being named in the proxy statement/prospectus as a nominee and to serving as a director, if elected); (B) a description of all direct and indirect compensation and other material monetary agreements, arrangements and understandings during the past three (3) years, and any other material relationships, between or among such stockholder, the beneficial owner, if any, on whose behalf any such proposal or nomination is being made, and their respective affiliates and associates, on the one hand, and each proposed nominee, and his or her respective affiliates and associates, on the other hand, including, without limitation, all information that would be required to be disclosed pursuant to Item 404 of Regulation S-K promulgated under the Securities Act of 1933, as amended, if such stockholder, such beneficial owner, or any affiliate or associate thereof, were the "registrant" for purposes of such rule and the nominee were a director or executive officer of such registrant; (C) to the extent known by the stockholder, the name and address of any other security holder of the Company who owns, beneficially or of record, any securities of the Company and who supports any nominee proposed by such stockholder; and (D) a questionnaire and a representation and agreement, completed and signed by such person, as required by our Amended and Restated Bylaws.

Stockholder nominations must be made in accordance with the procedures outlined in, and include the information required by, our Amended and Restated Bylaws and must be addressed to our Corporate Secretary, c/o Xenetic Biosciences, Inc., 40 Speen Street, Suite 102, Framingham, Massachusetts 01701. You can obtain a copy of our Amended and Restated Bylaws by writing to the Corporate Secretary at this address.

**Independence of The Board of Directors**

As required under the NASDAQ listing standards, a majority of the members of a listed company's board of directors must qualify as "independent," as affirmatively determined by the Board of Directors. The Board consults with advisors to ensure that the Board's determinations are consistent with relevant securities and other laws and regulations regarding the definition of "independent," including those set forth in pertinent listing standards of NASDAQ, as in effect from time to time.

Consistent with these considerations, after review of all relevant identified transactions or relationships between each director, or any of his or her family members, and the Company, its senior management and its independent auditors, the Board affirmatively determined that the following directors were independent directors within the meaning of the applicable NASDAQ listing standards for the period during which they served as a member of the Board during fiscal year 2018: Dr. Callaway, Mr. Dastoor, Dr. Kornberg, and Mr. Logal. In addition, the Board has determined that Mr. Vinogradov will be an independent director within the meaning of the applicable NASDAQ listing standards.

During fiscal year 2018, all members of our Audit Committee, Nominating and Corporate Governance Committee, and Compensation Committee were independent (as independence is currently defined in Rule 5605 of the NASDAQ listing standards).

**Board Leadership Structure**

Prior to August 2017, we combined the positions of Chief Executive Officer and Board Chair. As of August 2017, we separated the roles of Chief Executive Officer and Board Chair in recognition of the differences between the two roles. The Board of Directors is currently chaired by independent director, Adam Logal, and our current Chief Executive Officer, Jeffrey Eisenberg, is our only employee-director. The Chief Executive Officer is responsible for setting the strategic direction for the Company and the day to day leadership and performance of the Company, while the Board Chair is responsible for leading the Board in the execution of its fiduciary duties. The Board Chair presides over meetings of the full Board. While we recognize that different board leadership structures may be appropriate for companies in different situations, we believe our current leadership structure is the optimal structure for the Company at this time.

**Role of the Board in Risk Oversight**

Our management is principally responsible for defining the various risks facing the Company, formulating risk management policies and procedures, and managing our risk exposures on a day-to-day basis. The Board's principal responsibility in this area is to ensure that sufficient resources, with appropriate technical and managerial skills, are provided throughout the Company to identify, assess and facilitate processes and practices to address material risk and to monitor our risk management processes by informing itself concerning our material risks and evaluating whether management has reasonable controls in place to address the material risks. The involvement of the Board in reviewing our business strategy is an integral aspect of the Board's assessment of management's tolerance for risk and its determination of what constitutes an appropriate level of risk for the Company.

**Stockholder Communications With The Board Of Directors**

Historically, we have not provided a formal process related to stockholder communications with the Board. All communications to our Board, our Board committees or any individual director, must be in writing and addressed to our Corporate Secretary, c/o Xenetic Biosciences, Inc., 40 Speen Street, Suite 102, Framingham, Massachusetts 01701. All communications will be reviewed by the Secretary and, unless otherwise indicated in such communication, submitted to the Board or an individual director, as appropriate.

**Code of Business Conduct and Ethics**

We have adopted the Xenetic Biosciences, Inc. Code of Business Conduct and Ethics that applies to all of our employees, officers and directors, including our principal executive officer, principal financial officer and principal accounting officer. The Code of Business Conduct and Ethics is available on our website, www.xeneticbio.com, under "Investors" at "Corporate Governance." If we make any substantive amendments to the Code of Business Conduct and Ethics or grant any waiver from a provision of the Code of Business Conduct and Ethics to any executive officer or director, we intend to promptly disclose the nature of the amendment or waiver on our website, to the extent required by the applicable rules and exchange requirements.

**Meetings of The Board of Directors**

The Board of Directors met five times during the last fiscal year. Each Board member attended 75% or more of the aggregate number of meetings of the Board and of the committees on which she or he served that were held during the portion of the last fiscal year for which she or he was a director or committee member, except as follows: Dr. Kornberg attended 40% of the Board meetings during 2018. At the Company's last annual meeting of stockholders, which was held in November of 2018, six of our Board members attended the meeting and were available to be heard by those present at the meeting.

**Section 16(a) Beneficial Ownership Reporting Compliance**

Section 16(a) of the Exchange Act requires our directors and executive officers, and persons who own more than ten percent of a registered class of our equity securities, to file with the SEC initial reports of ownership and reports of changes in ownership of our ordinary shares and other equity securities. Such persons are required by SEC regulations to furnish us with copies of all Section 16(a) forms they file.

To our knowledge, based solely on a review of the copies of such reports furnished to us and written representations that no other reports were required, during the fiscal year ended December 31, 2018, we believe that all Section 16(a) filing requirements applicable to our executive officers, directors and greater than 10% beneficial owners were complied with, except that one report, covering an aggregate of one transaction, was filed late by Dr. Dmitry Genkin.

## Executive Compensation

### Summary Compensation Table

The following table sets forth, for the years ended December 31, 2018 and 2017, the compensation information for Jeffrey Eisenberg, our Chief Executive Officer, Dr. Curtis Lockshin, our Chief Scientific Officer, and James Parslow, our Chief Financial Officer. We refer to Messrs. Eisenberg, Lockshin, and Parslow, collectively, as our "named executive officers."

| Name and Principal Position | Year | Salary ($) | Bonus ($) | Stock Awards ($) | Option Awards[1] ($) | Non-Equity Incentive Plan Compensation ($) | All Other Compensation ($) | Total ($) |
|---|---|---|---|---|---|---|---|---|
| Jeffrey F. Eisenberg, | 2018 | $ 300,000 | $ – | $ – | $ – | $ – | $ 18,333[2] | $ 318,333 |
| *Chief Executive Officer* | 2017 | $ 300,000[3] | $ – | $ 105,720 | $ 375,389 | $ – | $ 34,381 | $ 815,490 |
| James Parslow, | 2018 | $ 265,000 | $ – | $ – | $ – | $ – | $ 22,595[4] | $ 287,595 |
| *Chief Financial Officer* | 2017 | $ 198,750[5] | $ – | $ – | $ 667,216 | $ – | $ 24,830 | $ 890,796 |
| Dr. Curtis Lockshin, | 2018 | $ 250,000 | $ – | $ – | $ – | $ – | $ 9,584[6] | $ 259,584 |
| *Chief Scientific Officer* | 2017 | $ 250,000[7] | $ – | $ – | $ 625,316 | $ – | $ 2,523 | $ 877,839 |

(1) The amounts represent the aggregate grant date fair value of stock options granted in the applicable fiscal year, computed in accordance with FASB ASC Topic 718, excluding the effect of estimated forfeitures. Assumptions used in the calculation of this amount are set forth in Note 10 to our audited consolidated financial statements included in Item 8 of the Annual Report to Stockholders. Mr. Eisenberg, Mr. Parslow, and Dr. Lockshin were granted options to purchase 250,000 shares, 175,000 shares and 175,000 shares of Common Stock, respectively, during 2017. In addition, Mr. Eisenberg was granted 50,000 restricted stock units in 2017.

(2) For 2018, includes $18,333 for health and welfare plans.

(3) Mr. Eisenberg was appointed our Chief Operating Officer in December 2016 and Chief Executive Officer in October 2017. Mr. Eisenberg served as a director of the Company from July 2016 through November 2016. As an employee, Mr. Eisenberg no longer receives compensation for serving as a member of our Board.

(4) Includes $22,595 for health and welfare plans.

(5) Mr. Parslow was appointed our Chief Financial Officer in April 2017.

(6) Includes $9,584 for health and welfare plans.

(7) Dr. Lockshin was appointed our Chief Scientific Officer in January 2017.

**Outstanding Equity Awards at Fiscal Year-End**

The following table sets forth certain information with respect to outstanding equity awards held by our named executive officers at December 31, 2018.

| | Option Awards | | | | Stock Awards | |
|---|---|---|---|---|---|---|
| Name | Number of Securities Underlying Unexercised Options, Exercisable | Number of Securities Underlying Unexercised Options, Unexercisable | Option Exercise Price ($) | Option Expiration Date | Number of Shares or Units of Stock That Have Not Vested | Market Value of Shares or Units of Stock That Have Not Vested ($) |
| Jeffrey F. Eisenberg | 154,900(1) | 75,100(1) | 3.40 | 12/2/2026 | — | — |
| | 41,667(2) | 208,333(2) | 2.11 | 10/26/2027 | — | — |
| | — | — | — | — | 33,333(3) | $70,480 |
| James Parslow | 58,333(4) | 116,667(4) | 4.57 | 4/3/2027 | — | — |
| Curtis Lockshin | 14,546(5) | — | 4.59 | 12/31/2024 | — | — |
| | 15,152(6) | — | 4.59 | 9/6/2025 | — | — |
| | 58,333(7) | 116,667(7) | 4.30 | 1/1/2027 | — | — |

(1) 4,700 shares vested 100% on the date of grant. Remainder vests one-third upon the first anniversary of the grant date, one-third of the remaining amount upon the second anniversary of the grant date and one-third of the remaining amount on the third anniversary of the grant date.

(2) 125,000 of the options granted vest one-third upon the first anniversary of the grant date, one-third upon the second anniversary of the grant date and one-third upon the third anniversary of the grant date. 100,000 of the options granted vest upon the achievement of key clinical milestones for XBIO-101 and 25,000 of the options granted vest upon the achievement of key development milestones related to PSA.

(3) References restricted stock units ("RSUs") granted on October 26, 2017. Each RSU represents the right to receive one share of the Company's Common Stock upon settlement, as defined. The RSUs vest one-third upon the first anniversary of the grant date, one-third upon the second anniversary of the grant date and one-third upon the third anniversary of the grant date.

(4) Vests one-third upon the first anniversary of the grant date, one-third upon the second anniversary of the grant date and one-third upon the third anniversary of the grant date.

(5) Vested one-third upon March 3, 2015, one-third upon March 15, 2016 and one-third upon March 15, 2017.

(6) Vested one-third upon the first anniversary of the grant date, one-third upon the second anniversary of the grant date and one-third upon the third anniversary of the grant date.

(7) Vests one-third upon the first anniversary of the grant date, one-third upon the second anniversary of the grant date and one-third upon the third anniversary of the grant date.

**Employment Agreements with our Named Executive Officers**

***Employment Agreement with Mr. Eisenberg***

We entered into an employment agreement with Mr. Eisenberg effective as of December 1, 2016 for him to serve as Chief Operating Officer (the "Original Agreement"). The Original Agreement was for an initial term of one year, and automatically renewed for successive one year periods unless either party gave notice to the other no later than 90 days prior to the expiration of the then-applicable term; provided, however, that we could terminate the Original Agreement at any time. Mr. Eisenberg's annual salary under the Original Agreement was $300,000, and was subject to annual review and upward adjustment only by the Compensation Committee of the Board. Mr. Eisenberg was also eligible to receive a bonus equal to 35% of his annual salary based on the attainment of certain individual and/or Company goals established by the Board or a committee thereto. Mr. Eisenberg was also eligible to participate in our employee benefit, welfare and other plans, as may be maintained by us from time to time, on a basis no less favorable than those provided to other similarly situated executives of the Company. Mr. Eisenberg was also subject to certain customary confidentiality, non-solicitation and non-competition provisions.

Under the Original Agreement, if Mr. Eisenberg's employment was terminated by us without "Cause" (as defined in the Original Agreement) or if he resigned for "Good Reason" (as defined in the Original Agreement), he was entitled to receive (i) six months of his then current base salary, paid over time in accordance with our payroll practices then in effect if he had been employed by us for six months or less, (ii) 12 months of his then current base salary, paid over time in accordance with our payroll practices then in effect if he had been employed by us for more than six months, (iii) a pro-rated annual bonus and (iv) payment of premiums for continued health benefits under COBRA for up to six months.

On October 26, 2017, the Company amended and restated the Original Agreement in order to employ Mr. Eisenberg as the Chief Executive Officer of the Company, effective as of the same date (the "Amended Agreement"). The terms of the Amended Agreement were substantially similar to the terms of the Original Agreement, except for Mr. Eisenberg is now eligible to receive a bonus equal to 50% of his annual salary based on the attainment of certain individual and/or Company goals established by the Board or a committee thereto, and if Mr. Eisenberg's employment is terminated by us without "Cause" (as defined in the Amended Agreement) or if he resigns for "Good Reason" (as defined in the Amended Agreement), he will be entitled to receive (i) within thirty days following the date of termination, an amount equal to one times his then current base salary, (ii) a pro-rated annual bonus and (iii) payment of premiums for continued health benefits under COBRA for up to twelve months.

***Employment Agreement with Mr. Parslow***

We entered into an employment agreement with Mr. Parslow effective as of April 3, 2017 (the "Parslow Employment Agreement"). The Parslow Employment Agreement does not provide for a specified term of employment and Mr. Parslow's employment will be on an at-will basis. Mr. Parslow will receive an initial annual base salary of $265,000 and is eligible to earn an annual cash incentive bonus, which is initially set at a target aggregate bonus amount of 35% of Mr. Parslow's base salary, upon achievement of certain individual and/or Company performance goals set by the Compensation Committee. Mr. Parslow is also eligible to participate in the Company's employee benefit, welfare and other plans, as may be maintained by the Company from time to time, on a basis no less favorable than those provided to other similarly-situated executives of the Company. Mr. Parslow is also subject to certain customary confidentiality, non-solicitation and non-competition provisions.

If Mr. Parslow's employment is terminated by the Company without "cause" (as defined in the Parslow Employment Agreement) or Mr. Parslow resigns for "good reason" (as defined in the Parslow Employment Agreement), after six months of employment but before his first anniversary with the Company, he will be entitled to receive (i) six months of his then current base salary, paid over time in accordance with the Company's payroll practices then in effect and (ii) payment of premiums for continued health benefits under COBRA for up to six months. If Mr. Parslow's employment is terminated by the Company without "cause" (as defined in the Parslow Employment Agreement) or Mr. Parslow resigns for "good reason" (as defined in the Parslow Employment Agreement), after his first anniversary with the Company, he will be entitled to receive (i) one year of his then current base salary, paid over time in accordance with the Company's payroll practices then in effect and (ii) payment of premiums for continued health benefits under COBRA for up to one year.

***Employment Agreement with Dr. Lockshin***

We entered into an employment agreement with Dr. Lockshin effective as of January 1, 2017 (the "Lockshin Employment Agreement"). The Lockshin Employment Agreement does not provide for a specified term of employment and Dr. Lockshin's employment will be on an at-will basis. Dr. Lockshin will receive an initial annual base salary of $250,000 and is eligible to earn an annual performance-based cash incentive bonus, which is initially set at a target aggregate bonus amount of 35% of Dr. Lockshin's base salary, upon achievement of certain individual and/or Company performance goals established by the Board or a committee thereto. Dr. Lockshin is also eligible to participate in the Company's employee benefit, welfare and other plans, as may be maintained by the Company from time to time, on a basis no less favorable than those provided to other similarly-situated executives of the Company. Dr. Lockshin is also subject to certain customary confidentiality, non-solicitation and non-competition provisions.

If Dr. Lockshin's employment is terminated by the Company without "Cause" (as defined in the Lockshin Employment Agreement) or Dr. Lockshin terminates his employment for "Good Reason" (as defined in the Lockshin Employment Agreement) and Dr. Lockshin executes and does not revoke a general release of claims against the Company, then he will be entitled to receive (i) one year of his then current base salary, paid over time in accordance with the Company's payroll practices then in effect and (ii) payment of premiums for continued health benefits under COBRA for up to twelve months.

***Potential Payments Upon Termination or Change of Control***

Our named executive officers may be entitled to payments upon termination or change in control. The details of such payments are included in the description of their employment agreements above.

The Director Proposal is conditioned upon and subject to the approval of the Transaction Proposal and Share Issuance Proposal. If the Transaction Proposal or the Share Issuance Proposal are not approved, the Director Proposal will not be consummated and our current directors will continue to comprise our Board of Directors.

**Vote Required**

The affirmative vote of a plurality of the votes cast at the Special Meeting by the holders of our Common Stock is required to approve the Director Proposal.

**THE BOARD OF DIRECTORS RECOMMENDS THAT YOU VOTE "FOR" THE ELECTION OF DR. ALEXEY VINOGRADOV TO THE BOARD OF DIRECTORS**

## PROPOSAL FOUR

## PROPOSAL FOUR: THE ADJOURNMENT PROPOSAL.

The adjournment proposal allows Xenetic's board of directors to submit a proposal to adjourn the Special Meeting to a later date or dates, if necessary, to permit further solicitation of proxies in the event, based on the tabulated votes, there are not sufficient votes at the time of the special meeting to approve any of the proposals. In no event will Xenetic solicit proxies to adjourn the Special Meeting or consummate the Transaction beyond the date by which it may properly do so under Nevada law. The purpose of the adjournment proposal is to provide more time for the Xenetic to solicit proxies in favor of the proposals.

In addition to an adjournment of the Special Meeting upon approval of an Adjournment Proposal, the board of directors of Xenetic is empowered under Nevada law to postpone the meeting at any time prior to the meeting being called to order. In such event, Xenetic will issue a press release and take such other steps as it believes are necessary and practical in the circumstances to inform its stockholders of the postponement.

**Consequences if the Adjournment Proposal is not Approved**

If an adjournment proposal is presented at the Special Meeting and such proposal is not approved by its stockholders, Xenetic's board of directors may not be able to adjourn the Special Meeting to a later date in the event, based on the tabulated votes, there are not sufficient votes at the time of the Special Meeting to approve the consummation of the Transaction and the proposals relating thereto.

**Vote Required**

The affirmative vote of a majority of the votes cast affirmatively or negatively at the Special Meeting by the holders of our Common Stock is required to approve the Adjournment Proposal.

**THE BOARD OF DIRECTORS RECOMMENDS THAT YOU VOTE "FOR" THE ADJOURNMENT PROPOSAL**

## XENETIC'S BUSINESS

### Overview

We are a biopharmaceutical company focused on the discovery, research and development of next-generation biological drugs and novel oncology therapeutics. We have an extensive patent portfolio of over 170 issued patents in the U.S. and worldwide, covering various aspects of our PolyXen™ platform technology and advanced polymer conjugate technologies, as well as our proprietary biologic drugs and novel oncology drug candidates. We believe our portfolio positions us well for strategic partnership and commercialization opportunities. Our objective is to leverage our portfolio to maximize opportunities to out-license assets from our portfolio in order to generate working capital to both build long-term stockholder value and provide us with the funding necessary for clinical development of our oncology drug candidates through market launch.

We incorporate our patented and proprietary technologies into a number of drug candidates currently under development with biotechnology and pharmaceutical industry collaborators to create what we believe will be next-generation biologic drugs with improved pharmacological properties over existing therapeutics. While we primarily focus on researching and developing oncology drugs, we also have significant interests in drugs being developed by our collaborators to treat other conditions.

Our most advanced investigational drug candidate is oncology therapeutic XBIO-101 (sodium cridanimod) for the treatment of progestin resistant endometrial cancer. We have exclusive rights to develop and commercialize XBIO-101 worldwide, except for specified countries in the Commonwealth of Independent States ("CIS"). XBIO-101 has been granted orphan drug designation by the U.S. Food and Drug Administration ("FDA") for the potential treatment of progesterone receptor negative ("PrR-") endometrial cancer in conjunction with progesterone therapy. We commenced a Phase II trial for XBIO-101 under an IND in 2017, with the first patient dosed in October 2017. We closed patient enrollment in the trial in March 2019 as a result of slower than expected progress on the trial resulting from patient enrollment and retention challenges.

Our lead proprietary technology is PolyXen™, an enabling platform technology which can be applied to protein or peptide therapeutics. It employs the natural polymer polysialic acid ("PSA") to prolong a drug's circulating half-life and potentially improve other pharmacological properties. PolyXen has been demonstrated in human clinical trials to confer prolonged half-life on biotherapeutics such as recombinant human erythropoietin and recombinant Factor VIII ("rFVIII"). We believe this technology may be applied to a variety of drug candidates to enhance the properties of the therapeutic, potentially providing advantages over competing products.

Our drug candidates have resulted from our research activities or that of our collaborators and are in the development stage. As a result, we continue to commit a significant amount of our resources to our research and development activities and anticipate continuing to do so for the near future. To date, none of our drug candidates have received regulatory marketing authorization in the U.S. by the FDA nor in any other territories by any applicable agencies. Although we hold a broad patent portfolio, because of capital constraints the focus of our internal development efforts in 2018 was limited to research and development of our primary product candidate XBIO-101.

We were incorporated under the laws of the State of Nevada in August 2011. We, directly or indirectly, through our wholly-owned subsidiary, Xenetic Biosciences (U.K.) Limited ("Xenetic U.K."), and its wholly-owned subsidiaries, Lipoxen Technologies Limited ("Lipoxen"), Xenetic Bioscience, Incorporated ("XTI") and SymbioTec, GmbH ("SymbioTec"), own various U.S. federal trademark registrations and applications, and unregistered trademarks and service marks, including but not limited to Virexxa®, OncoHist™, PolyXen, ErepoXen™, ImuXen™, and PulmoXen™.

### Our Strategy

The acquisition of the XCART platform technology is expected to close in the first half of 2019, subject to the approvals and other conditions discussed in this proxy statement/prospectus. We plan to initially apply the XCART technology to develop cell-based therapeutics for the treatment of B-cell Lymphomas. We believe these personalized T cell therapies have the potential to offer cancer patients substantial benefits over the existing standard of care and currently approved CAR T therapies. We anticipate that our primary focus once the Transaction is completed will be on advancing this technology through regulatory approval and commercialization.

Our strategy is to develop oncology drug candidates through regulatory approval and commercialization, and to opportunistically pursue a continuous and ongoing out-licensing effort for our PolyXen platform technology to drive incremental shareholder value and generate working capital to assist in providing the funding required to support our drug development efforts.

We intend to pursue orphan drug designations and accelerated approval pathways for relevant oncology indications as appropriate in both the U.S. and Europe. If our orphan oncology drug candidates are granted orphan drug designation, then we may benefit from certain key advantages of orphan status including certian market exclusivities.

We intend to opportunistically advance our PolyXen platform technology by entering into collaborative out-license arrangements with global pharmaceutical companies who could apply the necessary resources for advancing drug candidates through to worldwide commercialization, or by entering into arrangements with other partners that would in-license our technology on a restrictive-market basis. The latter arrangement would provide support to the Company in the form of access to partner-generated clinical data, which is informative when contemplating potential monetization of our proprietary technology in larger markets.

We intend to advance development of our drug candidates primarily through the use of contract manufacturing and contract research organizations ("CROs") in order to efficiently manage our resources. Continuous pipeline growth and advancement of out-licensed drug candidates is dependent, in part, on our ability to raise sufficient capital and to advance our existing co-development collaborations and strategic arrangements as well as enter into new such arrangements.

We intend to pursue development efforts of the XCART technology once the acquisition is consummated and pursue other development efforts around CAR T technology. We also plan to pursue collaborations with immuno-oncology ("I-O") companies in which we would seek to use XBIO-101 in combination with approved or developmental I-O compounds such as checkpoint inhibitors subject to adequate funding.

***Closing of Patient Enrollment in XBIO-101 Phase II EC Trial***

We commenced the Phase II trial for XBIO-101 in 2017, with the first patient dosed in October 2017. We closed patient enrollment in the trial in March 2019 as a result of slower than expected progress on the trial resulting from patient enrollment and retention challenges. We are in the process of identifying development paths for XBIO-101, particularly those that can efficiently leverage our existing human data and regulatory status to extend development into I-O settings.

**Our Technology and Drug Candidates**

*The Technologies*

We incorporate our patented and proprietary technologies into a number of drug candidates which are currently under development with our biotechnology and pharmaceutical collaborators, with the goal of creating what we believe will be the next generation of biologic drugs and therapeutics. While we primarily focus on researching and developing oncology drugs, we also have ownership and other economic interests in drugs being developed by our collaborators to treat other conditions. Our patent portfolio spans four core proprietary technologies including two platforms, small molecules and biologics covering multiple drug candidates and indications including XBIO-101, PolyXen, OncoHist and ImuXen. We have primarily been focused on the advancement of XBIO-101 through clinical trials. We have not been actively pursuing development efforts for PolyXen, OncoHist and ImuXen due to capital restraints. We anticipate that the focus of our future internal development efforts will be limited to research and development of our XCART technology as well as potential I-O applications for our product candidate XBIO-101.

| | |
|---|---|
| XBIO-101 | A small molecule therapeutic with the potential to confer sensitivity to hormone therapeutics upon cancer cells that are otherwise insensitive to such treatments. XBIO-101 (sodium cridanimod) belongs to a class of low-molecular weight synthetic interferon inducers. In addition to its immunomodulatory properties, XBIO-101 has been shown to increase levels of progesterone receptor, or PrR, expression in tumor tissue of patients who are PrR-, and thus may restore sensitivity of non-responsive endometrial cancers to hormonal (e.g., progestin) therapy. Based on preclinical observations, XBIO-101 may also be therapeutically relevant in other hormone-therapy resistant cancers, such as triple-negative breast cancer. XBIO-101 has been granted an orphan drug designation by the FDA for the potential treatment of progesterone receptor negative endometrial cancer in conjunction with progesterone therapy. Sodium cridanimod has been the subject of numerous nonclinical studies as well as 21 foreign controlled clinical trials totaling 750 subjects, which supported marketing authorizations in ex-Soviet territories, as well as enablement of our active US IND. We believe that XBIO-101 may also have utility, alone or in combination, in immuno-oncology approaches. The Company is therefore seeking to advance the compound in collaboration with I-O focused partners. |
| PolyXen | An enabling biological platform technology designed to extend the circulation time of drug molecules in the human body by chemically attaching polysialic acid, or PSA, to the drug molecule by a process termed polysialylation, thereby creating potentially superior next generation therapeutic candidates. PSA, a biopolymer, comprising a chain of sialic acid molecules, is a natural constituent of the human body, although we obtain our PSA from a bacterial source. |
| OncoHist | A novel therapeutic platform technology that utilizes the properties of modified human histone H1.3 for targeted cell apoptosis (programmed cell death), which may enable OncoHist to treat a broad range of cancer indications. OncoHist, unlike many competing oncology therapies, is based on a molecule occurring naturally in the human body, primarily in the cell nucleus, and is therefore hypothesized to be better tolerated and less immunogenic than other oncology therapies. |
| ImuXen | A novel liposomal co-entrapment encapsulation technology designed to maximize both cell and immune system mediated responses. The technology is based on the co-entrapment of the nominated antigen(s) in a liposomal vesicle. The technology when applied may create new vaccines and improve the use and efficacy of certain existing human vaccines. |

Though we hold a broad patent portfolio, the focus of our internal development efforts in 2018 was limited to research and development of XBIO-101.

**Research, Outside Services and Collaborations**

Through partner efforts, we are developing our pipeline of next-generation bio-therapeutics and novel oncology drugs based on our XBIO-101 and PolyXen proprietary technologies. In order to do this while efficiently managing our overhead, we rely on the services of contract manufacturers and CROs and our strategic collaborations. We currently do not have in-house research facilities to pursue these initiatives. Accordingly, continuous pipeline growth and advancement of our technologies and drug candidates is dependent on several important collaborations and strategic arrangements including our arrangements with:

- Pharmsynthez, a Russian pharmaceutical company and presently our majority stockholder;
- Serum Institute of India Limited ("Serum Institute"), one of the world's largest vaccine manufacturers and one of India's largest biotech companies, as well as a beneficial owner of over 5% of our Common Stock; and
- Takeda Pharmaceuticals Co. Ltd (formerly Shire plc) ("Takeda"), a global biopharmaceutical leader.

Accordingly, in addition to pursuing the development of our pipeline of next-generation bio-therapeutics and novel oncology drugs, we also have significant interests in drug candidates being developed by our collaborators to treat other conditions. We may collect milestone payments and royalties pursuant to these collaborations to the extent that these drugs are successfully developed and marketed. However, other than potential royalty payments under a sublicense with Takeda, we do not anticipate any milestone or royalty payments in the near term, if at all. For further detail, please read the section titled "Significant Co-Development Collaborations and Strategic Arrangements" below.

**Our Drug Candidate Pipeline**

Our product pipeline contains a number of drug candidates under development with our biotechnology and pharmaceutical collaborators. The following discussion summarizes key information regarding our current drug candidates, organized by our internal programs and our collaborators' programs:

***XBIO-101***

XBIO-101 is our most advanced internal candidate with an orphan drug designation from the FDA for the potential treatment of progesterone receptor negative endometrial cancer in conjunction with progesterone therapy. An IND application was submitted for XBIO-101 and is in effect for our Phase II clinical trial in the U.S.

We acquired certain IP rights with respect to XBIO-101, and the worldwide rights to develop, market and license XBIO-101 for certain uses, except for excluded uses within the CIS, from AS Kevelt ("Kevelt"), a wholly-owned subsidiary of Pharmsynthez. We also acquired Kevelt's orphan drug designation from the FDA for the use of XBIO-101 in the treatment of PrR- endometrial cancer in conjunction with progesterone therapy.

XBIO-101 (sodium cridanimod), belongs to a class of low-molecular weight synthetic interferon, or IFN, inducers and is primarily used in a wide range of therapeutic areas such as antiviral, antibacterial, antitumor, and inflammatory indications due to its ability to modify or regulate one or more immune system functions. We believe XBIO-101 may also prove to be therapeutically relevant in hormone-resistant cancers by increasing the levels of PrR expression in tumor tissue of patients who are PrR deficient. As such, it may restore the sensitivity of non-responsive endometrial cancers to hormonal (e.g., progestin) therapy. Accordingly, we were pursuing the use of XBIO-101 for the treatment of endometrial cancer.

Our decision to investigate XBIO-101 for the treatment of endometrial cancer was based in part on the history of sodium cridanimod in preclinical and clinical research conducted by others, including prior clinical trials conducted and completed in Russia that assessed the efficacy and safety of sodium cridanimod. Sodium cridanimod has been authorized for medicinal use in the Russian Federation for over 20 years with millions of doses estimated to have been sold for the treatment of non-cancer indications. XBIO-101 is also known under the brand names Neovir, Camedon and Primavir.

The extensive clinical testing conducted by others, as well as the marketing history of sodium cridanimod, provided support for our authorization to proceed directly with a Phase II efficacy study under our U.S. IND for the use of sodium cridanimod in conjunction with progestin therapy in patients with progestin resistant, recurrent or persistent endometrial cancer. We commenced the Phase II trial under the IND in 2017, with the first patient dosed in October 2017. We closed patient enrollment of the trial in March 2019 as a result of slower than expected progress on the trial resulting from patient enrollment and retention challenges. We are in the process of identifying development paths for XBIO-101, particularly those that can efficiently leverage our existing human data and regulatory status to extend development into immune-oncology settings.

***ErepoXen***

ErepoXen, or polysialylated erythropoietin ("PSA-EPO"), uses our PolyXen platform technology for the treatment of anemia in chronic kidney disease ("CKD") patients. It is designed to reduce the dosing frequency by extending the circulating half-life of the therapeutic in the body. We terminated our clinical development efforts of ErepoXen and continue to seek out-license opportunities for the drug candidate in our licensed territories.

We have collaboration agreements with SynBio LLC ("SynBio") and Serum Institute to develop and launch ErepoXen in limited markets pursuant to which we will collect royalties if they are successful in these efforts.

Serum Institute conducted Phase I and Phase II clinical trials in 95 human subjects. These safety trials, which had no significant drug-related adverse events, provided us with the data to commence a Phase II, repeat dosing, ICH compliant clinical trial for ErepoXen in Australia, New Zealand and South Africa for CKD patients not on dialysis. We completed three cohorts of this study and then terminated the study. Each cohort represents an increased dose of ErepoXen that is given on a repeat schedule until therapeutic levels of hemoglobin are achieved. In our study there were no serious Treatment Emergent Adverse Events ("TEAE") related to ErepoXen in either cohort 1 or 2. There was one serious TEAE in cohort 3 judged to be possibly related, but not unexpected given the safety profile of other Erythropoietin Stimulating Agents.

In addition, Serum Institute finished Phase I/II clinical trials in India of ErepoXen for in-center-dialysis patients. Serum Institute has submitted a clinical trial application to conduct a Phase II(b)/III clinical trial for PSA-EPO in India.

SynBio received regulatory approval to commence ErepoXen Phase II(b)/III human clinical trials in Russia, is currently recruiting patients and intends to commence the commercialization and marketing stages of ErepoXen in the Russian and CIS markets subject to approval in such markets.

***Drug Candidates in the Pipeline that are not Currently Active Internally or with Third Party Collaborators***

**OncoHist**

Our drug candidate OncoHist, which has clinical proof of concept, utilizes the properties of modified human histone H1.3 for targeted cell killing. We were previously researching and developing OncoHist for the treatment of relapsed or resistant acute myeloid leukemia ("AML"). Currently, all our development efforts regarding OncoHist remain on hold due to capital constraints. We would expect to file an IND application for OncoHist for AML once we are able to raise sufficient capital and reactivate our development efforts.

We have a sponsored research agreement with Dana Farber Cancer Institute intended to elucidate OncoHist's mechanism of action as well as to characterize the responsiveness of various AML cell lines to OncoHist. Dr. Richard Stone, MD, Professor of Medicine at Harvard Medical School and Clinical Director of the Adult Leukemia Program at Dana-Farber Cancer Institute, presented data at the 2014 American Society of Hematology meeting (*Blood*, 2014 124(21):3604 OncoHist, an rh Histone 1.3, Is Cytotoxic to Acute Myeloid Leukemia Cells and Results in Altered Downstream Signaling).

We have completed non-clinical toxicity studies and had a productive, in-person pre-IND meeting with the FDA in August 2015 where manufacturing and clinical matters were addressed, including guidance from the FDA regarding inclusion of an additional indication besides AML in our proposed Phase I clinical trial. However, our efforts in developing this drug candidate have been on hold since 2016 due to our focus on other product candidates and limited capital resources.

**Pipeline Expansion Opportunities**

Operating under licenses from us within their home markets, our collaborators can potentially generate preclinical and clinical data related to our technologies across a wide spectrum of therapeutic areas. Under these agreements, we retain all rights for major markets and co-own the clinical data. We therefore have the opportunity to utilize the data in our decision-making process regarding development and commercialization in major markets. We expect to be able to utilize the results from substantially all of our clinical toxicity data and other clinical data generated in the development of XBIO-101 and PolyXen, and potentially for OncoHist, and ImuXen, if any, for a variety of orphan oncology indications and next generation biologic drugs.

For example, we believe that we may be able to develop XBIO-101 for other indications. Results from preclinical and exploratory studies conducted by a collaborative partner suggest that XBIO-101 can up-regulate (i.e., increase the levels of) estrogen receptor ("ER") in certain tissue types. Proof of concept studies are being planned to investigate additional therapeutic opportunities for XBIO-101 in hormone therapy resistant tumor types other than endometrial cancer.

We are in the process of identifying development paths for XBIO-101, particularly those that can efficiently leverage our existing human data and regulatory status to extend development into immuno-oncology settings. We are seeking partners for conducting preclinical and Phase I – Phase II studies, such as human clinical dose ranging and biomarker studies of XBIO-101, alone and in combination with I-O therapeutics including checkpoint inhibitors.

We also believe that the nature of our technologies, including the PolyXen platform, will allow us to pursue additional drug candidates for new indications based on existing and future scientific data.

**Significant Co-Development Collaborations and Strategic Arrangements**

***Takeda Pharmaceuticals Co. Ltd. ("Takeda") (f/k/a Shire plc)***

We are a party to an exclusive research, development and license agreement with Baxalta US Inc. and Baxalta AB (collectively "Baxalta"), wholly-owned subsidiaries of Takeda, related to the development of a novel series of polysialylated blood coagulation factors. This collaboration with Takeda relies on the Company's PolyXen technology to conjugate PSA to therapeutic blood-clotting factors, with the goal of improving the pharmacokinetic profile and extending the active life of these biologic molecules. The agreement grants Takeda a worldwide, exclusive, royalty-bearing license to our PSA patented and proprietary technology in combination with Takeda's proprietary molecules designed for the treatment of blood and bleeding disorders. The first program under this agreement was a next generation Factor VIII protein product candidate.

In May 2017, we announced that Takeda had terminated further development of SHP656, its polysialylated rFVIII drug candidate for the treatment of hemophilia, being developed using our proprietary PolyXen technology. While Takeda's Phase I/II trial demonstrated SHP656's efficacy and pharmacokinetic data commensurate with the profile of an extended half-life rFVIII product, the pre-defined once-weekly dosing criterion set forth in the research, development, license and supply agreement was not met. To our knowledge, there were no drug-related adverse events, serious adverse events, or rFVIII inhibitors reported to date. Though the trial's pre-defined once-weekly dosing criterion was not met, we intend to continue to explore the potential for future collaborations with Takeda and Takeda has commenced a new, undisclosed project under the agreement.

In October 2017, we entered into a right to sublicense agreement (the "Sublicense Agreement") with Baxalta. Pursuant to the sublicense agreement, we granted to Baxalta the right to grant a nonexclusive sublicense to licensed patents in connection with products related to the treatment of blood and bleeding disorders ("Covered Products"). Pursuant to the sublicense agreement, Baxalta paid us a one-time payment of seven million five hundred thousand dollars ($7,500,000) in November 2017 and agreed to pay us single digit royalty payments based upon net sales of the Covered Products throughout the term, each of which is conditioned upon the performance of the sublicense contemplated by the sublicense agreement. No royalties have been received to date.

***SynBio LLC***

In August 2011, we entered into a stock subscription and collaborative development agreement with SynBio (the "Co-Development Agreement"), pursuant to which we granted SynBio an exclusive license to develop, market and commercialize certain drug candidates utilizing molecules based on our PolyXen and OncoHist platform technologies in Russia and the CIS, collectively referred to herein as the SynBio Market. In exchange for our granting to SynBio those certain license rights, SynBio granted an exclusive license to us to use any SynBio preclinical and clinical data generated by SynBio and to engage in the development and commercialization of drug candidates that may arise from the collaboration in any territory outside of the SynBio Market based upon the Co-Development Agreement.

We hope and expect to mitigate certain technical and commercial risks of drug development by working in collaboration with SynBio. Under the Co-Development Agreement, SynBio is responsible for progressing six new product candidates through human proof of concept trials in Russia as primary validation for the initiation of European Medicines Agency ("EMA") or FDA clinical trials by us.

The primary goal of the Co-Development Agreement is to research and develop drug candidates for planned commercialization using SynBio and our combined respective expertise and technologies. Drug candidates must meet the success criteria as decided upon by a joint steering committee, which includes representation from both SynBio and us, where we have the right to appoint the chair who has the casting vote. Once a potential drug candidate is selected, clinical trials will be separately conducted by each company in their respective territories with the goal to achieve regulatory approval of the products for commercial sale.

SynBio is wholly responsible for funding and conducting their own research and clinical development activities in Russia, and we are wholly responsible for funding and conducting our own research and clinical development activities in the U.S., Europe and elsewhere outside the SynBio Market. There are no milestones or other research-related payments provided for under the Co-Development Agreement other than fees for the provision of each party's respective research supplies based on their technology. For the years ended December 31, 2018 and 2017, we have recognized no supply service revenues in connection with the Co-Development Agreement. Among other provisions, the parties may terminate the Co-Development Agreement in relation to a particular product upon 30 days' written notice, if such party, in its reasonable opinion, believes that a third-party IP right exists, which would have a material effect on the research and/or development of the relevant product. Further, the parties may terminate the Co-Development Agreement if the other party is in material breach of the Co-Development Agreement and, in the case of a breach capable of remedy, the breach is not remedied within 90 days of receiving notice specifying the breach and requiring its remedy, or if the other party becomes insolvent. The parties also may terminate the Co-Development Agreement by immediate written notice to the other party in relation to a specific product such if product does not meet the relevant success criteria for the product.

In furtherance of our co-development clinical objectives, on December 31, 2014, we granted SynBio a warrant to purchase 204,394 shares of our Common Stock that contain vesting triggers based on the achievement by SynBio of certain clinical development objectives within specific timeframes (the "SynBio 2014 Warrant"). Simultaneously with the issuance of the SynBio 2014 Warrant, we granted additional warrants to purchase 9,697 aggregate new shares of our Common Stock to SynBio and Pharmsynthez non-director designees under the same terms and conditions of the SynBio 2014 Warrant. No warrants were exercised during the years ended December 31, 2018 and 2017. The vesting criteria for the SynBio 2014 warrants were not met and, as a result, the warrants expired during the year ended December 31, 2018.

In 2017, SynBio became a wholly-owned subsidiary of Pharmsynthez and all ownership percentages previously held by SynBio are combined with Pharmsynthez.

***PJSC Pharmsynthez***

In November 2009, we entered into a collaborative research and development license agreement with Pharmsynthez (the "Pharmsynthez Arrangement") pursuant to which we granted an exclusive license to Pharmsynthez to develop, commercialize and market six product candidates based on our PolyXen and ImuXen technology anywhere within Russia and the CIS, as well as certain clinical and research data developed by us on the six product candidates. In exchange, Pharmsynthez granted us an exclusive license to use any preclinical and clinical data developed by Pharmsynthez, within the scope of the Pharmsynthez Arrangement, and to engage in further research, development and commercialization of drug candidates in any territory outside of Russia and the CIS at our own expense.

We expect to mitigate certain risks of drug development by reviewing human clinical data arising out of this collaboration with Pharmsynthez before we take a particular drug candidate into FDA and EMA trials. Under the Pharmsynthez Arrangement, Pharmsynthez is responsible for progressing six new drug candidates through human proof of concept trials in Russia as primary validation prior to the initiation of EMA/FDA clinical trials by us outside of Russia. A joint steering committee, where we have the right to appoint the chair who has the casting vote, was established to facilitate the communication of scientific data and to assist generally with each party's research decisions and to monitor research and development progress under the Pharmsynthez Arrangement.

Pharmsynthez is wholly responsible for funding and conducting its own research and clinical development activities in Russia. We are wholly responsible for funding and conducting our own research and clinical development activities in the U.S., Europe and the rest of the world outside of Russia and the ex-CIS regions. There are no milestones or other research related payments provided for under the Pharmsynthez Arrangement other than royalties. Among other provisions, the parties may terminate the agreement in relation to a particular product upon 30 days' written notice, if such party, in its reasonable opinion, believe that a third-party intellectual property right exists which would have a material effect on the research and/or development of the relevant product. Further, the parties may terminate the agreement if the other party is in material breach of the agreement and, in the case of a breach capable of remedy, the breach is not remedied within 90 days of receiving notice specifying the breach and requiring its remedy, or if the other party becomes insolvent. The parties also may terminate the agreement by immediate written notice to the other party in relation to a specific product if such product does not meet the relevant success criteria for the product.

***Serum Institute***

In August 2011, we entered into a collaborative research and development agreement (the "Serum Agreement") with Serum Institute amending and restating a series of earlier agreements and providing Serum Institute an exclusive license to use our PolyXen technology to research and develop one potential commercial product, PSA-EPO. Serum Institute is responsible for conducting all preclinical and clinical trials required to achieve regulatory approvals within territories outside of certain predetermined territories assigned to us, which include the U.S., the European Economic Area, and Japan, among other territories, at Serum Institute's own expense. Royalty payments are payable by Serum Institute to us for net sales to certain customers in the Serum Institute sales territory. Royalty payments are payable by us to Serum Institute for net sales received by us over the term of the license. No royalty, revenue or expense was recognized by us related to the Serum Institute arrangement during the years ended December 31, 2018 and 2017. There are no milestone or other research-related payments due under the Serum Agreement.

Through December 31, 2018, we and Serum Institute continued to engage in research and development activities with no resultant commercial products. Among other reasons, the parties may terminate the Serum Agreement by written notice if the other party is in material breach of the Serum Agreement and, in the case of a breach capable of remedy, the breach is not remedied within 90 days of the other party receiving notice specifying the breach and requiring its remedy.

In furtherance of our co-development clinical objectives, on December 31, 2014, we granted to Serum Institute certain warrants to purchase 96,970 shares of our Common Stock that contain vesting triggers based on the achievement by Serum Institute of certain clinical development objectives within specific timeframes ("Serum 2014 Warrant"). Simultaneously with the issuance of the Serum 2014 Warrant, we issued additional warrants to purchase an aggregate of 4,852 shares of our Common Stock to Serum Institute non-director designees under the same terms and conditions of the Serum 2014 Warrant. The Serum 2014 Warrant expires on December 30, 2019 and no warrants were exercised during any of the years ended December 31, 2018 and 2017.

In addition, the Serum Agreement allows for Serum Institute to nominate a non-executive director to our Board of Directors as long as Serum Institute or its subsidiaries holds at least 6% of our Common Stock. Serum Institute is a related party of ours, with a share ownership of approximately 6.7% of our total issued Common Stock as of December 31, 2018.

**Our Intellectual Property**

We strive to protect and enhance the proprietary technology, inventions, and improvements that are commercially important to our business, including seeking, maintaining and defending patent rights, whether developed internally or licensed from our collaborators or other third-parties. Our policy is to seek to protect our proprietary position by, among other methods, filing patent applications in the U.S. and in jurisdictions outside of the U.S. covering our proprietary technology, inventions, improvements and product candidates that are important to the development and implementation of our business. We also rely on trade secrets and know-how relating to our proprietary technology and product candidates, continuing innovation, and in-licensing opportunities to develop, strengthen and maintain our proprietary position in the field of oncology. We also plan to rely on data exclusivity, market exclusivity, and patent term extensions when available. Our commercial success will depend in part on our ability to obtain and maintain patent and other proprietary protection for our technology, inventions, and improvements; to preserve the confidentiality of our trade secrets; to obtain and maintain licenses to use intellectual property owned by third-parties; to defend and enforce our proprietary rights, including any patents that we may own in the future; and to operate without infringing on the valid and enforceable patents and other proprietary rights of third-parties.

Our drug candidates are in various stages of development, each protected by patent and pending patent applications in the U.S. with the U.S. Patent and Trademark Office ("USPTO") and in certain other developed countries. Our first issued patents begin to expire starting in 2022 with the majority of the existing issued patents expiring between 2025 and 2030.

Our patent strategy is to file patent applications on innovations and improvements in those jurisdictions that comprise the major pharmaceutical markets in the world or locations where a pharmaceutical may be manufactured. These jurisdictions include, but are not limited to, the U.S., U.K., Australia, Japan, Canada, South Korea, China, India, Russia and certain other countries in the European Union ("E.U.") and Asia, though we do not necessarily file a patent application in each of these jurisdictions for every patent family.

As of February 28, 2019, we directly or indirectly own, through our wholly-owned subsidiary, Xenetic U.K., and its wholly-owned subsidiaries, Lipoxen, XTI and SymbioTec, more than 170 U.S. and international patents that cover various aspects of our technologies. We have filed patent applications, and plan to file additional patent applications, covering various aspects of our PolyXen platform technology covering polysialylation and advanced polymer conjugate technologies, respectively, as well as our other product candidates, including XBIO-101. More specifically, our patents and patent applications cover polymer architecture, drug conjugates, formulations, methods of manufacturing polymers and polymer conjugates and methods of administering polymer conjugates. We may also file additional patent applications, where possible, for XBIO-101 and OncoHist for additional uses and indications.

Our patent portfolio contains patents and patent applications that encompass our OncoHist platform technology including use of histones for the treatment of different cancers. The OncoHist patent portfolio, acquired as part of our acquisition of SymbioTec in January 2012, includes OncoHist, a bis-Met histone H1.3. In addition, our licensed patent portfolio includes patents issued in jurisdictions outside of the U.S. and licensed patent applications pending in jurisdictions outside of the U.S. that are foreign counterparts to one or more of the foregoing U.S. patents and patent applications. The OncoHist portfolio also includes patents that cover the use of a histone protein as an antibiotic and to treat thrombocytopenia and further as an antimicrobial component of a personal care product.

We have received patent protection for certain therapeutics that use our PolyXen technology linking the specific therapeutic to a PSA. These include, but are not limited to, PSA-EPO, PSA-insulin and PSA-insulin like protein, SHP656 (PSA-rFVIII), PSA-DNase I and PSA-granulocyte colony stimulating factor (PSA-GCSF). Further patents cover methods to prepare proteins that are linked to a PSA. These method patents include those that link a PSA to a protein in a high pH solution as well as patents that use a process for producing an aldehyde derivative of a sialic acid through the opening and oxidation of a sialic acid unit. For instance, we have patent protection for a PSA linkage that can be at the N-terminus.

We have received patent protection for the production of PSA and the removal of endotoxin during the purification process. The removal of endotoxin occurs through the addition of a high pH solution to the PSA and a process to separate a polydisperse ionically charged polysaccharide, such as PSA, into fractions of different average molecular weight. This is accomplished through the use of a column and elution buffers with different and constant ionic strength and pH, resulting in a fractionated polysaccharide that has a molecular weight polydispersity of 1.1 or lower.

Issued patents can provide protection for varying periods of time, depending upon the date of filing of the patent application, the date of patent issuance, and the legal term of patents in the countries in which they are obtained. In general, patents issued for applications filed in the U.S. can provide exclusionary rights for 20 years from the earliest effective filing date. In addition, in certain instances, the term of an issued U.S. patent that covers or claims an FDA approved product can be extended to recapture a portion of the term effectively lost as a result of the FDA regulatory review period, which is called patent term extension. The restoration period cannot be longer than five years and the total patent term, including the restoration period, must not exceed 14 years following FDA approval. The term of patents outside of the U.S. varies in accordance with the laws of the foreign jurisdiction, but typically is also 20 years from the earliest effective filing date. However, the actual protection afforded by a patent varies on a product-by-product basis, from country-to-country, and depends upon many factors, including the type of patent, the scope of its coverage, the availability of regulatory-related extensions, the availability of legal remedies in a particular country, and the validity and enforceability of the patent.

In certain situations, where we work with drugs covered by one or more patents, our ability to develop and commercialize our technologies may be affected by limitations of our access to these proprietary drugs. Even if we believe we are free to work with a proprietary drug, we cannot guarantee that we will not be accused of, or be determined to be, infringing a third-party's rights and be prohibited from working with the drug or found liable for damages. Any such restriction on access or liability for damages would have a material adverse effect on our business, results of operations and financial condition.

The patent positions of pharmaceutical and biotechnology companies, such as ours, are uncertain and involve complex legal and factual issues. There can be no assurance that patents that have issued will be held valid and enforceable in a court of law. Even for patents that are held valid and enforceable, the legal process associated with obtaining such a judgment is time consuming and costly. Additionally, issued patents can be subject to opposition or other proceedings that can result in the revocation of the patent or maintenance of the patent in amended form (and potentially in a form that renders the patent without commercially relevant and/or broad coverage). Further, our competitors may be able to circumvent and otherwise design around our patents. Even if a patent is issued and enforceable, because development and commercialization of pharmaceutical products can be subject to substantial delays, patents may expire early and provide only a short period of protection, if any, following the commercialization of products encompassed by our patent(s). We may have to participate in interference proceedings declared by the USPTO, which could result in a loss of the patent and/or substantial cost to us. Further, we understand that if any of our pending patent applications do not issue, or are deemed invalid following issuance, we may lose valuable IP protection.

U.S. and foreign patent rights and other proprietary rights exist that are owned by third-parties and relate to pharmaceutical compositions and reagents, medical devices and equipment and methods for preparation, packaging and delivery of pharmaceutical compositions. We cannot predict with any certainty which, if any, of these rights will be considered relevant to our technology by authorities in the various jurisdictions where such rights exist, nor can we predict with certainty which, if any, of these rights will or may be asserted against us by third-parties. We could incur substantial costs in defending ourselves and our partners against any such claims. Furthermore, parties making such claims may be able to obtain injunctive or other equitable relief, which could effectively block our ability to develop or commercialize some or all of our products in the U.S. and in other countries and could result in the award of substantial damages. In the event of a claim of infringement, we or our partners may be required to obtain one or more licenses from third-parties. There can be no assurance that we can obtain a license to any technology that we determine we require on reasonable terms, if at all, or that we could develop or otherwise obtain alternative technology. The failure to obtain licenses, if required, may have a material adverse effect on our business, results of operations and financial condition. Further, we may not be able to obtain IP licenses related to the development of our drug candidates on a commercially reasonable basis, if at all.

It is our policy to require our employees and consultants, outside scientific collaborators, sponsored researchers and other advisors who receive confidential information from us to execute confidentiality agreements upon the commencement of employment or consulting relationships with us. These agreements provide that all confidential information developed or made known to the individual during the course of the individual's relationship with us is to be kept confidential and not disclosed to third-parties except in specific circumstances. The agreements provide that all inventions conceived by an employee shall be our property. There can be no assurance, however, that these agreements will provide meaningful protection or adequate remedies for our trade secrets in the event of unauthorized use or disclosure of such information.

**Manufacturing and Supply**

We do not have the capability to manufacture our own materials necessary to support our drug candidate development programs nor do we intend to acquire such capability as part of our present business strategy. We currently have agreements in place with Serum Institute whereby Serum Institute produces clinical materials for use in the development of drug candidates involving our PolyXen technology. We are currently dependent on Kevelt for clinical materials with respect to our XBIO-101 research program.

**Government Regulation**

***General***

Government authorities in the U.S., at the federal, state and local level, and other countries extensively regulate, among other things, the research, development, testing, manufacture, quality control, approval, labeling, packaging, storage, record-keeping, promotion, advertising, distribution, marketing and export and import of products such as those we are developing. Generally, a new drug must be approved by the FDA through the NDA process and a new biologic must be licensed by the FDA through the biologics license application ("BLA") process before it may be legally marketed in the U.S.

**U.S. Regulation**

***Drug Development Process***

In the U.S., the FDA regulates drugs under the Federal Food, Drug, and Cosmetic Act ("FDCA"), and in the case of biologics, also under the Public Health Service Act, and their implementing regulations. The process of obtaining regulatory approvals and the subsequent compliance with appropriate federal, state, local and foreign statutes and regulations require the expenditure of substantial time and financial resources. Failure to comply with the applicable U.S. requirements at any time during the product development process, approval process or after approval may subject an applicant to administrative or judicial sanctions. These sanctions could include the FDA's refusal to approve pending applications, withdrawal of an approval, license revocation, a clinical hold, warning letters or untitled letters, product recalls, product seizures, total or partial suspension of production or distribution, injunctions, fines, refusals of government contracts, restitution, disgorgement or civil or criminal penalties. Any agency or judicial enforcement action could have a material adverse effect on us.

The process required by the FDA before a drug or biologic may be marketed in the U.S. generally involves the following:

- completion of preclinical laboratory tests, animal studies and formulation studies in accordance with Good Laboratory Practices ("GLP") regulations and other applicable regulations;
- submission to the FDA of an IND, which must become effective before human clinical trials may begin;
- performance of adequate and well-controlled human clinical trials in accordance with Good Clinical Practice ("GCP") regulations to establish the safety and efficacy of the proposed drug for its intended use;
- submission to the FDA of an NDA or BLA;
- satisfactory completion of an FDA inspection of the manufacturing facility or facilities at which the drug is produced to assess compliance with current Good Manufacturing Practices ("cGMP") requirements to assure that the facilities, methods and controls are adequate to preserve the drug's identity, strength, quality and purity; and
- FDA review and approval of the NDA or BLA.

Once a pharmaceutical candidate is identified for development, it enters the preclinical testing stage. Preclinical tests include laboratory evaluations of product chemistry, toxicity and formulation, as well as animal studies. An IND sponsor must submit the results of the preclinical tests, together with manufacturing information and analytical data, to the FDA as part of the IND. The sponsor will also include a protocol detailing, among other things, the objectives of the first phase of the clinical trial, the parameters to be used in monitoring safety, and the effectiveness criteria to be evaluated, if the first phase lends itself to an efficacy evaluation. Some preclinical testing may continue even after the IND is submitted. The IND automatically becomes effective 30 days after receipt by the FDA, unless the FDA, within the 30-day time period, places the clinical trial on a clinical hold. In such a case, the IND sponsor and the FDA must resolve any outstanding concerns before the clinical trial can begin. Clinical holds also may be imposed by the FDA at any time before or during clinical trials due to safety concerns about ongoing or proposed clinical trials or noncompliance with specific FDA requirements, and the trials may not begin or continue until the FDA notifies the sponsor that the hold has been lifted.

All clinical trials must be conducted under the supervision of one or more qualified investigators in accordance with GCP regulations. They must be conducted under protocols detailing the objectives of the trial, dosing procedures, subject selection and exclusion criteria and the safety and effectiveness criteria to be evaluated. Each protocol must be submitted to the FDA as part of the IND, and timely safety reports must be submitted to the FDA and the investigators for serious and unexpected adverse events. An institutional review board (IRB) at each institution participating in the clinical trial must review and approve each protocol before a clinical trial commences at that institution and must also approve the information regarding the trial and the consent form that must be provided to each trial subject or his or her legal representative, monitor the study until completed and otherwise comply with IRB regulations.

Human clinical trials are typically conducted in three sequential phases that may overlap or be combined:

- ***Phase I***: The drug candidate is initially introduced into healthy human subjects and tested for safety, dosage tolerance, absorption, metabolism, distribution and excretion. In the case of some products for severe or life-threatening diseases, such as cancer, especially when the product may be too inherently toxic to ethically administer to healthy volunteers, the initial human testing is often conducted in patients.
- ***Phase II***: This phase involves clinical trials in a limited patient population to identify possible adverse effects and safety risks, to preliminarily evaluate the efficacy of the product for specific targeted diseases and to determine dosage tolerance and appropriate dosage.
- ***Phase III***: Clinical trials are undertaken to further evaluate dosage, clinical efficacy and safety in an expanded patient population at geographically dispersed clinical study sites. These clinical trials are intended to establish the overall risk-benefit ratio of the drug candidate and provide, if appropriate, an adequate basis for product labeling.

Post-approval trials, sometimes referred to as Phase IV studies, may be conducted after initial marketing approval. These trials are used to gain additional experience from the treatment of patients in the intended therapeutic indication. In certain instances, the FDA may mandate the performance of Phase IV clinical trials as a condition of approval of an NDA or BLA.

The FDA or the sponsor may suspend a clinical trial at any time on various grounds, including a finding that the research subjects or patients are being exposed to an unacceptable health risk. Similarly, an IRB can suspend or terminate approval of a clinical trial at its institution if the clinical trial is not being conducted in accordance with the IRB's requirements or if the drug has been associated with unexpected serious harm to patients. In addition, some clinical trials are overseen by an independent group of qualified experts organized by the sponsor, known as a data safety monitoring board or committee. Depending on its charter, this group may determine whether a trial may move forward at designated check points based on access to certain data from the trial.

Concurrent with clinical trials, companies usually complete additional animal studies and must also develop additional information about the chemistry and physical characteristics of the drug and finalize a process for manufacturing the product in commercial quantities in accordance with cGMP requirements. The manufacturing process must be capable of consistently producing quality batches of the drug candidate and, among other things, the manufacturer must develop methods for testing the identity, strength, quality and purity of the final drug. In addition, appropriate packaging must be selected and tested and stability studies must be conducted to demonstrate that the drug candidate does not undergo unacceptable deterioration over its shelf life.

While the IND is active and before approval, progress reports summarizing the results of the clinical trials and nonclinical studies performed since the last progress report must be submitted at least annually to the FDA, and written IND safety reports must be submitted to the FDA and investigators for serious and unexpected suspected adverse events, findings from other studies suggesting a significant risk to humans exposed to the same or similar drugs, findings from animal or in-vitro testing suggesting a significant risk to humans, and any clinically important increased incidence of a serious suspected adverse reaction compared to that listed in the protocol or investigator brochure.

There are also requirements governing the reporting of ongoing clinical trials and completed trial results to public registries. Sponsors of certain clinical trials of FDA-regulated products are required to register and disclose specified clinical trial information, which is publicly available at www.clinicaltrials.gov. Information related to the product, patient population, phase of investigation, trial sites and investigators and other aspects of the clinical trial is then made public as part of the registration. Sponsors are also obligated to discuss the results of their clinical trials after completion. Disclosure of the results of these trials can be delayed until the new product or new indication being studied has been approved.

***U.S. Market Approval Process***

The results of product development, preclinical and other non-clinical studies and clinical trials, along with descriptions of the manufacturing process, analytical tests conducted on the chemistry of the drug, proposed labeling and other relevant information are submitted to the FDA as part of an NDA or BLA requesting approval to market the product. The submission of an NDA or BLA is subject to the payment of user fees; a waiver of such fees may be obtained under certain limited circumstances. The FDA reviews all NDAs and BLAs submitted to ensure that they are sufficiently complete for substantive review before it accepts them for filing. The FDA may request additional information rather than accept an NDA or BLA for filing. In this event, the NDA or BLA must be resubmitted with the additional information. The resubmitted application also is subject to review before the FDA accepts it for filing.

Once the submission is accepted for filing, the FDA begins an in-depth substantive review. The FDA may refer the NDA or BLA to an advisory committee for review, evaluation and recommendation as to whether the application should be approved and under what conditions. The FDA is not bound by the recommendation of an advisory committee, but it generally follows such recommendations. The approval process is lengthy and often difficult, and the FDA may refuse to approve an NDA or BLA if the applicable regulatory criteria are not satisfied or may require additional clinical or other data and information. Even if such data and information are submitted, the FDA may ultimately decide that the NDA or BLA does not satisfy the criteria for approval. The FDA reviews an NDA to determine, among other things, whether a product is safe and effective for its intended use and whether its manufacturing is cGMP-compliant to assure and preserve the product's identity, strength, quality and purity. The FDA reviews a BLA to determine, among other things whether the product is safe, pure and potent and the facility in which it is manufactured, processed, packed or held meets standards designed to assure the product's continued safety, purity and potency. Before approving an NDA or BLA, the FDA will inspect the facility or facilities where the product is manufactured.

After the FDA evaluates an NDA or BLA, it will issue an approval letter or a Complete Response Letter. An approval letter authorizes commercial marketing of the drug with prescribing information for specific indications. A Complete Response Letter indicates that the review cycle of the application is complete and the application will not be approved in its present form. A Complete Response Letter usually describes the specific deficiencies in the NDA or BLA identified by the FDA and may require additional clinical data, such as an additional pivotal Phase 3 trial or other significant and time-consuming requirements related to clinical trials, nonclinical studies or manufacturing. If a Complete Response Letter is issued, the sponsor must resubmit the NDA or BLA, addressing all of the deficiencies identified in the letter, or withdraw the application. Even if such data and information are submitted, the FDA may decide that the NDA or BLA does not satisfy the criteria for approval.

If a product receives regulatory approval, the approval may be significantly limited to specific diseases and dosages or the indications for use may otherwise be limited, which could restrict the commercial value of the product. In addition, the FDA may require a sponsor to conduct Phase 4 testing, which involves clinical trials designed to further assess a drug's safety and effectiveness after NDA or BLA approval, and may require testing and surveillance programs to monitor the safety of approved products which have been commercialized. The FDA may also place other conditions on approval including the requirement for a risk evaluation and mitigation strategy (REMS) to assure the safe use of the drug. If the FDA concludes a REMS is needed, the sponsor of the NDA or BLA must submit a proposed REMS. The FDA will not approve the NDA or BLA without an approved REMS, if required. A REMS could include medication guides, physician communication plans or elements to assure safe use, such as restricted distribution methods, patient registries and other risk minimization tools. Any of these limitations on approval or marketing could restrict the commercial promotion, distribution, prescription or dispensing of products. Marketing approval may be withdrawn for noncompliance with regulatory requirements or if problems occur following initial marketing.

***Orphan Drug Act***

The Orphan Drug Act provides incentives to manufacturers to develop and market drugs or biologics for rare diseases and conditions affecting fewer than 200,000 persons in the U.S. at the time of application for orphan drug designation, or for a patient population greater than 200,000 in the U.S. where there is no reasonable expectation that the cost of developing the drug or biologic will be recovered from sales in the U.S. The first developer to receive FDA marketing approval for an orphan drug is entitled to a seven-year exclusive marketing period in the U.S. for that product. However, a drug that the FDA considers to be clinically superior to, or different from, another approved orphan drug, even though for the same indication, may also obtain approval in the U.S. during the seven-year exclusive marketing period. In addition, holders of exclusivity for orphan drugs are expected to assure the availability of sufficient quantities of their orphan drugs to meet the needs of patients. Failure to do so could result in the withdrawal of marketing exclusivity for the drug.

***Pediatric Information***

Under the Pediatric Research Equity Act of 2007 ("PREA"), NDAs or BLAs or supplements to NDAs or BLAs must contain data to assess the safety and effectiveness of the drug for the claimed indication(s) in all relevant pediatric sub-populations and to support dosing and administration for each pediatric sub-population for which the drug is safe and effective. The FDA may grant deferrals for submission of data or full or partial waivers. Unless otherwise required by regulation, PREA does not apply to any drug for an indication for which orphan drug designation has been granted. The Best Pharmaceuticals for Children Act ("BPCA") provides sponsors of NDAs with an additional six-month period of market exclusivity for all unexpired patent or non-patent exclusivity on all forms of the drug containing the active moiety if the sponsor submits results of pediatric studies specifically requested by the FDA under BPCA within required timeframes. The Biologics Price Competition and Innovation Act provides sponsors of BLAs an additional six-month extension for all unexpired non-patent market exclusivity on all forms of the biologic containing the active moiety pursuant to the BPCA if the conditions under the BPCA are met.

The Food and Drug Administration Safety and Innovation Act ("FDASIA"), which was signed into law on July 9, 2012, amended the FDCA. FDASIA requires that a sponsor who is planning to submit a marketing application for a drug or biological product that includes a new active ingredient, new indication, new dosage form, new dosing regimen or new route of administration submit an initial Pediatric Study Plan ("PSP") within sixty days of an end-of-Phase II meeting or as may be agreed between the sponsor and FDA. The initial PSP must include an outline of the pediatric study or studies that the sponsor plans to conduct, including study objectives and design, age groups, relevant endpoints and statistical approach, or a justification for not including such detailed information, and any request for a deferral of pediatric assessments or a full or partial waiver of the requirement to provide data from pediatric studies along with supporting information. FDA and the sponsor must reach agreement on the PSP. A sponsor can submit amendments to an agreed-upon initial PSP at any time if changes to the pediatric plan need to be considered based on data collected from nonclinical studies, early phase clinical trials, and/or other clinical development programs.

***Expedited Development and Review Programs***

The FDA has a Fast Track program that is intended to expedite or facilitate the process for reviewing new drugs and biological products that meet certain criteria. Specifically, new drugs and biological products are eligible for Fast Track designation if they are intended to treat a serious or life-threatening condition and demonstrate the potential to address unmet medical needs for the condition. Fast Track designation applies to the combination of the product and the specific indication for which it is being studied. The sponsor of a new drug or biologic may request the FDA to designate the drug or biologic as a Fast Track product at any time during the clinical development of the product. Unique to a Fast Track product, the FDA may consider for review sections of the marketing application on a rolling basis before the complete application is submitted, if the sponsor provides a schedule for the submission of the sections of the application, the FDA agrees to accept sections of the application and determines that the schedule is acceptable, and the sponsor pays any required user fees upon submission of the first section of the application.

Any product submitted to the FDA for marketing, including under a Fast Track program, may be eligible for other types of FDA programs intended to expedite development and review, such as priority review and accelerated approval. Fast Track designation, priority review and accelerated approval do not change the standards for approval but may expedite the development or approval process. Any product is eligible for priority review if it has the potential to provide safe and effective therapy where no satisfactory alternative therapy exists or a significant improvement in the treatment, diagnosis or prevention of a disease compared to marketed products. The FDA will attempt to direct additional resources to the evaluation of an application for a new drug or biological product designated for priority review in an effort to facilitate the review. Additionally, a product may be eligible for accelerated approval. Drug or biological products studied for their safety and effectiveness in treating serious or life-threatening illnesses and that provide meaningful therapeutic benefit over existing treatments may receive accelerated approval, which means that they may be approved on the basis of adequate and well-controlled clinical trials establishing that the product has an effect on a surrogate endpoint that is reasonably likely to predict a clinical benefit, or on the basis of an effect on a clinical endpoint other than survival or irreversible morbidity. As a condition of approval, the FDA may require that a sponsor of a drug or biological product receiving accelerated approval perform adequate and well-controlled post-marketing clinical trials. In addition, the FDA currently requires as a condition for accelerated approval pre-approval of promotional materials, which could adversely impact the timing of the commercial launch of the product. If the FDA concludes that a drug shown to be effective can be safely used only if distribution or use is restricted, it will require such post-marketing restrictions as it deems necessary to assure safe use of the drug, such as distribution restricted to certain facilities or physicians with special training or experience; or distribution conditioned on the performance of specified medical procedures.

FDASIA established a new category of drugs and biologics referred to as "breakthrough therapies" that may be eligible to receive Breakthrough Therapy Designation. A sponsor may seek FDA designation of a drug or biologic candidate as a "breakthrough therapy" if the product is intended, alone or in combination with one or more other products, to treat a serious or life-threatening disease or condition and preliminary clinical evidence indicates that the product may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. The designation includes all of the Fast Track program features, as well as more intensive FDA interaction and guidance. The Breakthrough Therapy Designation is a distinct status from both accelerated approval and priority review, which can also be granted to the same drug if relevant criteria are met. If a product is designated as breakthrough therapy, the FDA will expedite the development and review of such drug. All requests for breakthrough therapy designation will be reviewed within 60 days of receipt, and the FDA will either grant or deny the request.

***Post-Approval Requirements***

Once an approval is granted, the FDA may withdraw the approval if compliance with regulatory requirements or standards is not maintained or if problems occur after the product reaches the market. Later discovery of previously unknown problems with a product may result in restrictions on the product or even complete withdrawal of the product from the market. After approval, some types of changes to the approved product, such as adding new indications, certain manufacturing changes and additional labeling claims, are subject to further FDA review and approval. Drug and biologics manufacturers and other entities involved in the manufacture and distribution of approved drugs and biologics are required to register their establishments with the FDA and certain state agencies, and are subject to periodic unannounced inspections by the FDA and certain state agencies for compliance with cGMP regulations and other laws and regulations.

***U.S. Patent Term Restoration and Marketing Exclusivity***

Depending upon the timing, duration and specifics of the FDA approval of our drug candidates, some of our U.S. patents may be eligible for limited patent term extension under the Drug Price Competition and Patent Term Restoration Act of 1984, commonly referred to as the Hatch-Waxman Amendments. The Hatch-Waxman Amendments permit a patent restoration term of up to five years as compensation for patent term lost during product development and the FDA regulatory review process. However, patent term restoration cannot extend the remaining term of a patent beyond a total of 14 years from the product's approval date. The patent term restoration period is generally one-half the time between the effective date of an IND and the submission date of an NDA or BLA plus the time between the submission date of an NDA or BLA and the approval of that application. Only one patent applicable to an approved drug is eligible for the extension and the application for the extension must be submitted prior to the expiration of the patent. The USPTO, in consultation with the FDA, reviews and approves the application for any patent term extension or restoration. In the future, we intend to apply for restoration of patent term for one of our currently owned or licensed patents to add patent life beyond its current expiration date, depending on the expected length of the clinical trials and other factors involved in the filing of the relevant NDA or BLA.

Marketing exclusivity provisions under the FDCA can also delay the submission or the approval of certain marketing applications. The FDCA provides a five-year period of non-patent marketing exclusivity within the U.S. to the first applicant to obtain approval of an NDA for a new chemical entity. A drug is a new chemical entity if the FDA has not previously approved any other new drug containing the same active moiety, which is the molecule or ion responsible for the action of the drug substance. During the exclusivity period, the FDA may not accept for review an abbreviated new drug application (ANDA), or a 505(b)(2) NDA submitted by another company for another drug based on the same active moiety, regardless of whether the drug is intended for the same indication as the original innovator drug or for another indication, where the applicant does not own or have a legal right of reference to all the data required for approval. However, an application may be submitted after four years if it contains a certification of patent invalidity or non-infringement to one of the patents listed with the FDA by the innovator NDA holder. The FDCA also provides three years of marketing exclusivity for an NDA, or supplement to an existing NDA if new clinical investigations, other than bioavailability studies, that were conducted or sponsored by the applicant are deemed by the FDA to be essential to the approval of the application, for example new indications, dosages or strengths of an existing drug. This three-year exclusivity covers only the modification for which the drug received approval on the basis of the new clinical investigations and does not prohibit the FDA from approving ANDAs for drugs containing the active agent for the original indication or condition of use. Five-year and three-year exclusivity will not delay the submission or approval of a full NDA. However, an applicant submitting a full NDA would be required to conduct or obtain a right of reference to all of the preclinical studies and adequate and well-controlled clinical trials necessary to demonstrate safety and effectiveness.

Pediatric exclusivity is another type of regulatory market exclusivity in the U.S. under the BPCA. Pediatric exclusivity provides for an additional six months of marketing exclusivity if a sponsor conducts clinical trials in children as addressed in the section named "Pediatric Information" above. In addition, orphan drug exclusivity, as described above, may offer a seven-year period of marketing exclusivity, except in certain circumstances.

***Foreign Regulation***

In addition to regulations in the U.S., we will be subject to a variety of regulations in other jurisdictions governing, among other things, clinical trials and any commercial sales and distribution of our drug candidates.

Whether or not we obtain FDA approval for our drug candidates, we must obtain the requisite approvals from regulatory authorities in foreign countries prior to the commencement of clinical trials or marketing of the drug candidates in those countries. Certain countries outside of the U.S. have a similar process that requires the submission of a clinical trial application much like the IND prior to the commencement of human clinical trials. In the European Union, for example, a CTA must be submitted to each country's national health authority and an independent ethics committee, much like the FDA and the IRB, respectively. Once the CTA is approved in accordance with a country's requirements, clinical study development may proceed.

The requirements and process governing the conduct of clinical trials, product approval and licensing, pricing and reimbursement vary from country to country. In all cases, the clinical trials are conducted in accordance with GCP and the applicable regulatory requirements and the ethical principles that have their origin in the Declaration of Helsinki.

To obtain regulatory approval of an investigational drug or biological product under European Union regulatory systems, we must submit a marketing authorization application. The application used to file the NDA or BLA in the U.S. is similar to that required in the European Union, with the exception of, among other things, country-specific document requirements. The European Union also provides opportunities for market exclusivity. For example, in the European Union, upon receiving marketing authorization, new chemical entities generally receive eight years of data exclusivity and an additional two years of market exclusivity. If granted, data exclusivity prevents regulatory authorities in the European Union from referencing the innovator's data to assess a generic application. During the additional two-year period of market exclusivity, a generic marketing authorization can be submitted, and the innovator's data may be referenced, but no generic product can be marketed until the expiration of the market exclusivity. However, there is no guarantee that a product will be considered by the European Union's regulatory authorities to be a new chemical entity, and products may not qualify for data exclusivity. Products receiving orphan designation in the European Union can receive ten years of market exclusivity, during which time no similar medicinal product for the same indication may be placed on the market. An orphan product can also obtain an additional two years of market exclusivity in the European Union for pediatric studies. No extension to any supplementary protection certificate can be granted on the basis of pediatric studies for orphan indications.

The criteria for designating an "orphan medicinal product" in the European Union are similar in principle to those in the U.S. Under Article 3 of Regulation (EC) 141/2000, a medicinal product may be designated as orphan if (1) it is intended for the diagnosis, prevention or treatment of a life-threatening or chronically debilitating condition; (2) either (a) such condition affects no more than five in 10,000 persons in the European Union when the application is made, or (b) the product, without the benefits derived from orphan status, would not generate sufficient return in the European Union to justify investment; and (3) there exists no satisfactory method of diagnosis, prevention or treatment of such condition authorized for marketing in the European Union, or if such a method exists, the product will be of significant benefit to those affected by the condition, as defined in Regulation (EC) 847/2000. Orphan medicinal products are eligible for financial incentives such as reduction of fees or fee waivers and are, upon grant of a marketing authorization, entitled to ten years of market exclusivity for the approved therapeutic indication. The application for orphan drug designation must be submitted before the application for marketing authorization. The applicant will receive a fee reduction for the marketing authorization application if the orphan drug designation has been granted, but not if the designation is still pending at the time the marketing authorization is submitted. Orphan drug designation does not convey any advantage in, or shorten the duration of, the regulatory review and approval process.

The 10-year market exclusivity may be reduced to six years if, at the end of the fifth year, it is established that the product no longer meets the criteria for orphan designation, for example, if the product is sufficiently profitable not to justify maintenance of market exclusivity. In addition, marketing authorization may be granted to a similar product for the same indication at any time if:

- the second applicant can establish that its product, although similar, is safer, more effective or otherwise clinically superior;
- the applicant consents to a second orphan medicinal product application; or
- the applicant cannot supply enough orphan medicinal product.

For other countries outside of the European Union, such as countries in Eastern Europe, Latin America or Asia, the requirements governing the conduct of clinical studies, product licensing or approval, pricing and reimbursement vary from country to country. In all cases, again, the clinical studies are conducted in accordance with GCP and the applicable regulatory requirements and the ethical principles that have their origin in the Declaration of Helsinki.

If we fail to comply with applicable foreign regulatory requirements, we may be subject to, among other things, fines, suspension or withdrawal of regulatory approvals, product recalls, seizure of products, operating restrictions and criminal prosecution.

***Other Regulatory Matters***

Manufacturing, sales, promotion and other activities following product approval are also potentially subject to regulation by numerous regulatory authorities in addition to the FDA, including, in the U.S., the Centers for Medicare & Medicaid Services, other divisions of the Department of Health and Human Services, the Drug Enforcement Administration, the Consumer Product Safety Commission, the Federal Trade Commission, the Occupational Safety & Health Administration, the Environmental Protection Agency and state and local governments. In the U.S., sales, marketing and scientific/educational programs must also comply with state and federal fraud and abuse laws, including state and federal anti-kickback, false claims, data privacy and security and physician payment transparency laws. Pricing and rebate programs must comply with the Medicaid rebate requirements of the U.S. Omnibus Budget Reconciliation Act of 1990 and more recent requirements in the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act of 2010, collectively the Affordable Care Act. If products are made available to authorized users of the Federal Supply Schedule of the General Services Administration, additional laws and requirements apply. The handling of any controlled substances must comply with the U.S. Controlled Substances Act and Controlled Substances Import and Export Act. Products must meet applicable child-resistant packaging requirements under the U.S. Poison Prevention Packaging Act. Manufacturing, sales, promotion and other activities are also potentially subject to federal and state consumer protection and unfair competition laws.

The distribution of pharmaceutical products is subject to additional requirements and regulations, including extensive record-keeping, licensing, storage and security requirements intended to prevent the unauthorized sale of pharmaceutical products.

The failure to comply with regulatory requirements may subject us to possible legal or regulatory action. Depending on the circumstances, failure to meet applicable regulatory requirements can result in criminal prosecution, fines or other penalties, injunctions, recall or seizure of products, total or partial suspension of production, denial or withdrawal of product approvals, or refusal to allow a firm to enter into supply contracts, including government contracts. In addition, even if a firm complies with FDA and other requirements, new information regarding the safety or efficacy of a product could lead the FDA to modify or withdraw product approval. Prohibitions or restrictions on sales or withdrawal of future products marketed by us could materially affect our business in an adverse way.

Changes in regulations, statutes or the interpretation of existing regulations could impact our business in the future by requiring, for example: (i) changes to our manufacturing arrangements; (ii) additions or modifications to product labeling; (iii) the recall or discontinuation of our products; or (iv) additional record-keeping requirements. If any such changes were to be imposed, they could adversely affect the operation of our business.

**Environmental Regulation**

In addition to being subject to extensive regulation by the FDA, we must also comply with environmental regulation insofar as such regulation applies to us or our drug candidates. Our costs of compliance with environmental regulation as applied to similar pharmaceutical companies are minimal, since we do not currently, nor do we intend to, engage in the manufacturing of any of our drug candidates. We currently use unaffiliated manufacturers to produce all of our drug candidate material and receive final material from such manufacturer, without any involvement on our part in the manufacturing process at any stage of the process.

Although we believe that our safety procedures for using, handling, storing and disposing of our drug candidate materials comply with the environmental standards required by state and federal laws and regulations, we cannot completely eliminate the risk of accidental contamination or injury from these materials. We do not carry a specific insurance policy to mitigate this risk to us or to the environment.

**Research and Development Expenses**

Research and development activities include personnel costs, research supplies, clinical and preclinical study costs. Such expenses related to the research and development of our drug candidates totaled $2.9 million for the year ended December 31, 2018 and $4.1 million for the year ended December 31, 2017.

**Employees**

At December 31, 2018, we employed four full-time employees. We are not a party to any collective bargaining agreement with our employees; nor are any of our employees a member of any labor unions. We are subject to certain statutory and contractual obligations in instances where we terminate U.K.-based employees. These obligations, which are ordinary and customary in the U.K., generally range from one to 12 months of wages for terminated employees and would not be expected to represent a material adverse effect to us.

To complement our own professional staff, we utilize specialists in regulatory affairs, pharmacovigilance, process engineering, manufacturing, quality assurance, preclinical and clinical development, accounting and business development. These individuals include scientific advisors as well as independent consultants.

**Competition**

The pharmaceutical and biotechnology industries are characterized by intense competition and rely heavily on the ability to move quickly, adapt to changing medical and market needs, and to develop and maintain strong intellectual property positions. We believe that the development experience of our scientific and management team, as well as the strength and promise of our drug candidates, provide us with a competitive advantage; nevertheless, we face potential competition from a myriad of sources many of which operate with greater resources and more mature products. These include pharmaceutical and biotechnology companies, academic institutions, governmental agencies and public and private research institutions. Competition is intense and is expected to increase.

***Product and Technology Specific Competition***

**XBIO-101 for Endometrial Cancer ("EC") and Triple Negative Breast Cancer ("TNBC")**

Current standard of care treatments for EC and TNBC include radiation, surgery as well as certain chemotherapeutic and antineoplastic agents, particularly platinum-based agents, including but not limited to Taxol, Taxane, anthracycline, carboplatin, doxorubicin, cisplatin, ifosfamide, and topotecan.

A number of additional therapeutic classes are in development worldwide, including but not limited to antibodies, antibody-drug conjugates, and immunotherapies. Additionally, there are a number of targeted agents including PARP inhibitors and other agents that target the PI3K/Akt/mTOR pathway and other kinase inhibitors. The aforementioned therapeutics and therapeutic classes may be used either alone or in combination.

**PSA for Drug Delivery**

Current competing platforms include PEGylation, Fc-fusion, albumin -fusion, HESylation, PASylation,, depot and CTP-fusion, among others.

We also expect to compete with academic institutions and other smaller pharmaceutical companies during the drug development stage of our progress. In addition to competing with universities and other research institutions in the development of drug products, therapies, technologies and processes, we may compete with other companies in acquiring rights to products or technologies from universities. There can be no assurance that our products or drug candidates will be more effective or achieve greater market acceptance than competitive products, or that these companies will not succeed in developing products and technologies that are more effective than those being developed for us or that would render our products and technologies less competitive or obsolete.

**Properties**

We occupied a facility consisting of approximately 4,000 square feet in the Ledgemont Technology Center in Lexington, Massachusetts. The premises were divided into approximately 50% laboratory and 50% office space and were leased by our subsidiary, Xenetic Bioscience, Incorporated. The lease provided for an initial term of 61 months which commenced in January 2014 and expired on January 31, 2019. Commencing February 1, 2019, we occupy a facility consisting of approximately 1,700 square feet of office space at 40 Speen Street in Framingham, Massachusetts. The sublease is for 21 months through September 2020. We believe that this space is adequate for our current needs and that if additional space is required, it can be obtained at commercially reasonable terms nearby.

In addition, we lease 450 sq. ft. of office space in Miami, Florida. The lease provided for an initial term of 12 months, which commenced on December 1, 2016, and was extended for an additional two years through November 30, 2019. We believe that this space is adequate for our current needs and that if additional space is required, it can be obtained at commercially reasonable terms either within its current space or nearby.

**Legal Proceedings**

From time to time, we may be a party to litigation and subject to claims incident to the ordinary course of business. Although the results of litigation and claims cannot be predicted with certainty, we currently believe that the final outcome of these ordinary course matters will not have a material adverse effect on our business. Regardless of the outcome, litigation can have an adverse impact on us because of defense and settlement costs, diversion of management resources and other factors.

There are no matters, as of December 31, 2018, that, in the opinion of management, might have a material adverse effect on our financial position, results of operations or cash flows.

**Market Price And Dividend Information**

Our Common Stock is listed for trading on The NASDAQ Capital Market under the symbol "XBIO."

*Holders of Record*

As of March 15, 2019, there were 410 holders of record of our Common Stock.

*Dividends*

There are no restrictions in our articles of incorporation or bylaws that prevent us from declaring dividends. The Nevada Revised Statutes, however, do prohibit us from declaring dividends where after giving effect to the distribution of the dividend:

- We would not be able to pay our debts as they become due in the usual course of business; or
- Our total assets would be less than the sum of our total liabilities plus the amount that would be needed to satisfy the rights of stockholders who have preferential rights superior to those receiving the distribution.

We have never previously declared or paid any cash dividends on our Common Stock. We currently intend to retain earnings and profits, if any, to support our business strategy and do not intend to pay any cash dividends within the foreseeable future. Any future determination to pay cash dividends will be at the sole discretion of our Board of Directors and will depend upon the financial condition of the Company, our operating results, capital requirements, general business conditions and any other factors that the Board of Directors deems relevant.

## XENETIC'S MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

### BUSINESS OVERVIEW

Our Phase II trial for our novel oncology product, XBIO-101, commenced patient dosing in October 2017. We closed patient enrollment of the trial in March 2019 as a result of slower than expected progress on the trial resulting from patient enrollment and retention challenges.

We continue to commit a significant amount of our resources to our research and development activities and anticipate continuing to do so for the near future. Although we hold a broad patent portfolio, the focus of our internal development efforts during 2018 was limited to research and development of XBIO-101 due to capital constraints.

On March 1, 2019, the Company entered into an agreement to acquire XCART, a proximity-based screening platform capable of identifying CAR constructs that can target patient-specific tumor neoantigens, with a demonstrated proof of mechanism in B-cell Non-Hodgkin lymphomas. The XCART technology, developed by the Institute in collaboration with the IBCH, is believed to have the potential to significantly enhance the safety and efficacy of cell therapy for B-cell lymphomas by generating patient- and tumor-specific CAR T cells. The closing of the Transaction is subject to customary closing conditions as well as conditions regarding (i) the Company having adequate financing to fund its future working capital obligations following the closing and (ii) the Company obtaining necessary and appropriate stockholder approvals, evidencing among other matters, approval of the Share Purchase Agreement and the transactions contemplated thereunder, including the issuance of the transaction shares. Subject to the satisfaction of the closing conditions, the transaction is expected to close in the first half of 2019.

### Critical Accounting Estimates

The preparation of our financial statements in conformity with U.S. generally accepted accounting principles ("U.S. GAAP") requires us to make estimates, judgments and assumptions that affect the reported amounts of assets and liabilities at the date of the financial statements and the reported amounts of revenue, costs and expenses during the reporting period. On an ongoing basis, we evaluate our estimates that are based on historical experience and on various other assumptions that we believe to be reasonable under the circumstances. The result of these evaluations forms the basis for making judgments about the carrying values of assets and liabilities and the reported amount of expenses that are not readily apparent from other sources. Because future events and their effects cannot be determined with certainty, actual results and outcomes could differ materially from our estimates, judgments and assumptions.

Management believes that the following accounting estimates are the most critical to aid in fully understanding and evaluating our reported financial results, and they require management's most difficult subjective or complex judgments, resulting from the need to make estimates about the effect of matters that are inherently uncertain. The following narrative describes these critical accounting estimates, judgments and assumptions and the effect if actual results differ from these assumptions.

### Revenue Recognition

We enter into supply, license and collaboration arrangements with pharmaceutical and biotechnology partners, some of which include royalty agreements based on potential net sales of approved commercial pharmaceutical products.

Effective January 1, 2018, we adopted Accounting Standards Codification ("ASC") Topic 606,*Revenue from Contracts with Customers* ("ASC 606"), using the modified retrospective transition method. Under this method, results for reporting periods beginning after January 1, 2018 are presented under ASC 606, while prior period amounts are not adjusted and continue to be reported in accordance with ASC 605. This standard applies to all contracts with customers, except for contracts that are within the scope of other standards, such as leases, insurance, collaboration arrangements and financial instruments. We did not have any revenue generating contracts with customers and, therefore, the adoption of this new revenue standard did not have a material impact on the consolidated financial statements. Under ASC 605, we recognized revenue when all of the following criteria were met: (i) persuasive evidence of an arrangement existed; (ii) delivery had occurred or services had been rendered; (iii) the seller's price to the buyer was fixed or determinable; and (iv) collectability was reasonably assured.

The terms of our license agreements may include delivery of an IP license to a collaboration partner. We may be compensated under license arrangements through a combination of non-refundable upfront receipts, development and regulatory objective receipts and royalty receipts on future product sales by partners. We anticipate recognizing non-refundable upfront license payments and development and regulatory milestone payments received by us in license and collaboration arrangements that include future obligations, such as supply obligations, ratably over our expected performance period under each respective arrangement. We make our best estimate of the period over which we expect to fulfil our performance obligations, which may include technology transfer assistance, research activities, clinical development activities, and manufacturing activities from development through the commercialization of the product. Given the uncertainties of these collaboration arrangements, significant judgment is required to determine the duration of the performance period.

When we enter into an arrangement to sublicense some of our patents, we will consider the performance obligations to determine if there is a single element or multiple elements to the arrangement as we determine the proper method and timing of revenue recognition. We consider the terms of the license or sublicense for such elements as price adjustments or refund clauses in addition to any performance obligations for us to provide such as services, patent defense costs, technology support, marketing or sales assistance or any other elements to the arrangement that could constitute an additional deliverable to us that could change the timing of the revenue recognition. Non-refundable upfront license and sublicense fees received, whereby continued performance or future obligations are considered inconsequential or perfunctory to the relevant licensed technology, are recognized as revenue upon delivery of the technology.

We expect to recognize royalty revenue in the period of sale, based on the underlying contract terms, provided that the reported sales are reliably measurable, we have no remaining performance obligations, and all other revenue recognition criteria are met.

We anticipate reimbursements for research and development services completed by us related to the collaboration agreements to be recognized in operations as revenue on a gross basis.

Our license, sublicense and collaboration agreements with certain collaboration partners could also provide for future milestone receipts to us based solely upon the performance of the respective collaboration partner in consideration of deadline extensions or upon the achievement of specified sales volumes of approved drugs. For such receipts, we expect to recognize the receipts as revenue when earned under the applicable contract terms on a performance basis or ratably over the term of the agreement. These receipts may also be recognized as revenue when continued performance or future obligations by us are considered inconsequential or perfunctory.

Under ASC 606, an entity recognizes revenue when its customer obtains control of promised goods or services, in an amount that reflects the consideration which the entity expects to receive in exchange for those goods or services. To determine revenue recognition for arrangements that an entity determines are within the scope of ASC 606, the entity performs the following five steps: (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue at a point in time, or over time, as it satisfies a performance obligation. We only apply the five-step model to contracts when it is probable that we will collect the consideration we are entitled to in exchange for the goods or services we transfer to the customer. At contract inception, once the contract is determined to be within the scope of ASC 606, we assess the goods or services promised within each contract, determine those that are performance obligations, and assess whether each promised good or service is distinct. We then recognize as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) the performance obligation is satisfied.

As part of the accounting for these arrangements, we must use significant judgment to determine: a) the number of performance obligations based on the determination under step (ii) above; b) the transaction price under step (iii) above; and c) the stand-alone selling price for each performance obligation identified in the contract for the allocation of transaction price in step (iv) above. We use judgment to determine whether milestones or other variable consideration should be included in the transaction price as described further below. The transaction price is allocated to each performance obligation on a relative stand-alone selling price basis, for which we recognize revenue as or when the performance obligations under the contract are satisfied. In developing the stand-alone price for a performance obligation, we consider applicable market conditions and relevant entity-specific factors, including factors that were contemplated in negotiating the agreement with the customer and estimated costs. We validate the stand-alone selling price for performance obligations by evaluating whether changes in the key assumptions used to determine the stand-alone selling prices will have a significant effect on the allocation of transaction price between multiple performance obligations. We recognize a contract asset or liability for the difference between our performance (i.e., the goods or services transferred to the customer) and the customer's performance (i.e., the consideration paid by, and unconditionally due from, the customer).

**Research and Development Expenses**

Research and development expenses consist of expenses incurred in performing research and development activities, including compensation and benefits, facilities expenses, overhead expenses, clinical trial and related clinical manufacturing expenses, fees paid to Clinical Research Organizations (“CROs”) and contract manufacturing organizations and other outside expenses. We expense research and development costs as incurred. We expense upfront, non-refundable payments made for research and development services as obligations are incurred. The value ascribed to intangible assets acquired but which have not met capitalization criteria is expensed as research and development at the time of acquisition.

We are required to estimate accrued research and development expenses at each reporting period. This process involves reviewing open contracts and purchase orders, communicating with our personnel to identify services that have been performed on our behalf and estimating the level of service performed and the associated cost incurred for the service when we have not yet been invoiced or otherwise notified of actual costs. The majority of our service providers invoice us in arrears for services performed, on a pre-determined schedule or when contractual milestones are met. However, some require advanced payments. We make estimates of accrued expenses as of each balance sheet date in the financial statements based on facts and circumstances known at that time. We periodically confirm the accuracy of the estimates with the service providers and make adjustments, if necessary. Examples of estimated accrued research and development expenses include fees paid to:

- program managers in connection with overall program management of clinical trials;
- CROs in connection with clinical trials; and
- investigative sites in connection with clinical trials.

We base our expenses related to clinical trials on our estimates of the services received and efforts expended pursuant to quotes and contracts with multiple research institutions and CROs that conduct and manage clinical trials on our behalf. The financial terms of these agreements are subject to negotiation, vary from contract to contract and may result in uneven payment flows. There may be instances in which payments made to vendors will exceed the level of services provided and result in a prepayment of the expense. In accruing service fees, we estimate the time period over which services will be performed and the level of effort to be expended in each period. If the actual timing of the performance of services or the level of effort varies from the estimate, we adjust the accrual or prepaid accordingly. Although we do not expect our estimates to be materially different from amounts actually incurred, our understanding of the status and timing of services performed relative to the actual status and timing of services performed may vary and may result in reporting amounts that are too high or too low in any particular period. To date, there have not been any material adjustments to our prior estimates of accrued research and development expenses.

**Share-based Expense**

Share-based expense includes grants of options and restricted stock units ("RSUs") to employees and non-employees to purchase shares of Common Stock, Joint Share Ownership Plan ("JSOP") awards to employees, as well as agreements to issue Common Stock in exchange for services provided by non-employees.

Share-based expense is based on the estimated fair value of the option or calculated using the Black-Scholes option pricing model. Determining the appropriate fair value model and related assumptions requires judgment, including estimating share price volatility and expected terms of the awards. The expected volatility rates are estimated based on our actual volatility and of comparable public companies over the expected term of the option. The expected terms represent the time that options are expected to be outstanding. We account for forfeitures as they occur and not at the time of grant. The Company has not paid dividends and does not anticipate paying cash dividends in the foreseeable future and, accordingly, uses an expected dividend yield of zero. The risk-free interest rate is based on the rate of U.S. Treasury securities with maturities consistent with the estimated expected term of the awards. Upon exercise, stock options are redeemed for newly issued shares of Common Stock. RSUs are redeemed for newly issued shares of Common Stock as the vesting and settlement provisions of the grant are met.

For employee options that vest based solely on service conditions, the fair value measurement date is generally on the date of grant and the related compensation expense is recognized on a straight-line basis over the requisite vesting period of the awards. For non-employee options, the fair value measurement date is the earlier of the date the performance of services is complete or the date the performance commitment has been reached. We generally determine that the fair value of the stock options is more reliably measurable than the fair value of the services received. Compensation expense related to stock options granted to non-employees that vest based solely on service conditions is subject to re-measurement at each reporting period until the options vest and is recognized on a straight-line basis over requisite vesting period of the awards.

The fair value of Common Stock awards issued in exchange for services provided by non-employees is generally determined by using the fair value of the services provided, as this provides the most reliable measure of the fair value of the awards. Share-based expense is recognized as services are rendered on a straight-line basis. The assumptions used in calculating the fair value of the Common Stock awards represent our best estimates and involve inherent uncertainties and the application of our judgment. As a result, if factors change and we use different assumptions, share-based expense related to the Common Stock awards could be materially different in the future.

**Warrants**

In connection with certain financing, consulting and collaboration arrangements, we issued warrants to purchase shares of our Common Stock. Outstanding warrants are standalone instruments that are not puttable or mandatorily redeemable by the holder and are classified as equity awards. We measure the fair value of the awards using the Black-Scholes option pricing model, which requires the input of subjective assumptions and judgments, including estimating the expected term of the awards and the share price volatility, at each reporting period until the measurement date is reached. The expected term is deemed to be the contractual life of the warrant and we determine the expected volatility based on a weighted-average of the historical volatility of a peer group of comparable publicly traded companies with drug candidates in similar stages of development to our drug candidates in conjunction with our historical volatility.

All other warrants are recorded at fair value as expense on a straight-line basis over the requisite service period or at the date of issuance, if there is not a service period or if service has already been rendered. For warrants that contain vesting triggers based on the achievement of certain objectives, we apply judgment to estimate the probability and timing of the achievement of those objectives. These estimates involve inherent uncertainties, and as a result, if the probability or timing of the achievement of those objectives change, expense related warrants could be materially different in the future.

Warrants issued to collaboration partners in conjunction with the issuance of Common Stock are initially recorded at fair value as a reduction of additional paid-in capital of the Common Stock issued.

For warrants issued in connection with financing arrangements the Company allocates the proceeds based on the relative fair value of the award and other instrument(s).

**Goodwill and Indefinite-lived Intangible Assets**

*Goodwill*

Goodwill is not amortized but is reviewed for impairment annually as of October 1, or when events or changes in the business environment indicate that all, or a portion, of the carrying value of the reporting unit may no longer be recoverable. Under this method, we compare the fair value of our reporting unit to its carrying value. If the fair value is less than the carrying amount, a more detailed analysis is performed to determine if goodwill is impaired. An impairment loss, if any, is measured as the excess of the carrying value of goodwill over the fair value of goodwill. We also have the option to first assess qualitative factors to determine whether the existence of events or circumstances leads us to determine that it is more likely than not (that is, a likelihood of more than 50%) that goodwill is impaired. If we choose to first assess qualitative factors and it is determined that it is not more likely than not goodwill is impaired, we are not required to take further action to test for impairment. We also have the option to bypass the qualitative assessment and perform only the quantitative impairment test, which we may choose to do in some periods but not in others. As the option to perform the qualitative assessment is not a permanent election, we reassess this option during each annual impairment review.

We determine our reporting unit by identifying the components of our operating segment with similar economic characteristics based on quantitative and qualitative factors that have discrete financial information available. We determined that we have one reporting unit as of October 1, 2018 and 2017, the dates of our annual impairment reviews. Based on our annual impairment reviews, we used the quantitative method and determined no adjustment to the carrying value of goodwill would be necessary as the fair value of our reporting unit exceeded its respective carrying value as of October 1, 2018 and 2017, respectively. There can be no assurance that future events will not result in an impairment of goodwill.

*Indefinite-lived Intangible Assets*

Our indefinite-lived intangible assets consist of acquired in-process research and development ("IPR&D"). IPR&D intangible assets are considered indefinite-lived intangible assets until completion or abandonment of the associated research and development efforts. IPR&D is not amortized but is reviewed for impairment annually as of October 1, or when events or changes in the business environment indicate the carrying value may be impaired. If the fair value of the intangible asset is less than the carrying amount, we perform a quantitative test to determine the fair value. The impairment loss, if any, is measured as the excess of the carrying value of the intangible asset over its fair value. We also have the option to first assess qualitative factors to determine whether the existence of events or circumstances leads us to determine that it is more likely than not (that is, a likelihood of more than 50%) that our indefinite-lived intangible asset is impaired. If we choose to first assess qualitative factors and it is determined that it is not more likely than not our indefinite-lived intangible asset is impaired, we are not required to take further action to test for impairment. We also have the option to bypass the qualitative assessment and perform only the quantitative impairment test, which we may choose to do in some periods but not in others. As the option to perform the qualitative assessment is not a permanent election, we reassess this option during each annual impairment review. During 2018 and 2017, we used the quantitative method and determined the fair value of the indefinite-lived intangible asset exceeded its carrying value as of October 1, 2018 and 2017.

Significant judgments are inherent in the calculation of fair value. With the assistance of an independent third party, we calculated the fair value of our IPR&D by using the Multi-Period Excess-Earnings Method (the "MPEEM") which is a form of the income approach. Under the MPEEM, the fair value of an intangible asset is equal to the present value of the asset's incremental after-tax cash flows (excess earnings) remaining after deducting the market rates of return on the estimated value of contributory assets (contributory charge) over its remaining useful life. This method requires us to make long-term projections of the amount and timing of income and expenses related to development and commercialization of the acquired intangible asset and assumptions regarding the rate of return on contributory assets, the weighted average cost of capital and the discount rate for estimated future after-tax cash flows. Specifically, this method took into account our estimates of future incremental milestone payments that may be achieved upon completion of clinical trial stages, regulatory approval and sales goals upon commercialization, as well as our expected royalty income based on sales upon commercialization. Projected expenses are based on our forecasted spend required to complete the development of our IPR&D, which will require the Company to raise further capital to fund the development. Our projections are estimates subject to change based on several factors including the results of clinical trials and delays in regulatory approval. The discount rate used is commensurate with the uncertainties associated with the economic estimates described above and reflects the stage of development, the time and resources needed to complete the development of the product and the risks of advancement through regulatory approval processes.

Key assumptions utilized in the fair valuation of our indefinite-lived intangible asset are as follows:

- Discount rate – 45.0%
- Estimated aggregate milestone receipts – approximately $300 million
- Royalty rates – 10% of net sales

While we believe reasonable estimates and appropriate assumptions were utilized to calculate the fair value of IPR&D, it is possible a material change could occur. Use of different estimates and judgments could yield materially different results in our analysis and could result in materially different asset values or expense.

There can be no assurance that we will be able to successfully develop and complete the acquired IPR&D program and profitably commercialize the underlying drug candidates before our competitors develop and commercialize similar products, or at all. Moreover, if the acquired IPR&D program fails or is abandoned during development, then we may not realize the value we have estimated and recorded in our financial statements on the acquisition date, and we may also not recover the research and development investment made since the acquisition date to further develop that program. If such circumstances were to occur, our future operating results could be materially adversely impacted.

We did not record an impairment charge as a result of our goodwill or indefinite-lived intangible asset impairment tests in 2018 or 2017. We will continue to closely monitor the performance of our indefinite-lived intangible asset and reporting unit. If the business experiences adverse changes in our key assumptions and judgments, we will perform an interim goodwill and/or indefinite-lived intangible asset impairment analysis. There can be no assurance that future events will not result in an impairment of our goodwill or indefinite-lived intangible asset. As a result of the going concern uncertainty discussed under *Liquidity and Capital Resources* below, the recoverability and classification of the Company's intangible assets and goodwill could be adversely affected.

**Results of Operations**

The table below sets forth the comparison of our historical results of operations for the year ended December 31, 2018 to the year ended December 31, 2017.

| Description | 2018 | 2017 | Increase (Decrease) | Percentage Change |
|---|---|---|---|---|
| Revenues: | | | | |
| Licenses and collaboration services | $ – | $ 7,585,000 | $ (7,585,000) | (100.0)% |
| Operating costs and expenses: | | | | |
| Cost of research and development revenue | – | (156,119) | (156,119) | (100.0)% |
| Research and development | (2,883,952) | (4,060,000) | (1,176,048) | (29.0)% |
| General and administrative | (4,392,375) | (6,937,643) | (2,545,268) | (36.7)% |
| Loss from operations | $ (7,276,327) | $ (3,568,762) | $ 3,707,565 | 103.9% |
| Other income (expense): | | | | |
| Other expense | (24,640) | (24,552) | 88 | 0.4% |
| Interest income (expense) | 509 | (1,818) | (2,327) | (128.0)% |
| Net loss | $ (7,300,458) | $ (3,595,132) | $ 3,705,326 | 103.1% |

**Revenue**

For the year ended December 31, 2017, revenue represented license and collaboration services. We did not receive any license or collaboration service revenue for the year ended December 31, 2018.

In October 2017, we entered into a Right to Sublicense Agreement (the "Sublicense Agreement") with Baxalta Incorporated, Baxalta US Inc., and Baxalta GmbH (collectively, with their affiliates "Baxalta") wholly-owned subsidiaries of Takeda Pharmaceuticals Co., Ltd. ("Takeda"), formerly Shire plc . Pursuant to the Sublicense Agreement, Baxalta paid us a one-time payment of seven million five hundred thousand dollars ($7,500,000) in November 2017 and agreed to pay us single digit royalty payments based upon net sales of the licensed patents in connection with products related to the treatment of blood and bleeding disorders ("Covered Products") throughout the term, each of which is conditioned upon the performance of the sublicense contemplated by the Sublicense Agreement. We recognized revenue of $7.5 million in 2017 related to this payment.

Research and development revenue represents collaboration services related to research and development programs conducted on behalf of third-parties in 2017.

**Cost of Revenue**

There was no cost of revenue for the year ended December 31, 2018. Cost of research and development revenue represents collaboration services related to research and development programs conducted on behalf of third-parties in 2017.

**Research and Development Expense**

R&D expenses decreased $1.2 million, or 29.0% to $2.9 million from $4.1 million in the comparable period in 2017. The table below sets forth the research and development expenses incurred by category of expense for the years ended December 31, 2018 and 2017.

| | Year ended December 31, | |
|---|---|---|
| **Category of Expense** | **2018** | **2017** |
| Outside services and Contract Research Organizations | $ 2,242,658 | $ 3,094,583 |
| Share-based expense | 203,031 | 101,400 |
| Personnel costs | 280,118 | 568,376 |
| Other | 158,145 | 295,641 |
| Total research and development expense | $ 2,883,952 | $ 4,060,000 |

The decrease in outside services and contract research organizations expense was primarily due to our internal development efforts being solely focused on our oncology product, XBIO-101, during the year ended December 31, 2018 due to capital constraints. For the year ended December 31, 2017 outside services and contract research organizations included costs associated with other programs and development efforts but such costs were not continued in 2018. Share-based expense increased during the year ended December 31, 2018 as compared to the same period in the prior year primarily due to expense related to warrants issued to Serum Institute in 2016. Salaries and wages decreased during the year ended December 31, 2018 as we reduced our R&D headcount in the second half of fiscal year 2017 due to our limited internal development efforts. Other expense decreased during the year ended December 31, 2018 primarily due to lower laboratory costs in 2018 as we discontinued our internal development efforts in the second half of 2017.

**General and Administrative Expense**

General and administrative expenses decreased by approximately $2.5 million or 36.7% for the year ended December 31, 2018 to $4.4 million from $6.9 million in the comparable period in 2017. Employee-related costs, including shared-based costs and travel, legal, accounting, investor and public relations costs all decreased during the year ended December 31, 2018 compared to the year ended December 31, 2017 as we significantly reduced our discretionary spending due to our capital constraints. In addition, expense for the year ended December 31, 2017 included approximately $0.6 million in accrued severance related to a settlement agreement with our former Chief Executive Officer who separated from the Company in November 2017.

**Other Expense**

Other expense was approximately $25,000 for the year ended December 31, 2018 and was relatively unchanged from the prior year.

**Interest Income (Expense)**

We earned $500 of net interest income for the year ended December 31, 2018 compared to net interest expense of $2,000 in the year ended December 31, 2017 due to lower interest expense on our operating lease.

**Liquidity and Capital Resources**

We incurred a net loss of approximately $7.3 million for the year ended December 31, 2018 and had an accumulated deficit of $153.2 million at December 31, 2018 as compared to an accumulated deficit of approximately $145.9 million at December 31, 2017. Working capital (deficit) was approximately $(0.4) million and $3.9 million at December 31, 2018 and December 31, 2017, respectively. During the year ended December 31, 2018, our working capital decreased by $4.3 million due primarily to outflows for general operating costs and costs related to our XBIO-101 Phase II clinical trial. These cash outflows were partially offset by approximately $1.5 million of proceeds received from the exercise of warrants during the year ended December 31, 2018. We expect to continue incurring losses for the foreseeable future and will need to raise additional capital or pursue other strategic alternatives in the very near term in order to continue the pursuit of our business plan and continue as a going concern.

Our principal source of liquidity consists of cash. At December 31, 2018, we had approximately $0.6 million in cash and $1.6 million in accounts payable and accrued expenses. At December 31, 2017, we had approximately $5.5 million in cash and $1.9 million in accounts payable and accrued expenses.

We have historically relied upon sales of our equity securities to fund our operations. Since 2005, we have raised approximately $60.0 million in proceeds from offerings of our common and preferred stock. We have also received approximately $20.0 million from revenue producing activities from 2005 through December 31, 2018, including two cash payments from Takeda in 2017: a $3.0 million clinical milestone payment in January 2017; and a $7.5 million sublicense payment in November 2017. More than 90% of the milestone and sublicense revenue received to date has been from a single collaborator, Takeda. We expect the majority of our funding through equity or equity-linked instruments, debt financings, corporate collaborations, related party funding and/or licensing agreements to continue as a trend for the foreseeable future.

We estimate that our existing resources will only be able to fund our planned operations, existing obligations and contractual commitments through the first half of 2019. This estimate is based on our current expectations regarding projected staffing expenses, working capital requirements, costs to close the XCART transaction, capital expenditure plans and anticipated revenues. Given our current working capital constraints, we have attempted to minimize cash commitments and expenditures for external research and development and general and administrative services to the greatest extent practicable. We will need to raise additional working capital in the very near term in order to fund our future operations, including our development efforts associated with the XCART platform technology.

We have no committed sources of additional capital. Our management believes that we have access to capital resources through possible public or private equity offerings, debt financings, corporate collaborations, related party funding or other means. On March 5, 2019, we raised $3.1 million in a registered direct common stock offering resulting in $2.7 million of net proceeds to the Company. However, we have not secured any commitment for additional financing at this time. The terms, timing and extent of any future financing will depend upon several factors including the achievement of progress in our clinical development programs, our ability to identify and enter into licensing or other strategic arrangements and factors related to financial, economic and market conditions, many of which are beyond our control.

Management evaluates whether there are conditions or events, considered in the aggregate, that raise substantial doubt about our ability to continue as a going concern within one year after the date that the financial statements are issued. We have incurred substantial losses since our inception, and we expect to continue to incur operating losses in the near-term. These factors raise substantial doubt about our ability to continue as a going concern. As a result, our independent registered public accounting firm included an explanatory paragraph in its report on our audited financial statements for the year ended December 31, 2018 expressing doubt as to our ability to continue as a going concern. We will need to raise additional capital in order to sustain our operations. If we are unable to secure additional funds on a timely basis or on acceptable terms, we may be required to defer, reduce or eliminate significant planned expenditures, restructure, curtail or eliminate some or all of our development programs or other operations, reduce general and administrative expenses, and delay or cease the purchase of clinical research services, dispose of technology or assets, pursue an acquisition of our company by another party at a price that may result in a loss on investment for our stockholders, enter into arrangements that may require us to relinquish rights to certain of our drug candidates, technologies or potential markets, file for bankruptcy or cease operations altogether.

We continue to seek appropriate out-license arrangements for all of our technologies but are currently unable to reliably predict whether or when we may enter into an agreement. Due to the uncertainties inherent in the clinical research process and unknown future market conditions, there can be no assurance any of our technologies will lead to any future income.

**Cash Flows from Operating Activities**

Cash flows used in operating activities for the year ended December 31, 2018 totaled approximately $6.5 million, which was primarily due to our $7.3 million net loss for the period offset by non-cash charges of $1.4 million. Cash flows from operating activities for the year ended December 31, 2017 was $1.5 million due to the receipt of the $3.0 million clinical milestone payment from Takeda in January 2017. Cash flow from this clinical milestone payment was substantially offset by our net loss of $3.6 million, which included $1.8 million of non-cash share-based expense.

**Cash Flows from Investing Activities**

Cash flows provided by investing activities for the year ended December 31, 2018 totaled approximately $23,000, which represented proceeds from the sale of laboratory equipment.

Cash flows used in investing activities for the year ended December 31, 2017 included approximately $9,000 for the purchase of assets consisting primarily of computer equipment.

As of December 31, 2018, there were no material commitments for capital expenditures.

**Cash Flow from Financing Activities**

Cash flows from financing activities for the year ended December 31, 2018 totaled approximately $1.5 million representing proceeds from the exercise of warrants.

For the year ended December 31, 2017, there were no significant cash sources or uses from financing activities.

**Off-Balance Sheet Arrangements**

We do not have any off-balance sheet arrangements that have or are reasonably likely to have a current or future material effect on our financial condition, changes in financial condition, revenues or expenses, results of operations, liquidity, capital expenditures or capital resources.

**Contractual Obligations**

Contractual obligations represent future cash commitments and liabilities under agreements with third-parties and exclude contingent liabilities for which we cannot reasonably predict future payment. Our contractual obligations result from property leases for office space. Although we do have obligations for CRO services, the table below excludes potential payments we may be required to make under our agreements with CROs because timing of payments and actual amounts paid under those agreements may be different depending on the timing of receipt of goods or services or changes to agreed-upon terms or amounts for some obligations, and those agreements are cancelable upon written notice by the Company and therefore, not long-term liabilities. The contracts also contain variable costs that are hard to predict as they are based on such things as patients enrolled and clinical trial sites, which can vary and, therefore, are also not included in the table below. Additionally, the expected timing of payment of the obligations presented below is estimated based on current information.

The following table represents our contractual obligations as of December 31, 2018, aggregated by type:

| | Payments Due by Period | | | | |
|---|---|---|---|---|---|
| | Total | Less than 1 year | 1-3 years | 3-5 years | More than 5 years |
| Operating lease obligations | $ 24,583 | $ 24,583 | $ – | $ – | $ – |
| Total | $ 24,583 | $ 24,583 | $ – | $ – | $ – |

On January 7, 2019, we entered into a new office lease in Framingham, MA. The sublease is for 21 months through September 30, 2020 with a total contractual obligation of approximately $50,000.

**Recent Accounting Standards**

Refer to Note 2, *Summary of Significant Accounting Policies*, of the accompanying financial statements in Item 8 herein.

**Changes in and Disagreements with Accountants on Accounting and Financial Disclosure**

Not applicable.

## NO DISSENTER'S RIGHTS

Holders of shares of Xenetic Common Stock are not entitled to dissenter's rights in connection with the Transaction.

## NO REGULATORY APPROVALS

In the United States, Xenetic must comply with applicable federal and state securities laws and the rules and regulations of NASDAQ in connection with the issuance of shares of Xenetic Common Stock pursuant to the Share Purchase Agreement and the filing of this proxy statement/prospectus with the SEC.

## MATERIAL U.S. FEDERAL INCOME TAX CONSEQUENCES

We have not obtained a tax opinion from legal counsel or tax experts on the Transaction. The Transaction for federal income tax purposes is not intended to qualify as a reorganization within the meaning of Section 368(a) of the Internal Revenue Code of 1986, as amended, and the regulations promulgated thereunder. Based on the provisions of the Internal Revenue Code of 1986, as amended, existing United States Treasury regulations promulgated thereunder and administrative and judicial interpretations thereof, all as in effect as of the date hereof and all of which are subject to change (possibly with retroactive effect), the Transaction will not give rise to the recognition of gain or losses to us or our stockholders for U.S. federal income tax purposes. The foregoing summary is for general information only and does not discuss any state, local, foreign or other tax consequences.

## COMPARISON OF XENETIC STOCKHOLDERS AND HESPERIX SHAREHOLDERS RIGHTS AND CORPORATE GOVERNANCE MATTERS

This section of the proxy statement/ prospectus describes the material differences between the rights of Xenetic's and Hesperix's respective stockholders and shareholders. While Xenetic believes that the description summarizes the material differences between the two, this summary may not contain all of the information that is important to you. You should carefully read this entire document and the other documents referred to for a more complete understanding of the differences among the rights of Xenetic's stockholders and Hesperix's shareholders.

The rights of Hesperix shareholders are governed by the Swiss Code of Obligations and Hesperix's articles of incorporation ("Statuten"). The rights and obligations of the board of directors and the management of Hesperix are further governed by the bylaws ("Organisationsreglement") of Hesperix as far as existing. These documents are referred to as the articles of incorporation and bylaws of Hesperix, respectively. In the table below summarizing the material differences between the rights of Xenetic's stockholders and Hesperix's shareholders, Swiss legal concepts are expressed in English terms and not in their original language. These concepts may not be identical to the concepts described by the same English terms as they exist under the laws of other jurisdictions.

The rights of Xenetic stockholders are currently governed by the Nevada Revised Statues, the Articles of Incorporation, as amended, and the amended and restated bylaws of Xenetic, which are referred to as the Articles of Incorporation and Bylaws of Xenetic, respectively. Upon closing of the Transaction, Hesperix shareholders who have tendered their shares in Hesperix will become stockholders of Xenetic, and their rights will be governed by the Nevada Revised Statutes, and the Articles of Incorporation and Bylaws of Xenetic.

This summary does not include a complete description of all aspects in which Nevada corporate law and Swiss corporate law differ, all differences among the rights of Xenetic's stockholders and Hesperix's shareholders, nor does it include a complete description of the specific rights of these respective stockholders and shareholders. Furthermore, the identification of some of the differences in the rights of these stockholders and shareholders as material is not intended to indicate that other differences that may be equally important do not exist. You are urged to read carefully the governing documents of Xenetic and Hesperix. See the section titled, "Where You Can Find More Information" for information on how you can request copies of these documents free of charge. Copies of the Articles of Incorporation and Bylaws of Xenetic are filed as exhibits to the reports of Xenetic filed with the Securities and Exchange Commission.

Although it is impracticable to compare all aspects in which Nevada corporate law and Swiss corporate law, and Xenetic's and Hesperix's governing documents, differ with respect to rights of Xenetic's stockholders and Hesperix's shareholders, the following is a brief discussion summarizing certain differences between them.

| | **Xenetic Stockholder Rights** | **Hesperix Shareholder Rights** |
|---|---|---|
| *Authorized Capital Stock* | The authorized capital stock of Xenetic currently consists of 45,454,546 shares of Xenetic Common Stock, par value $0.001 per share, and 10,000,000 shares of preferred stock, par value $0.001 per share. Of the 10,000,000 shares of preferred stock, 1,000,000 shares have been designated as Series A Preferred Stock and 2,500,000 shares have been designated as Series B Preferred Stock. The remaining 6,500,000 preferred shares are available for future issuance in one or more series to be issued from time to time. | Hesperix's share capital currently amounts to CHF 100'000 consisting of 100 bearer shares with a nominal value of CHF 1'000 each.<br><br>Hexperix's articles of incorporation do not provide for authorized or conditioned share capital. |

| | Xenetic Stockholder Rights | Hesperix Shareholder Rights |
|---|---|---|
| *Preferred Stock* | Xenetic's board of directors is authorized to fix or alter the rights, preferences, privileges, and restrictions granted to or imposed upon wholly unissued series of preferred stock. There are currently 1,000,000 shares of Series A Preferred Stock and 2,500,000 shares of Series B Preferred Stock outstanding. | The articles of incorporation of Hesperix currently do not provide for preferred stock ("Vorzugsaktien"). The general meeting of shareholders of Hesperix SA could, however, introduce preferred stock by a resolution passed by a qualified majority of at least two- thirds of the votes represented and the absolute majority of the par value of shares represented. |
| *Number of Directors* | Xenetic's board of directors shall consist of at least one (1) individual and not more than thirteen (13) individuals. The number of directors may be changed from time to time in such manner as shall be provided in the Bylaws of Xenetic. | Pursuant to the articles of incorporation of Hesperix, the board of directors shall consist of one or several members. The shareholders of Hesperix elect the members of the board of directors of Hesperix by a resolution adopted by a absolute majority of the votes represented at a general meeting of shareholders. The current number of directors registered with the commercial register of the canton of Ticino is three (3). |
| *Cumulative Voting* | Under the Nevada Revised Statutes (as amended from time to time, the "NRS"), cumulative voting in the election of directors is permitted only where provided for in the articles of incorporation, and certain notice procedures are followed. Xenetic's Articles of Incorporation do not provide for cumulative voting. | Under the Swiss Code of Obligations, cumulative voting ("Stimmrechtsaktien") is permitted if provided for in the articles of incorporation. The articles of incorporation of Hesperix do not provide for cumulative voting. |

| | Xenetic Stockholder Rights | Hesperix Shareholder Rights |
|---|---|---|
| *Quorum* | At any meeting of the stockholders, the holders of not less than 50% of the outstanding shares of stock entitled to vote at the meeting, present in person or by proxy, shall constitute a quorum for all purposes, unless or except to the extent that the presence of a larger number may be required by law, by the Articles of Incorporation or by rules of any stock exchange upon which Xenetic's securities are listed. Where a separate vote by a class or classes of the shares of capital stock of Xenetic is required, not less than 50% of the outstanding shares of such class or classes present in person or represented by proxy shall constitute a quorum entitled to take action with respect to that vote on that matter, unless or except to the extent that the presence of a larger number may be required by law, by the Articles of Incorporation or by rules of any stock exchange upon which Xenetic's securities are listed. | The general meeting of shareholders carries out its elections and passes its resolutions in principle with the absolute majority of the share votes represented, either in person or by proxy, unless or except to the extent mandatory law or the articles of incorporation provide otherwise.<br><br>The articles of incorporation of Hesperix do not provide a special Quorium<br><br>The Swiss Code of Obligation as well as the Swiss merger act provide for some resolutions of the general meeting of shareholders that need to be passed by a qualified majority of at least two-thirds of the votes represented and the absolute majority of the par value of shares represented (change of the purpose of the company, introduction of cumulative voting, approval of merger contracts etc.).<br><br>Independently of the requested quorum each share entitles the holder to one vote. |
| *Voting Stock* | Each holder of shares of Xenetic Common Stock shall be entitled to one vote for each share of Common Stock. Except as required by the law, the holders of Series A Preferred Stock and Series B Preferred Stock shall not be entitled to vote on any matters on which the Common Stock shall be entitled to vote, and shall not be entitled to notice of any stockholders' meeting in accordance with the Bylaws of Xenetic. | Each share entitles the holder to one vote at the general meeting of shareholders. Hesperix's articles of incorporation do currently not provide for the issuance of shares with cumulative voting or privileged voting rights. |
| *Classification of Board of Directors* | Xenetic's board of directors is not classified and each director is elected for a one-year term expiring at the annual meeting of the stockholders. | Hesperix's articles of incorporation do not provide for classification of Hesperix's members of the board of directors. Each member of the board is elected for a term of one year and is, in principle, reeligible. |

| | Xenetic Stockholder Rights | Hesperix Shareholder Rights |
|---|---|---|
| *Removal of Directors* | Subject to the rights of holders of any series of preferred stock then outstanding, any director, or the entire Board of Directors, may be removed from office at any time only for cause and only by the affirmative vote of the holders of at least two-thirds of the voting power of the issued and outstanding stock entitled to vote at an election of directors, voting together as a single class. | The entire board of directors or any individual member may be removed at the general meeting of shareholders at any time and without cause by a resolution with the absolute majority of the share votes represented, either in person or by proxy at any general ordinary or extraordinary meeting of shareholders. |
| *Vacancies on the Board of Directors* | Vacancies on the board of directors for any reason and newly created directorships resulting from an increase in the authorized number of directors shall, unless otherwise required by law or by resolution of the board of directors, be filled only by a majority vote of the directors then in office even though less than a quorum, or by a sole remaining director, and not by the stockholders of Xenetic, and directors so chosen shall serve for a term expiring at the annual meeting of the stockholders at which the term of office of the class to which they have been chosen, if any, expires and until such director's successor shall have been duly elected and qualified. | Vacancies on the board of directors for any reason may be filled only by a resolution with the absolute majority of the share votes represented, either in person or by proxy at any general or extraordinary meeting of shareholders.<br><br>In case the company should not have at least one board member registered each shareholder, creditor or the commercial register could file an action for liquidation of the company and/or filling the vacancy. |
| *Stockholder and Shareholder Action by Written Consent* | Xenetic's Bylaws permit the taking of any action by written consent of the stockholders setting forth the action so taken and signed by the holders of outstanding stock having not less than the minimum number of votes that would be necessary to authorize or take such action at a meeting at which all shares entitled to vote upon were present and voted. | The shareholders carry out elections and pass resolutions at the general ordinary or extraordinary meetings of shareholders either in person or by proxy. Shareholder resolutions by written consent in lieu of a meeting is not possible under Swiss Law. |

| | Xenetic Stockholder Rights | Hesperix Shareholder Rights |
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| *Amendment of the Articles of Incorporation* | Under the NRS, to amend the Articles of Incorporation, Xenetic's board of directors must adopt a resolution setting forth the amendment proposed and either call a special meeting of the stockholders entitled to vote on the amendment or direct that the proposed amendment be considered at the next annual meeting of the stockholders entitled to vote on the amendment. If stockholders holding shares entitling them to exercise at least a majority of the voting power have voted in favor of the amendment, an officer of the corporation shall sign a certificate setting forth the amendment, or setting forth the articles of incorporation as amended, and the vote by which the amendment was adopted. | The general meeting of shareholders has the inalienable power to amend Hesperix's articles of incorporation. The amendment of the articles of incorporation requires a resolution with the absolute majority of the share votes represented, either in person or by proxy. A resolution of the general meeting of shareholders passed by a qualified majority of at least two- thirds of the votes represented and the absolute majority of the par value of shares represented shall be required for important amendments of the articles of incorporation, such as the change of the company purpose or increases of the authorized or conditional share capital etc. |
| *Amendment of Bylaws* | Under Xenetic's Articles of Incorporation, the board of directors is expressly granted the power to make, amend, alter, or repeal the Bylaws of Xenetic pursuant to the NRS.<br><br>Under Xenetic's Bylaws, in furtherance and not in limitation of the powers conferred by law and the Articles of Incorporation, the board of directors is expressly authorized to adopt, amend and repeal the Bylaws, but subject to the power of the holders of the shares of capital stock of Xenetic to adopt, amend or repeal the Bylaws; provided, however, that, with respect to the power of such holders, notwithstanding any other provision of the Bylaws or any provision of the NRS which might otherwise permit a lesser vote or no vote, and in addition to the affirmative vote of the holders of any class or series of the shares of capital stock of Xenetic required by law, the Articles of Incorporation, the Bylaws or any preferred stock, the affirmative vote of the holders of at least two-thirds of the voting power of the issued and outstanding stock entitled to vote generally in the election of directors, voting together as a single class, shall be required to adopt, amend or repeal any provision of the Bylaws. | Pursuant to the articles of incorporation Hesperix's board of directors may at any time establish and accordingly amend bylaws.<br><br>Up to date no such bylaws have been established. |

| | Xenetic Stockholder Rights | Hesperix Shareholder Rights |
|---|---|---|
| *Annual Meeting of Stockholders or Shareholders* | An annual meeting of the stockholders, for the election of directors to succeed those whose terms expire and for the transaction of such other business as may properly come before the meeting, shall be held at such place, on such date, and at such time as the board of directors shall fix. The board of directors may, in its sole discretion, determine that the meeting shall not be held at any place, but instead shall be held solely by means of remote communication as provided under the NRS. | Annual shareholders meetings shall be held at such place, on such date, and at such time as the board of directors shall each year fix, which date shall within six months upon the close of the business year. |
| *Failure to Hold an Annual Meeting* | Nevada law provides that if a corporation fails to elect directors within 18 months after the last election, a Nevada district court may order an election upon the petition of one or more stockholders holding at least 15% of the corporation's voting power. NRS 78.345 | Under Swiss Law a shareholder representing at least 10% of the share capital may file an action request that the company has to invite for the annual meeting. |
| *Special Meeting of Stockholders or Shareholders* | Xenetic's Bylaws provide that special meetings of stockholders may be called by the board of directors pursuant to a resolution adopted by a majority of the total number of authorized directors (whether or not any vacancies exist), or by the holders of not less than 10% of all shares entitled to cast votes at the meeting, voting together as a single class and shall be held at such place, on such date, and at such time as they shall fix. | Special or extraordinary meetings of shareholders may be called pursuant to a resolution adopted by the board of directors. Shareholders meetings may also be called by the auditors and, as the case may be, by the liquidator. The calling of a general meeting of shareholders may also be requested by one or more shareholders representing together at least 10% of the share capital. |

| | Xenetic Stockholder Rights | Hesperix Shareholder Rights |
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| *Notice of Stockholder or Shareholder Meeting* | Notice of the place, if any, date, and time of all meetings of the stockholders and the means of remote communications, if any, by which the stockholders and proxyholders thereof may be deemed to be present in person and vote at such meeting, shall be given, not less than ten (10), nor more than sixty (60) days before the date on which the meeting is to be held, to each stockholder entitled to vote at such meeting, except as otherwise provided in Xenetic's Bylaws or required by law (meaning, here and hereinafter, as required from time to time by the NRS or the Articles of Incorporation of Xenetic).<br><br>When a meeting is adjourned to another place, if any, date or time, notice need not be given of the adjourned meeting if the place, if any, date and time thereof, and the means of remote communications, if any, by which the stockholders and proxyholders thereof may be deemed to be present in person and vote at such adjourned meeting, are announced at the meeting at which the adjournment is taken; provided, however, that if the date of any adjourned meeting is more than thirty (30) days after the date for which the meeting was originally noticed, or if a new record date is fixed for the adjourned meeting, and the means of remote communications, if any, by which the stockholders and proxyholders thereof may be deemed to be present in person and vote at such adjourned meeting, shall be given in conformity herewith. At any adjourned meeting, any business may be transacted which might have been transacted at the original meeting. | The calling of the general shareholders meeting shall be made not less than twenty (20) days before the day of the meeting through publication in the Swiss Official Commercial Gazette of Commerce or by registered letter to the shareholders, to the extent the addresses of all shareholders are known. |

| | Xenetic Stockholder Rights | Hesperix Shareholder Rights |
|---|---|---|
| *Conduct of Stockholder or Shareholder Meeting* | At an annual or special meeting of the stockholders, only such business shall be conducted as shall have been properly brought before the meeting. To be properly brought before a meeting, business must be (a) specified in the notice of meeting (or any supplement thereto) given by or at the direction of the board of directors, (b) properly brought before the meeting by or at the direction of the board of directors, or (c) properly brought before an annual or special meeting by a stockholder. | No resolutions can be passed on motions concerning agenda items which have not been duly announced, except concerning a request for the convening of an extraordinary general meeting of shareholders, the conduct of a special investigation or a universal meeting (as long as the owners or representatives of all shares are present, all subjects pertaining to the area of business of the general meeting of shareholders may be discussed and valid resolutions may be passed). To be properly brought before a meeting, the calling must contain, besides day, time and place of the meeting, the items on the agenda as well as the motions of the board of directors and the shareholders who requested the holding of a meeting of shareholders or the inclusion of an item in the agenda.<br><br>In addition during the notice period the shareholders must have the possibility to review at the seat of the company the annual report, the auditors report as well as the annual financial statements.<br><br>The owners, beneficiaries or representatives of all shares may, provided that there is no objection, hold a general meeting of shareholders without observing the foregoing formalities for the convening of the general meeting of shareholders. |

| | Xenetic Stockholder Rights | Hesperix Shareholder Rights |
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| *Delivery and Notice Requirements of Stockholder or Shareholder Nominations and Proposals* | For business to be properly brought before a meeting by a stockholder, the stockholder must have given timely notice thereof in writing to the Secretary of Xenetic. To be timely, a stockholder proposal to be presented at an annual meeting shall be delivered to the secretary at Xenetic's principal executive offices not less than ninety (90) or more than one-hundred and twenty (120) days prior to the first anniversary (the "Anniversary") of the date of the preceding year's annual meeting; provided, however, that in the event that the date of the annual meeting is more than thirty (30) days before or more than thirty (30) days after the Anniversary, to be timely, notice by the stockholder must be so delivered not earlier than the close of business (at the principal executive office of Xenetic) on the one-hundred and twentieth (120th) day prior to such annual meeting and not later than the close of business on the later of (i) the ninetieth (90th) day prior to such annual meeting or (ii) the close of business on the tenth (10th) day following the day on which public announcement of the date of such meeting is first made by Xenetic. | Shareholder nominations and proposals to the agenda must be received by Hesperix's board of directors prior to the start of the notice period for the calling of the general shareholders meeting. Hesperix's articles of incorporation do not provide for a deadline by which nominations or proposals to the agenda must be received by Hesperix. |
| *Record Date* | The board of directors may fix a record date, provided, however, that such record date (a) shall not precede the date on which the resolution fixing the record date is adopted and (b) shall not be more than sixty (60) nor less than ten (10) days before the date of any meeting of the stockholders, nor more than sixty (60) days prior to the time for such other action as hereinbefore described (receiving payments and exercising rights by the stockholders). Such date shall also be the record date for determining the stockholders of record entitled to vote at such meeting, unless the board of directors at the time it fixes such record date directs that a later date on or before the date of the meeting shall be the date for making such determination. If no record date is fixed by the board of directors, (i) the record date for determining stockholders of record entitled to notice of and to vote at a meeting of the stockholders shall be at the close of business on the day immediately preceding the day on which notice is given or, if notice is waived, at the close of business on the day immediately preceding the day on which the meeting is held, and, (ii) the record date, for determining stockholders of record entitled to receive payment of any dividend or other distribution or allotment of rights or to exercise any rights of change, conversion or exchange of the shares of Xenetic's capital stock or for any other purpose, shall be at the close of business on the day on which the board of directors adopts a resolution relating thereto. | Since Hesperix's share capital is consisting of bearer shares no record date is applicable. |

| | Xenetic Stockholder Rights | Hesperix Shareholder Rights |
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| *Declaration and Payment of Dividends* | The Bylaws of Xenetic provide that, subject to applicable law, the board of directors may declare dividends from time to time. | The Swiss Code of Obligations provides that the general meeting of shareholders has the inalienable power to resolve on the declaration of the dividends. |
| *Indemnification of Directors and Officers; Advancement of Expenses* | The Bylaws of Xenetic provide each person who was or is made a party or is threatened to be made a party to or is otherwise involved (including, without limitation, as a witness) in any action, suit or proceeding, whether civil, criminal, administrative or investigative, by reason of the fact that he is or was a director or an officer of Xenetic or is or was serving at the request of Xenetic as a director, officer, or trustee of another corporation, or of a partnership, joint venture, trust or other enterprise, including service with respect to an employee benefit plan (hereinafter an "Indemnitee"), whether the basis of such action, suit or proceeding is alleged action in an official capacity as a director, officer or trustee or in any other capacity while serving as a director, officer or trustee, shall be indemnified and held harmless by Xenetic to the fullest extent permitted by law.<br><br>In addition, an Indemnitee shall also have the right to be paid by Xenetic the expenses (including attorney's fees) incurred in defending any such proceeding in advance of its final disposition; provided, however, that, if the NRS then requires, an advancement of expenses incurred by an Indemnitee in his capacity as a director or officer (and not in any other capacity in which service was or is rendered by such Indemnitee, including, without limitation, service to an employee benefit plan) shall be made only upon delivery to Xenetic of an undertaking, by or on behalf of such Indemnitee, to repay all amounts so advanced if it shall ultimately be determined by final judicial decision from which there is no further right to appeal that such Indemnitee is not entitled to be indemnified for such expenses. | Hesperix's articles of incorporation do not contain any provisions as to indemnification. Thus a possible indemnification would require a corresponding board decision. |

| | Xenetic Stockholder Rights | Hesperix Shareholder Rights |
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| *Limitation of Personal Liability of Directors* | Under Xenetic's Articles of Incorporation, the liability of directors and officers of Xenetic shall be eliminated or limited to the fullest extent permitted by the NRS, as so amended from time to time.<br><br>Under the NRS, unless a corporation's articles of incorporation provide for greater individual liability, a director or an officer of a Nevada corporation is not individually liable to the corporation, its stockholders or its creditors for damages as a result of any act or failure to act unless it is proven that the director or officer committed a breach of fiduciary duty and such breach involved intentional misconduct, fraud, or knowing violation of law. NRS 78.138. | Hesperix's articles of incorporation do not provide for any specific limitation of the liability of directors or officers.<br><br>Under the Swiss Code of Obligations the general meeting of the shareholders may give discharge/release to its directors and officers with the effect that any liability of the directors and officers towards shareholders and/or the company is eliminated – however not their liability against third parties i.e. creditors. |
| *Interested Party Transactions* | No contract or transaction between Xenetic on one hand and one or more of its directors or officers, or any other corporation, partnership, association, or other organization in which one or more of its directors or officers are directors or officers, or have a financial interest, shall be void or voidable (i) solely for this reason, or (ii) solely because the director or officer is present at or participates in the meeting of the board of directors or committee thereof, which authorizes the contract or transaction, or (iii) solely because the votes of such director or officer are counted for such purpose, if: (a) The material facts as to his or her relationship or interest and as to the contract or transaction are disclosed to or are known to the board of directors or the committee, and the board of directors or committee in good faith authorizes the contract or transaction by the affirmative votes of a majority of the disinterested directors, even though the disinterested directors be less than a quorum; or (b) The material facts as to his or her relationship or interest and as to the contract or transaction are disclosed or are known to the stockholders entitled to vote thereon, and the contract or transaction is specifically approved in good faith by vote of the stockholders; or (c) The contract or transaction is fair as to Xenetic as of the time it is authorized, approved or ratified, by the board of directors, a committee thereof, or the stockholders. | Under Swiss Law contracts and transactions between Hesperix and one or more of its directors or any corporation, partnership or other organization represented by Hesperix's directors can be void in cases where such contracts or transactions are signed for both parties by the same person (self-dealing) unless (i) such contracts or transactions have been approved by either the board of directors or the shareholders, (ii) or there exists no risk for a possible damage of the company. |

| | Xenetic Stockholder Rights | Hesperix Shareholder Rights |
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| *Anti-Takeover Provisions* | Certain provisions of Xenetic's Articles of Incorporation, Bylaws, and the NRS may be deemed to have an anti-takeover effect. Such provisions may delay, deter or prevent a tender offer or takeover attempt that a stockholder might consider to be in that stockholder's best interests, including attempts that might result in a premium over the market price for the shares held by stockholders.<br><br>The NRS permits, if authorized by the Articles of Incorporation, the issuance of Blank Check Preferred Stock with preferences, limitations and relative rights determined by a corporation's board of directors without stockholder approval.<br><br>Xeneti's Articles of Incorporation currently authorizes the issuance of Blank Check Preferred Stock, of which 6,500,000 preferred shares are available for future issuance in one or more series to be issued from time to time.<br><br>Xenetic has opted out of NRS 78.411 to 78.444, which prohibits Nevada corporations from engaging in any "combination" with an "interested stockholder" for a period of two years following the date that the stockholder became an "interested stockholder" unless prior to that time the Board of Directors of the corporation approved either the "combination" or the transaction which resulted in the stockholder becoming an "interested stockholder."<br><br>Each of the foregoing may have the effect of preventing or rendering more difficult or costly, the completion of a takeover transaction that stockholders might view as being in their best interests. | Hesperix's articles of incorporation do not contain any anti-takeover provisions. The provisions of the Swiss Federal Act on Cartels and other Restraints remain reserved. |

## DESCRIPTION OF XENETIC CAPITAL STOCK

*The following is a summary of the rights and preferences of our capital stock. While we believe that the following description covers the material terms of our capital stock, the description may not contain all of the information that is important to you. We encourage you to read carefully this entire proxy statement/prospectus, any future related certificates of designation relating to the securities, as applicable, our articles of incorporation, as amended and the Bylaws and the other documents we refer to for a more complete understanding of our capital stock. Copies of our charter and bylaws are incorporated by reference as exhibits to the registration statement of which this proxy statement/prospectus is a part. See "Where You Can Find More Information."*

### General

Our charter provides that we may issue up to 45,454,546 shares of Common Stock, $0.001 par value per share, and 10,000,000 shares of preferred stock, $0.001 par value per share, 1,000,000 of which are designated as Series A Preferred Stock, 2,500,000 of which are designated as Series B Preferred Stock, and 6,500,000 of which shares of preferred stock are undesignated. As of March 15, 2019, there were issued and outstanding: 10,443,889 shares of Common Stock, 970,000 shares of Series A Preferred Stock, 1,804,394 shares of Series B Preferred Stock and 5,240,427 shares of Common Stock issuable upon exercise of warrants. Under Nevada law, stockholders are not generally liable for our debts or obligations.

### Shares of Common Stock

*Voting Rights*

Our Common Stock is entitled to one vote per share on all matters submitted to a vote of the stockholders, including the election of directors. Except as otherwise required by law or provided in any resolution adopted by our board of directors with respect to any series of preferred stock, the holders of our Common Stock will possess all voting power. Generally, all matters to be voted on by stockholders must be approved by a majority (or, in the case of election of directors, by a plurality) of the votes entitled to be cast by all shares of our Common Stock that are present in person or represented by proxy, subject to any voting rights granted to holders of any preferred stock. Our stockholders do not have cumulative voting rights in the election of directors. Holders of our Common Stock representing 50% of our capital stock issued, outstanding and entitled to vote, represented in person or by proxy, are necessary to constitute a quorum at any meeting of our stockholders. A vote by the holders of a majority of our outstanding shares is required to effectuate certain fundamental corporate changes such as liquidation, merger or an amendment to our charter.

*Dividends*

Subject to the preferential rights of any other class or series of shares of stock created from time to time by our board of directors from time to time, the holders of shares of our Common Stock will be entitled to such cash dividends, non-cumulative, as may be declared from time to time by our board of directors from funds available therefore. We will not pay any dividends on shares of Common Stock (other than dividends in the form of Common Stock) unless and until such time as we pay dividends on the Series B Preferred Stock on an as-converted basis.

*Liquidation*

Subject to the preferential rights of any other class or series of shares of stock created from time to time by our board of directors, upon liquidation, dissolution or winding up, the holders of shares of our Common Stock will be entitled to share ratably in the assets of the Company available for distribution to such holders.

*Rights and Preferences*

In the event of any merger or consolidation with or into another company in connection with which shares of our Common Stock are converted into or exchangeable for shares of stock, other securities or property (including cash), all holders of our Common Stock will be entitled to receive the same kind and amount of shares of stock and other securities and property (including cash). Holders of our Common Stock have no pre-emptive, conversion, subscription or other rights and there are no redemption or sinking fund provisions applicable to our Common Stock. The rights, preferences and privileges of the holders of our Common Stock are subject to and may be adversely affected by the rights of the holders of shares of any series of our preferred stock that we may designate in the future.

*Fully Paid and Nonassessable*

All of our outstanding shares of Common Stock are duly authorized, validly issued, fully paid and nonassessable.

**Shares of Preferred Stock**

The following description sets forth general terms and provisions of the preferred stock to which any prospectus supplement may relate. The statements below describing the preferred stock are in all respects subject to and qualified in their entirety by reference to our charter, bylaws, and any certificate of designation, designating terms of a series of preferred stock. The outstanding shares of our preferred stock have been validly issued, fully paid, and non-assessable. Because our board of directors has the power to establish the preferences, powers and rights of each series of preferred stock, our board of directors may afford the holders of any series of preferred stock preferences, powers and rights, voting or otherwise, senior to the rights of our common stockholders. The issuance of our preferred stock could adversely affect the voting power of holders of Common Stock and the likelihood that such holders will receive dividend payments and payments upon a liquidation. In addition, the issuance of preferred stock could have the effect of delaying, deferring or preventing a change of control of the Company or other corporate action.

The rights, preferences, privileges and restrictions of our outstanding series of preferred stock are, and of each additional series of preferred stock, when and if issued in the future will be, fixed by the certificate of designation relating to the series. A prospectus supplement, relating to each series, will specify the terms of the preferred stock, as follows:

- the title and stated value of the preferred stock;
- the voting rights of the preferred stock, if applicable;
- the preemptive rights of the preferred stock, if applicable;
- the restrictions on alienability of the preferred stock, if applicable;
- the number of shares offered, the liquidation preference per share and the offering price of the shares;
- liability to further calls or assessment of the preferred stock, if applicable;
- the dividend rate(s), period(s) and payment date(s) or method(s) of calculation applicable to the preferred stock;
- the date from which dividends on the preferred stock will accumulate, if applicable;
- the procedures for any auction and remarketing for the preferred stock, if any;
- the provision for a sinking fund, if any, for the preferred stock;
- the provision for and any restriction on redemption, if applicable, of the preferred stock;
- the provision for and any restriction on repurchase, if applicable, of the preferred stock;
- any listing of the preferred stock on any securities exchange;
- the terms and provisions, if any, upon which the preferred stock will be convertible into Common Stock, including the conversion price (or manner of calculation) and conversion period;
- the terms under which the rights of the preferred stock may be modified, if applicable;
- any other specific terms, preferences, rights, limitations or restrictions of the preferred stock;
- a discussion of certain material federal income tax considerations applicable to the preferred stock;
- the relative ranking and preferences of the preferred stock as to dividend rights and rights upon the liquidation, dissolution or winding-up of our affairs;
- any limitation on issuance of any series of preferred stock ranking senior to or on a parity with the series of preferred stock as to dividend rights and rights upon the liquidation, dissolution or winding-up of our affairs; and
- any limitations on direct or beneficial ownership and restrictions on transfer of the preferred stock.

**Transfer Agent and Registrar**

The transfer agent and registrar for our Common Stock and preferred stock is Empire Stock Transfer, Inc.

**Restrictions on Transfer**

Transfers of shares of capital stock of the Company shall be made only (i) by entering upon the stock-transfer books of the Company or (ii) by transfer agents designated to transfer shares of capital stock of the Company.

## INTERESTS OF CERTAIN PERSONS IN MATTERS TO BE ACTED UPON

Pharmsynthez is the Company's largest stockholder with ownership of approximately **[●]**% of the Company's issued and outstanding Common Stock. Pharmsynthez's ownership of Company Common Stock does not include approximately 1.0 million shares of Common Stock issuable upon the conversion of our Series A Preferred Stock, approximately 1.5 million shares of Common Stock issuable upon the conversion of our Series B Preferred Stock, or approximately 2.5 million shares issuable upon the exercise of outstanding warrants. Dr. Genkin is a director of the Company and serves as the Executive Chairman of Pharmsynthez. Another of our directors, Mr. Knyazev, is also a director of Pharmsynthez. One of our executive officers, Dr. Curtis Lockshin, is an officer of a wholly-owned subsidiary of Pharmsynthez. If the transactions described in this proxy statement/prospectus are approved, Pharmsynthez will be entitled to certain royalty payments as described herein.

OPKO is a wholly-owned subsidiary of OPKO Health, Inc. ("OPKO Health"). OPKO Health owns approximately**[●]**% of the Company's issued and outstanding Common Stock of the Record Date. OPKO Health's ownership of Company Common Stock does not include approximately 0.3 million shares of Common Stock issuable upon the conversion of our Series B Preferred Stock and approximately 0.5 million shares issuable upon the exercise of outstanding warrants. Dr. Lerner, a co-inventor of the technology, is a director of OPKO Health. A director of the Company, Adam Logal, is the Senior Vice President and Chief Financial Officer of OPKO Health. OPKO Health also owns approximately **[●]**% of the issued and outstanding stock of Pharmsynthez. If the Transaction is approved and completed, OPKO will be issued an additional 1,968,750 shares of Common Stock, which is **[●]**% of our issued and outstanding shares after giving effect to the Transaction.

As of the Record Date, approximately [●] of our issued and outstanding shares of our Common Stock representing [●]% of the total voting power of stockholders entitled to vote on the Transaction, were held by certain of the Interested Parties. Each of these Interested Parties entered into separate Voting Agreements with the Company pursuant to which each such Interested Party has agreed to vote all of its shares of Common Stock "FOR" the Transaction Proposal, the Share Issuance Proposal, and the Director Proposal. Accordingly, approval of the Transaction Proposal, the Share Issuance Proposal, and the Director Proposal is expected, regardless of whether or not disinterested stockholders vote in favor of such proposals.

Other than as disclosed in this proxy statement/prospectus, no person who has been a director or executive officer of the Company at any time since the beginning of the Company's most recently completed financial year, or any associate or affiliate of any such director or officer, has any material interest, direct or indirect, by way of beneficial ownership of securities or otherwise, in any matter to be acted upon at the Special Meeting.

## SOLICITATION OF PROXIES

This solicitation is made on behalf of the Board of Directors. We will bear the costs of preparing, mailing, online processing and other costs of the proxy solicitation made by the Board of Directors. Certain of our officers and employees may solicit the submission of proxies authorizing the voting of shares in accordance with the recommendations of the Board of Directors. Such solicitations may be made by telephone, facsimile transmission or personal solicitation. No additional compensation will be paid to such officers, directors or regular employees for such services. We will reimburse banks, brokerage firms and other custodians, nominees and fiduciaries for reasonable out-of-pocket expenses incurred by them in sending proxy material to stockholders. The Company has retained Okapi, an independent proxy solicitation firm, to assist in soliciting proxies on its behalf. The Company has agreed to pay Okapi Partners a fee of $6,500, plus costs and expenses, for these services. If stockholders need assistance with casting or changing their vote, they should contact our proxy solicitor, Okapi, toll-free at 1-877-259-6290.

## LEGAL MATTERS

Akerman LLP, Fort Lauderdale, Florida will pass upon the validity of the Xenetic Common Stock offered by this proxy statement/prospectus.

## EXPERTS

The financial statements of Xenetic Biosciences, Inc. as of December 31, 2018 and 2017, and for each of the years in the two-year period ended December 31, 2018, have been included herein and in the registration statement in reliance upon the report of Marcum LLP, independent registered public accounting firm, appearing elsewhere herein, and upon the authority of said firm as experts in accounting and auditing.

## SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT

The following tables and footnotes set forth certain information known to us regarding beneficial ownership of our capital stock (i) as of the Record Date and (ii) after giving effect to the Transaction for:

- each person known by us to be the beneficial owner of more than 5% of our capital stock;
- our named executive officers for the 2018;
- each of our directors; and
- all executive officers and directors as a group.

The number of shares beneficially owned by each entity, person, director or executive officer is determined in accordance with the rules of the SEC, and the information is not necessarily indicative of beneficial ownership for any other purpose. Under such rules, beneficial ownership includes any shares over which the individual has sole or shared voting power or investment power as well as any shares that the individual has the right to acquire within 60 days through the exercise of any stock option, warrants or other rights. Except as otherwise indicated, and subject to applicable community property laws, the persons named in the table have sole voting and investment power with respect to all shares of Common Stock held by that person or entity.

**Beneficial Ownership as of the Record Date**

The percentage of shares beneficially owned is computed on the basis of [●] shares of our Common Stock outstanding as of the Record Date, on an as-converted basis. Shares of our Common Stock that a person has the right to acquire within 60 days after the record date are deemed outstanding for purposes of computing the percentage ownership of the person or entity holding such rights, but are not deemed outstanding for purposes of computing the percentage ownership of any other person, except with respect to the percentage ownership of all directors and executive officers as a group. Unless otherwise indicated below, the address for each beneficial owner listed is c/o Xenetic Biosciences, Inc., at 40 Speen Street, Suite 102, Framingham, Massachusetts 01701.

| Name of Beneficial Owner | Number of Shares Beneficially Owned[1] | Percentage Beneficially Owned |
|---|---|---|
| **Fiscal Year 2018 Named Executive Officers and Directors** | | |
| Jeffrey F. Eisenberg | [●] (2) | [●]% |
| James Parslow | [●] (3) | [●]% |
| Dr. Curtis Lockshin | [●] (4) | [●]% |
| Dr. James E. Callaway | [●] (5) | [●]% |
| Firdaus J. Dastoor | [●] (6) | [●]% |
| Dr. Dmitry Genkin[7] | [●] (8) | [●]% |
| Roman Knyazev[9] | [●] (10) | [●]% |
| Dr. Roger Kornberg | [●] (11) | [●]% |
| Adam Logal | [●] (12) | [●]% |
| All executive officers and directors as a group (9 persons) | [●] (13) | [●]% |
| **5% Current Stockholders** | | |
| PJSC Pharmsynthez[7] [9] | [●] (14) | [●]% |
| Empery Asset Management | [●] (15) | [●]% |
| Serum Institute of India Private Limited | [●] (16) | [●]% |

* Represents beneficial ownership of less than one percent (1%).

(1) This table is based upon corporate records, information supplied by officers, directors and, in the case of principal stockholders, information provided by our transfer agent.

(2) The total beneficial ownership consists of [●] shares issuable upon exercise of options that are exercisable within 60 days of [●] and [●] shares issuable upon the vesting of restricted stock units within 60 days of [●].

(3) The total beneficial ownership consists of [●] shares issuable upon exercise of options that are exercisable within 60 days of [●].

(4) The total beneficial ownership consists of [●] shares issuable upon exercise of options that are exercisable within 60 days of [●].

(5) The total beneficial ownership consists of [●] shares issuable upon exercise of options that are exercisable within 60 days of [●].

(6) The total beneficial ownership consists of [●] shares issuable upon exercise of warrants and options that are exercisable within 60 days of [●].

(7) Dr. Genkin is the Chairman of the Board of Directors of Pharmsynthez.

(8) The total beneficial ownership consists of [●] shares of Common Stock owned directly and [●] shares issuable upon exercise of warrants and options that are exercisable within 60 days of [●].

(9) Mr. Knyazev is the Deputy Chairman of the Board of Directors of Pharmsynthez.

(10) The total beneficial ownership consists of [●] shares issuable upon exercise of options that are exercisable within 60 days of [●].

(11) The total beneficial ownership consists of [●] shares issuable upon exercise of options that are exercisable within 60 days of [●].

(12) The total beneficial ownership consists of [●] shares issuable upon exercise of options that are exercisable within 60 days of [●].

(13) The total beneficial ownership consists of [●] shares of Common Stock owned directly and [●] shares issuable upon exercise of warrants and options that are exercisable within 60 days of [●].

(14) The total beneficial ownership consists of [●] shares of Common Stock owned directly or indirectly through SynBio, [●] shares issuable upon the conversion of Series B Preferred Stock and [●] shares issuable upon exercise of warrants that are exercisable within 60 days of [●]. The address of PJSC Pharmsynthez is Office Center IT Park, 25 Liter ZH, Krasnogo Kursanta St., St. Petersburg, 197110, Russia.

(15) The total beneficial ownership consists of [●] shares of Common Stock owned directly and indirectly by related affiliates of Empery Asset Management and [●] shares issuable upon exercise of warrants that are exercisable within 60 days of [●]. The address of Empery Asset Management is 1 Rockefeller Plaza, Suite 1205 New York, New York 10020.

(16) The total beneficial ownership consists of [●] shares of Common Stock owned directly and indirectly by related affiliates of Serum Institute of India Private Limited and [●] shares issuable upon exercise of warrants that are exercisable within 60 days of [●]. The address of Serum Institute of India is S. No. 212/2, Off Soli Poonawalla Road, Hadapsar, Pune, 411028, Maharashtra, India.

**Beneficial Ownership after the Transaction**

The percentage of shares beneficially owned is computed on the basis of [●] shares of our Common Stock outstanding as of [●], 2019, on an as-converted basis. Shares of our Common Stock that a person has the right to acquire within 60 days after the record date are deemed outstanding for purposes of computing the percentage ownership of the person or entity holding such rights, but are not deemed outstanding for purposes of computing the percentage ownership of any other person, except with respect to the percentage ownership of all directors and executive officers as a group. Unless otherwise indicated below, the address for each beneficial owner listed is c/o Xenetic Biosciences, Inc., at 40 Speen Street, Suite 102, Framingham, Massachusetts 01701.

| Name of Beneficial Owner | Number of Shares Beneficially Owned[1] | Percentage Beneficially Owned |
|---|---|---|
| **Fiscal Year 2018 Named Executive Officers and Directors** | | |
| Jeffrey F. Eisenberg | [●] (2) | [●]% |
| James Parslow | [●] (3) | [●]% |
| Dr. Curtis Lockshin | [●] (4) | [●]% |
| Dr. James E. Callaway | [●] (5) | [●]% |
| Firdaus J. Dastoor | [●] (6) | [●]% |
| Dr. Dmitry Genkin[7] | [●] (8) | [●]% |
| Roman Knyazev[9] | [●] (10) | [●]% |
| Dr. Roger Kornberg | [●] (11) | [●]% |
| Adam Logal | [●] (12) | [●]% |
| Alexey Vinogradov | [●] (13) | [●]% |
| All executive officers and directors as a group (10 persons) | [●] (14) | [●]% |
| **5% Current Stockholders** | | |
| PJSC Pharmsynthez(7) (9) | [●] (15) | [●]% |
| Empery Asset Management | [●] (16) | [●]% |
| OPKO Pharmaceuticals, LLC | [●] (17) | [●]% |
| Serum Institute of India Private Limited | [●] (18) | [●]% |

* Represents beneficial ownership of less than one percent (1%).

(1) This table is based upon corporate records, information supplied by officers, directors and, in the case of principal stockholders, information provided by our transfer agent.

(2) The total beneficial ownership consists of [●] shares issuable upon exercise of options that are exercisable within 60 days of [●], 2019 and [●] shares issuable upon the vesting of restricted stock units within 60 days of [●], 2019.

(3) The total beneficial ownership consists of [●] shares issuable upon exercise of options that are exercisable within 60 days of [●], 2019.

(4) The total beneficial ownership consists of [●] shares issuable upon exercise of options that are exercisable within 60 days of [●], 2019.

(5) The total beneficial ownership consists of [●] shares issuable upon exercise of options that are exercisable within 60 days of [●], 2019.

(6) The total beneficial ownership consists of [●] shares issuable upon exercise of warrants and options that are exercisable within 60 days of [●], 2019.

(7) Dr. Genkin is the Chairman of the Board of Directors of Pharmsynthez.

(8) The total beneficial ownership consists of [●] shares of Common Stock owned directly and [●] shares issuable upon exercise of warrants and options that are exercisable within 60 days of [●], 2019.
(9) Mr. Knyazev is the Deputy Chairman of the Board of Directors of Pharmsynthez.
(10) The total beneficial ownership consists of [●] shares issuable upon exercise of options that are exercisable within 60 days of [●], 2019.
(11) The total beneficial ownership consists of [●] shares issuable upon exercise of options that are exercisable within 60 days of [●], 2019.
(12) The total beneficial ownership consists of [●] shares issuable upon exercise of options that are exercisable within 60 days of [●], 2019.
(13) [●]
(14) The total beneficial ownership consists of [●] shares of Common Stock owned directly and [●] shares issuable upon exercise of warrants and options that are exercisable within 60 days of [●], 2019.
(15) The total beneficial ownership consists of [●] shares of Common Stock owned directly or indirectly through SynBio, [●] shares issuable upon the conversion of Series B Preferred Stock and [●] shares issuable upon exercise of warrants that are exercisable within 60 days of [●], 2019. The address of PJSC Pharmsynthez is Office Center IT Park, 25 Liter ZH, Krasnogo Kursanta St., St. Petersburg, 197110, Russia.
(16) The total beneficial ownership consists of [●] shares of Common Stock owned directly and indirectly by related affiliates of Empery Asset Management and [●] shares issuable upon exercise of warrants that are exercisable within 60 days of [●]. The address of Empery Asset Management is 1 Rockefeller Plaza, Suite 1205 New York, New York 10020.
(17) The total beneficial ownership consists of [●] shares of Common Stock owned directly and indirectly by related affiliates of OPKO Pharmaceuticals and [●] shares issuable upon exercise of warrants that are exercisable within 60 days of [●]. The address of OPKO Pharmaceuticals, LLC is [●]. The number of shares issuable to the affiliate of OPKO Pharmaceuticals is subject to a 4.9% blocker, meaning this affiliate will not be issued more than 4.9% of the Company's then issued and outstanding shares as long as the blocker remains in place.
(18) The total beneficial ownership consists of [●] shares of Common Stock owned directly and indirectly by related affiliates of Serum Institute of India Private Limited and [●] shares issuable upon exercise of warrants that are exercisable within 60 days of [●], 2019. The address of Serum Institute of India is S. No. 212/2, Off Soli Poonawalla Road, Hadapsar, Pune, 411028, Maharashtra, India.

## HOUSEHOLDING OF PROXY MATERIALS

The SEC has adopted rules that permit companies and intermediaries (e.g., brokers) to satisfy the delivery requirements for Special Meeting materials with respect to two or more stockholders sharing the same address by delivering a single set of Special Meeting materials addressed to those stockholders. This process, which is commonly referred to as "householding," potentially means extra convenience for stockholders and cost savings for companies.

A number of brokers with account holders who are the Company's stockholders will be "householding" our proxy materials. A single set of Special Meeting materials will be delivered to multiple stockholders sharing an address unless contrary instructions have been received from the affected stockholders. Once you have received notice from your broker that they will be "householding" communications to your address, "householding" will continue until you are notified otherwise or until you revoke your consent. If, at any time, you no longer wish to participate in "householding" and would prefer to receive a separate set of Special Meeting materials, please notify your broker or the Company. Direct your written request to Xenetic Biosciences, Inc., to the attention of our Corporate Secretary, 40 Speen Street, Suite 102, Framingham, Massachusetts 01701 or contact our Corporate Secretary at 781-778-7720. Stockholders who currently receive multiple copies of these materials at their addresses and would like to request "householding" of their communications should contact their brokers.

## WHERE YOU CAN FIND MORE INFORMATION

Xenetic files annual, quarterly and special reports, proxy statements and other information with the SEC. Xenetic's SEC filings are available to the public from commercial document retrieval services and on the website maintained by the SEC at http://www.sec.gov.Our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q and Current Reports on Form 8-K and amendments to those reports are available, free of charge, on or through our website www.xeneticbio.com as soon as practicable after we electronically file such forms, or furnish them to, the SEC.

As of the date of this proxy statement/prospectus, Xenetic has filed a registration statement on Form S-4 to register with the SEC the Xenetic Common Stock that Xenetic will issue to Hesperix stockholders in the Transaction. This proxy statement/prospectus is a part of that registration statement and constitutes a prospectus of Xenetic, as well as a proxy statement of Xenetic for its special meeting.

Xenetic has supplied all information contained in this proxy statement/prospectus relating to Xenetic. If you would like to request documents from Xenetic please send a request in writing or by telephone to the following address:

Xenetic Biosciences, Inc.
40 Speen Street, Suite 102
Framingham, Massachusetts 01701
Telephone: (781) 778-7720
Attn: Corporate Secretary

**INDEX TO FINANCIAL STATEMENTS**

## REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Shareholders and Board of Directors of
Xenetic Biosciences, Inc.

**Opinion on the Financial Statements**

We have audited the accompanying consolidated balance sheets of Xenetic Biosciences, Inc. (the "Company") as of December 31, 2018 and 2017, and the related consolidated statements of comprehensive loss, stockholder's equity and cash flows for each of the two years in the period ended December 31, 2018 and the related notes (collectively referred to as the "financial statements"). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the two years in the period ended December 31, 2018, in conformity with accounting principles generally accepted in the United States of America.

**Explanatory Paragraph/Going Concern**

The accompanying consolidated financial statements have been prepared assuming that the Company will continue as a going concern. As more fully described in Note 1 to the financial statements, the Company has had recurring net losses and continues to experience negative cash flows from operations. These conditions raise substantial doubt about its ability to continue as a going concern. Management's plans regarding those matters are also described in Note 1. The consolidated financial statements do not include any adjustments that might result from the outcome of this uncertainty.

**Basis for Opinion**

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) ("PCAOB") and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Marcum llp

Marcum llp

We have served as the Company's auditor since 2015.

Boston, Massachusetts
March 29, 2019

**XENETIC BIOSCIENCES, INC.**
**CONSOLIDATED BALANCE SHEETS**

| | December 31, 2018 | December 31, 2017 |
|---|---|---|
| ASSETS | | |
| Current assets: | | |
| Cash | $ 571,605 | $ 5,533,062 |
| Restricted cash | 66,510 | 66,510 |
| Prepaid expenses and other | 555,856 | 285,005 |
| Total current assets | 1,193,971 | 5,884,577 |
| | | |
| Property and equipment, net | 4,956 | 27,846 |
| Goodwill | 3,283,379 | 3,283,379 |
| Indefinite-lived intangible assets | 9,243,128 | 9,243,128 |
| Other assets | 705,660 | 724,713 |
| Total assets | $ 14,431,094 | $ 19,163,643 |
| | | |
| LIABILITIES AND STOCKHOLDERS' EQUITY | | |
| Current liabilities: | | |
| Accounts payable | $ 934,147 | $ 786,779 |
| Accrued expenses | 664,029 | 1,135,653 |
| Other current liabilities | 1,612 | 21,234 |
| Total current liabilities | 1,599,788 | 1,943,666 |
| | | |
| Deferred tax liability | 2,918,518 | 2,918,518 |
| Total liabilities | $ 4,518,306 | $ 4,862,184 |
| | | |
| Commitments and contingent liabilities (Note 12) | | |
| Stockholders' equity: | | |
| Preferred stock, 10,000,000 shares authorized | | |
| Series B, $0.001 par value: 1,804,394 and 2,120,742 shares issued and outstanding as of December 31, 2018 and December 31, 2017, respectively | 1,804 | 2,120 |
| Series A, $0.001 par value: 970,000 shares issued and outstanding as of December 31, 2018 and December 31, 2017 | 970 | 970 |
| Common stock, $0.001 par value; 45,454,546 shares authorized as of December 31, 2018 and December 31, 2017; 9,727,774 and 9,041,426 shares issued as of December 31, 2018 and December 31, 2017, respectively; 9,403,889 and 8,717,541 shares outstanding as of December 31, 2018 and December 31, 2017, respectively | 9,726 | 9,040 |
| Additional paid in capital | 168,161,329 | 165,249,912 |
| Accumulated deficit | (153,233,595) | (145,933,137) |
| Accumulated other comprehensive income | 253,734 | 253,734 |
| Treasury stock | (5,281,180) | (5,281,180) |
| Total stockholders' equity | 9,912,788 | 14,301,459 |
| Total liabilities and stockholders' equity | $ 14,431,094 | $ 19,163,643 |

The accompanying notes are an integral part of these consolidated financial statements.

**XENETIC BIOSCIENCES, INC.**
**CONSOLIDATED STATEMENTS OF COMPREHENSIVE LOSS**

| | FOR THE YEARS ENDED DECEMBER 31, | |
|---|---|---|
| | **2018** | **2017** |
| Revenue | | |
| Licenses | $ – | $ 7,500,000 |
| Collaboration services | – | 85,000 |
| Total revenue | – | 7,585,000 |
| | | |
| Operating costs and expenses: | | |
| Cost of research and development revenue | – | (156,119) |
| Research and development | (2,883,952) | (4,060,000) |
| General and administrative | (4,392,375) | (6,937,643) |
| Loss from operations | (7,276,327) | (3,568,762) |
| | | |
| Other income (expense): | | |
| Other expense | (24,640) | (24,552) |
| Interest income (expense) | 509 | (1,818) |
| Total other expense | (24,131) | (26,370) |
| | | |
| Net loss | $ (7,300,458) | $ (3,595,132) |
| | | |
| Basic and diluted loss per share | $ (0.80) | $ (0.41) |
| | | |
| Weighted-average shares of common stock outstanding, basic and diluted | 9,070,883 | 8,665,763 |

The accompanying notes are an integral part of these consolidated financial statements.

**XENETIC BIOSCIENCES, INC.**
**CONSOLIDATED STATEMENTS OF CHANGES IN STOCKHOLDERS' EQUITY**

| | Preferred Stock | | Common Stock | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Number of Shares | Par Value ($0.001) | Number of Shares | Par Value ($0.001) | Additional Paid in Capital | Accumulated Deficit | Accumulated Other Comprehensive Income (Loss) | Treasury Stock | Total Stockholders' Equity |
| **Balance as of January 1, 2017** | 3,275,742 | $ 3,275 | 8,731,029 | $ 8,730 | $ 163,522,921 | $ (142,338,005) | $ 253,734 | $ (5,281,180) | $ 16,169,475 |
| Conversion of notes | – | – | 125,397 | 125 | (125) | – | – | – | – |
| Conversion of Series B preferred stock to shares of common stock | (185,000) | (185) | 185,000 | 185 | – | – | – | – | – |
| Share-based expense | – | – | – | – | 1,784,129 | – | – | – | 1,784,129 |
| Common stock awards to vendors | – | – | – | – | 69,303 | – | – | – | 69,303 |
| Warrant expense | – | – | – | – | (126,316) | – | – | – | (126,316) |
| Net loss | – | – | – | – | – | (3,595,132) | – | – | (3,595,132) |
| **Balance as of December 31, 2017** | 3,090,742 | $ 3,090 | 9,041,426 | $ 9,040 | $ 165,249,912 | $ (145,933,137) | $ 253,734 | $ (5,281,180) | $ 14,301,459 |
| Exercise of warrants | – | – | 370,000 | 370 | 1,479,630 | – | – | – | 1,480,000 |
| Conversion of Series B preferred stock to shares of common stock | (316,348) | (316) | 316,348 | 316 | – | – | – | – | – |
| Share-based expense | – | – | – | – | 1,351,873 | – | – | – | 1,351,873 |
| Common stock awards to vendors | – | – | – | – | 69,708 | – | – | – | 69,708 |
| Warrant expense | – | – | – | – | 10,206 | – | – | – | 10,206 |
| Net loss | – | – | – | – | – | (7,300,458) | – | – | (7,300,458) |
| **Balance as of December 31, 2018** | 2,774,394 | $ 2,774 | 9,727,774 | $ 9,726 | $ 168,161,329 | $ (153,233,595) | $ 253,734 | $ (5,281,180) | $ 9,912,788 |

The accompanying notes are an integral part of these consolidated financial statements.

**XENETIC BIOSCIENCES, INC.**
**CONSOLIDATED STATEMENTS OF CASH FLOWS**

| | FOR THE YEARS ENDED DECEMBER 31, | |
|---|---|---|
| | **2018** | **2017** |
| **CASH FLOWS FROM OPERATING ACTIVITIES:** | | |
| Net loss | $ (7,300,458) | $ (3,595,132) |
| Adjustments to reconcile net loss to net cash (used in) provided by operating activities: | | |
| Depreciation | 15,827 | 23,784 |
| Gain on sale of property and equipment | (15,437) | – |
| Share-based expense | 1,351,873 | 1,784,129 |
| Warrant-based expense for services | 10,206 | (126,316) |
| Vendor share-based payments | 69,708 | 135,280 |
| Changes in operating assets and liabilities: | | |
| Accounts receivable | – | 3,000,000 |
| Prepaid expenses and other assets | (251,798) | 280,633 |
| Accounts payable, accrued expenses and other liabilities | (343,878) | (8,183) |
| Net cash (used in) provided by operating activities | (6,463,957) | 1,494,195 |
| **CASH FLOWS FROM INVESTING ACTIVITIES:** | | |
| Purchases of property and equipment | – | (9,264) |
| Proceeds from sale of property and equipment | 22,500 | – |
| Net cash provided by (used in) investing activities | 22,500 | (9,264) |
| **CASH FLOWS FROM FINANCING ACTIVITIES:** | | |
| Proceeds from exercise of warrants | 1,480,000 | – |
| Net cash provided by financing activities | 1,480,000 | – |
| Net change in cash and restricted cash | (4,961,457) | 1,484,931 |
| Cash and restricted cash at beginning of period | 5,599,572 | 4,114,641 |
| Cash and restricted cash at end of period | $ 638,115 | $ 5,599,572 |
| **SUPPLEMENTAL CASH FLOW INFORMATION:** | | |
| Cash paid for interest | $ 599 | $ 1,932 |
| **SUPPLEMENTAL SCHEDULE OF NON-CASH INVESTING AND FINANCING ACTIVITIES:** | | |
| Conversion of Series B preferred stock to common stock | $ 316 | $ 185 |
| Reclassification of common shares issuable to accounts payable | $ – | $ 65,977 |
| Issuance of common stock for promissory note converted in 2016 | $ – | $ 125 |

The accompanying notes are an integral part of these consolidated financial statements.

## 1. The Company

***Background***

Xenetic Biosciences, Inc. ("Xenetic" or the "Company"), incorporated in the state of Nevada and based in Framingham, Massachusetts, is a biopharmaceutical company focused on the discovery, research and development of next generation biological drugs and novel oncology therapeutics. The Company's 170+ patent portfolio covers next generation biologic drugs and novel oncology drug therapeutics and provides protection for its current drug candidates and positions it well for strategic partnership and commercialization opportunities. The Company's objective is to leverage its portfolio to maximize opportunities to out-license assets from its portfolio in order to generate working capital to both build long-term stockholder value and provide the Company with the funding necessary for clinical development of its oncology drug candidates through market launch.

Xenetic incorporates its patented and proprietary technologies into a number of drug candidates under development with biotechnology and pharmaceutical industry collaborators to create what the Company believes will be the next-generation biologic drugs with improved pharmacological properties over existing therapeutics. While the Company primarily focuses on researching and developing oncology drugs, it also has significant interests in drugs being developed by its collaborators to treat other conditions.

Xenetic's most advanced investigational drug candidate is oncology therapeutic XBIO-101 (sodium cridanimod) for the treatment of progestin resistant endometrial cancer. The Company has exclusive rights to develop and commercialize XBIO-101 worldwide, except for specified countries in the Commonwealth of Independent States ("CIS"). XBIO-101 has been granted orphan drug designation by the United States ("U.S.") Food and Drug Administration ("FDA") for the potential treatment of progesterone receptor negative ("PrR-") endometrial cancer in conjunction with progesterone therapy. The Company's Phase II trial for XBIO-101 commenced patient dosing in October 2017. The Company closed patient enrollment in the trial in March 2019 as a result of slower than expected progress on the trial resulting from patient enrollment and retention challenges.

Xenetic's lead proprietary technology is PolyXen™, an enabling platform technology which can be applied to protein or peptide therapeutics. It employs the natural polymer polysialic acid ("PSA") to prolong a drug's circulating half-life and potentially improve other pharmacological properties. PolyXen has been demonstrated in human clinical trials to confer prolonged half-life on biotherapeutics such as recombinant human erythropoietin and recombinant Factor VIII ("rFVIII"). The Company believes this technology may be applied to a variety of drug candidates to enhance the properties of the therapeutic, potentially providing advantages over competing products.

On March 1, 2019, the Company entered into an agreement to acquire the novel CAR T ("Chimeric Antigen Receptor T Cell") platform technology, referred to herein as "XCART," (the "Transaction") a proximity-based screening platform capable of identifying CAR constructs that can target patient-specific tumor neoantigens, with a demonstrated proof of mechanism in B-cell Non-Hodgkin lymphomas. The XCART technology, developed by The Scripps Research Institute (the "Institute") in collaboration with the Shemyakin-Ovchinnikov Institute of Bioorganic Chemistry ("IBCH"), is believed to have the potential to significantly enhance the safety and efficacy of cell therapy for B-cell lymphomas by generating patient- and tumor-specific CAR T cells.

The XCART technology platform was designed by its originators to utilize an established screening technique to identify peptide ligands that bind specifically to the unique B-cell receptor ("BCR") on the surface of an individual patient's malignant tumor cells. The peptide is then inserted into the antigen-binding domain of a CAR, and a subsequent transduction/transfection process is used to engineer the patient's T cells into a CAR T format which redirects the patient's T cells to attack the tumor. Essentially, the XCART screening platform is the inverse of a typical CAR T screening protocol wherein libraries of highly specific antibody domains are screened against a given target. In the case of XCART screening, the target is itself an antibody domain, and hence highly specific by its nature. The XCART technology creates the possibility of personalized treatment of lymphomas utilizing a CAR with an antigen-binding domain that should only recognize, and only be recognized by, the unique BCR of a particular patient's B-cell lymphoma. An expected result for XCART is limited off-tumor toxicities, such as B-cell aplasia. Xenetic's clinical development program will seek to confirm the early preclinical results, and to demonstrate a more attractive safety profile than existing therapies.

The closing of the Transaction is subject to customary closing conditions as well as conditions regarding (i) the Company having adequate financing to fund its future working capital obligations following the closing and (ii) the Company obtaining necessary and appropriate stockholder approvals, evidencing among other matters, approval of the Share Purchase Agreement and the transactions contemplated thereunder, including the issuance of shares of the Company's common stock. Subject to the satisfaction of the closing conditions, the Transaction is expected to close in the first half of 2019. See Note 14 "*Subsequent Events*".

Xenetic's drug candidates have resulted from its research activities or those of its collaborators and are in the development stage. As a result, the Company continues to commit a significant amount of its resources to its research and development activities and anticipates continuing to do so for the near future. To date, none of the Company's drug candidates have received regulatory marketing authorization in the U.S. by the FDA nor in any other territories by any applicable agencies. Although the Company holds a broad patent portfolio, the focus of its internal development efforts was limited in 2018 to research and development of its primary product candidate XBIO-101 due to capital constraints. The Company intends to pursue development efforts of the XCART technology once the acquisition is consummated and pursue other developments efforts around CAR T technology. The Company also plans to research potential utilities for XBIO-101 alone or in combination, in immuno-oncology approaches and will continue to look for potential partner and out-licensing opportunities for its platform technologies subject to adequate funding.

The Company, directly or indirectly, through its wholly-owned subsidiary, Xenetic UK, and the wholly-owned subsidiaries of Xenetic Biosciences (U.K.) Limited ("Xenetic UK"), Lipoxen Technologies Limited ("Lipoxen"), Xenetic Bioscience, Incorporated and SymbioTec, GmbH ("SymbioTec"), owns various U.S. federal trademark registrations and applications, and unregistered trademarks and service marks, including but not limited to Virexxa®, OncoHist™, PolyXen™, ErepoXen™, ImuXen™, and PulmoXen™, which may be used throughout this Annual Report. All other company and product names may be trademarks of the respective companies with which they are associated.

***Going Concern and Management's Plan***

The Company incurred a net loss of approximately $7.3 million for the year ended December 31, 2018. The Company had an accumulated deficit of approximately $153.2 million as of December 31, 2018 as compared to an accumulated deficit of approximately $145.9 million as of December 31, 2017. Working capital (deficit) was approximately $(0.4) million at December 31, 2018 and approximately $3.9 million at December 31, 2017. The Company expects to continue incurring losses for the foreseeable future and will need to raise additional capital or pursue other strategic alternatives in the very near term in order to continue pursuit of its business plan and continue as a going concern.

The Company believes that it has access to capital resources through possible public or private equity offerings, debt financings, corporate collaborations, related party funding or other means. On March 5, 2019, the Company raised $3.1 million in a registered direct common stock offering resulting in $2.7 million of net proceeds to the Company. However, it has not secured any commitment for additional financing at this time. The terms, timing and extent of any future financing will depend upon several factors, including the achievement of progress in its clinical development programs, its ability to identify and enter into licensing or other strategic arrangements, and factors related to financial, economic and market conditions, many of which are beyond its control.

While these consolidated financial statements have been prepared on a going concern basis, if the Company does not successfully raise additional working capital, there can be no assurance that the Company will be able to continue its operations and these conditions raise substantial doubt about its ability to continue as a going concern. Under such circumstances, the Company would have to further reduce the planned scale of, or possibly suspend, some or all of its preclinical development initiatives and clinical trials. In addition, the Company would have to continue to reduce its general and administrative and other operating expenses and delay or cease the purchase of clinical research services if and until the Company is able to obtain additional financing. The accompanying consolidated financial statements do not include any adjustments related to the recoverability or classification of asset carrying amounts or the amounts and classification of liabilities that may result should the Company be unable to continue as a going concern.

**2. Summary of Significant Accounting Policies**

***Preparation of Financial Statements***

These consolidated financial statements have been prepared on the assumption that the Company will be able to realize its assets and discharge its liabilities in the normal course of business. This assumption is presently uncertain and contingent upon the Company's ability to raise additional working capital. The financial statements do not include any adjustments relating to recoverability and classification of recorded asset amounts or the amounts and classification of liabilities that might be necessary should the Company be unable to continue as a going concern.

***Principles of Consolidation***

The consolidated financial statements of the Company include the accounts of Xenetic UK and its wholly-owned subsidiaries: Lipoxen, Xenetic Bioscience, Incorporated, and SymbioTec. All material intercompany balances and transactions have been eliminated in consolidation.

***Use of Estimates***

The consolidated financial statements and accompanying notes are prepared in accordance with U.S. generally accepted accounting principles ("U.S. GAAP"). The preparation of the financial statements in accordance with U.S. GAAP requires management to make estimates, judgments and assumptions that affect the reported amounts of assets and liabilities, the reported amounts of revenue, costs and expenses in the financial statements and disclosures in the accompanying notes. Actual results and outcomes may differ materially from management's estimates, judgments and assumptions.

***Functional Currency Change***

Effective April 1, 2015, the functional currency of the Company's foreign subsidiaries changed from the British Pound Sterling to the U.S. dollar. The change in functional currency was applied on a prospective basis. Therefore, any gains and losses that were previously recorded in accumulated other comprehensive income remain unchanged.

***Foreign Currency Transactions***

Realized and unrealized gains and losses resulting from foreign currency transactions arising from exchange rate fluctuations on balances denominated in currencies other than the functional currencies are recognized in "Other income (expense)" in the consolidated statements of comprehensive loss. Monetary assets and liabilities that are denominated in a currency other than the functional currency are re-measured to the functional currency using the exchange rate at the balance sheet date and gains or losses are recorded in the consolidated statements of comprehensive loss.

***Fair Value of Financial Instruments***

The Company applies the following fair value hierarchy, which prioritizes the inputs used to measure fair value into three levels and bases the categorization within the hierarchy upon the lowest level of input that is available and significant to the fair value measurement. Level 1 inputs are quoted prices in active markets for identical assets or liabilities that the reporting entity has the ability to access at the measurement date. Level 2 utilizes quoted market prices in markets that are not active, broker or dealer quotations, or alternative pricing sources with reasonable levels of price transparency. Level 3 inputs are unobservable inputs for the asset or liability in which there is little, if any, market activity for the asset or liability at the measurement date. See Note 7, *Fair Value Measurements*, for discussion of the Company's fair value measurements.

***Cash and Cash Equivalents***

The Company considers all highly liquid investments with maturities of 90 days or less from the date of purchase to be cash equivalents. Investments with original maturities of greater than 90 days from the date of purchase but less than one year from the balance sheet date are classified as short-term investments, while investments with maturities of one year or beyond from the balance sheet date are classified as long-term investments. Management determines the appropriate classification of its cash equivalents and investment securities at the time of purchase and re-evaluates such determination as of each balance sheet date.

***Restricted Cash***

As of December 31, 2018 and 2017, restricted cash represents a certificate of deposit that matures annually and secures the Company's outstanding letter of credit of approximately $0.1 million for its former operating lease in Lexington, Massachusetts (the "Lexington Lease"). The Lexington Lease expired in January 2019 and the letter of credit is required to be maintained through May 1, 2019.

In November 2016, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") 2016-18, *Statement of Cash Flows (Topic 230): Restricted Cash* that changes the presentation of restricted cash and cash equivalents on the statement of cash flows. Restricted cash and restricted cash equivalents are included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amounts shown on the statement of cash flows. ASU 2016-18 was effective for the Company in the first quarter of fiscal 2018. Adoption of this standard resulted in reclassification of restricted cash in the consolidated statements of cash flows for the year ended December 31, 2017.

***Concentration of Credit Risk***

Financial instruments that subject the Company to concentrations of credit risk include cash and cash equivalents. The Company maintains cash and cash equivalents with various major financial institutions. The Company performs periodic evaluations of the relative credit standing of these financial institutions and limits the amount of credit exposure with any one institution.

***Property and Equipment***

The Company records property and equipment at cost less accumulated depreciation. Expenditures for major renewals and improvements which extend the life or usefulness of the asset are capitalized. Items of an ordinary repair or maintenance nature are charged directly to operating expense as incurred. The Company calculates depreciation using the straight-line method over the estimated useful lives of the assets:

| Asset Classification | Estimated Useful Life |
|---|---|
| Laboratory equipment | 3 years |
| Office and computer equipment | 3 years |
| Leasehold improvements | 5 years or the remaining term of the lease, if shorter |
| Furniture and fixtures | 5 years |

The Company eliminates the cost of assets retired or otherwise disposed of, along with the corresponding accumulated depreciation, from the related accounts, and the resulting gain or loss is reflected in the results of operations.

***Indefinite-Lived Intangible Assets***

Acquired indefinite-lived intangible assets consist of in-process research and development ("IPR&D") related to the Company's business combination with SymbioTec, which was recorded at fair value on the acquisition date. IPR&D intangible assets are considered indefinite-lived intangible assets until completion or abandonment of the associated research and development efforts. Substantial additional research and development may be required before the Company's IPR&D reaches technological feasibility. Upon completion of the IPR&D project, the IPR&D assets will be amortized over their estimated useful lives.

The Company assesses intangible assets with indefinite lives for impairment at least annually as of October 1, or when events or changes in the business environment indicate the carrying value may be impaired. The Company also has the option to first assess qualitative factors to determine whether the existence of events orcircumstances leads the Company to determine that it is more likely than not (that is, a likelihood of more than 50%) that the acquired IPR&D is impaired. If the Company chooses to first assess the qualitative factors and it is determined that it is not more likely than not acquired IPR&D is impaired, the Company is not required to take further action to test for impairment. The Company also has the option to bypass the qualitative assessment and perform only the quantitative impairment test, which the Company may choose to perform in some periods but not in others.

No impairment was recorded during the years ended December 31, 2018 and 2017.

***Goodwill***

Goodwill is comprised of the purchase price of business combinations in excess of the fair value assigned at acquisition to the net tangible and identifiable intangible assets acquired. Goodwill is not amortized. The Company assesses goodwill for impairment at least annually, or when events or changes in the business environment indicate the carrying value may not be fully recoverable. The Company also has the option to first assess qualitative factors to determine whether the existence of events or circumstances leads the Company to determine that it is more likely than not (that is, a likelihood of more than 50%) that goodwill is impaired. If the Company chooses to first assess qualitative factors and it is determined that it is not more likely than not goodwill is impaired, the Company is not required to take further action to test for impairment. The Company also has the option to bypass the qualitative assessment and perform only the quantitative impairment test, which the Company may choose to do in some periods but not in others. The Company performs its annual impairment review as of October 1.

No impairment was recorded during the years ended December 31, 2018 and 2017.

***Impairment of Long-Lived Assets***

The Company reviews long-lived assets to be held and used, including property and equipment, for impairment whenever events or changes in circumstances indicate that the carrying amount of the assets or asset group may not be fully recoverable. No such impairments were recorded during the years ended December 31, 2018 and 2017.

Evaluation of recoverability is based on an estimate of undiscounted future cash flows resulting from the use of the asset or asset group and its eventual disposition. Impairment, if any, is calculated as the amount by which an asset's carrying value exceeds its fair value, typically using discounted cash flows to determine fair value.

***Revenue Recognition***

The Company enters into supply, license and collaboration arrangements with pharmaceutical and biotechnology partners, some of which include royalty agreements based on potential net sales of approved commercial pharmaceutical products.

Effective January 1, 2018, the Company adopted Accounting Standards Codification ("ASC") Topic 606, *Revenue from Contracts with Customers* ("ASC 606"), using the modified retrospective transition method. Under this method, results for reporting periods beginning after January 1, 2018 are presented under ASC 606, while prior period amounts are not adjusted and continue to be reported in accordance with ASC 605. This standard applies to all contracts with customers, except for contracts that are within the scope of other standards, such as leases, insurance, collaboration arrangements and financial instruments. The Company did not have any revenue generating contracts with customers and, therefore, the adoption of this new revenue standard did not have a material impact on the consolidated financial statements. Under ASC 605, the Company recognized revenue when all of the following criteria were met: (i) persuasive evidence of an arrangement existed; (ii) delivery had occurred or services had been rendered; (iii) the seller's price to the buyer was fixed or determinable; and (iv) collectability was reasonably assured.

The terms of the Company's license agreements may include delivery of an IP license to a collaboration partner. The Company may be compensated under license arrangements through a combination of non-refundable upfront receipts, development and regulatory objective receipts and royalty receipts on future product sales by partners. The Company anticipates recognizing non-refundable upfront license payments and development and regulatory milestone payments received by the Company in license and collaboration arrangements that include future obligations, such as supply obligations, ratably over the Company's expected performance period under each respective arrangement. The Company makes its best estimate of the period over which the Company expects to fulfil the Company's performance obligations, which may include technology transfer assistance, research activities, clinical development activities, and manufacturing activities from development through the commercialization of the product. Given the uncertainties of these collaboration arrangements, significant judgment is required to determine the duration of the performance period.

When the Company enters into an arrangement to sublicense some of its patents, it will consider the performance obligations to determine if there is a single element or multiple elements to the arrangement as it determines the proper method and timing of revenue recognition. The Company considers the terms of the license or sublicense for such elements as price adjustments or refund clauses in addition to any performance obligations for it to provide such as services, patent defense costs, technology support, marketing or sales assistance or any other elements to the arrangement that could constitute an additional deliverable to it that could change the timing of the revenue recognition. Non-refundable upfront license and sublicense fees received, whereby continued performance or future obligations are considered inconsequential or perfunctory to the relevant licensed technology, are recognized as revenue upon delivery of the technology.

The Company expects to recognize royalty revenue in the period of sale, based on the underlying contract terms, provided that the reported sales are reliably measurable, the Company has no remaining performance obligations, and all other revenue recognition criteria are met.

The Company anticipates reimbursements for research and development services completed by the Company related to the collaboration agreements to be recognized in operations as revenue on a gross basis.

The Company's license and collaboration agreements with certain collaboration partners could also provide for future milestone receipts to the Company based solely upon the performance of the respective collaboration partner in consideration of deadline extensions or upon the achievement of specified sales volumes of approved drugs. For such receipts, the Company expects to recognize the receipts as revenue when earned under the applicable contract terms on a performance basis or ratably over the term of the agreement. These receipts may also be recognized as revenue when continued performance or future obligations by the Company are considered inconsequential or perfunctory.

Under ASC 606, an entity recognizes revenue when its customer obtains control of promised goods or services, in an amount that reflects the consideration which the entity expects to receive in exchange for those goods or services. To determine revenue recognition for arrangements that an entity determines are within the scope of ASC 606, the entity performs the following five steps: (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue at a point in time, or over time, as it satisfies a performance obligation. The Company only applies the five-step model to contracts when it is probable that it will collect the consideration it is entitled to in exchange for the goods or services it transfers to the customer. At contract inception, once the contract is determined to be within the scope of ASC 606, the Company assesses the goods or services promised within each contract, determine those that are performance obligations, and assess whether each promised good or service is distinct. The Company then recognizes as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) the performance obligation is satisfied.

As part of the accounting for these arrangements, the Company must use significant judgment to determine: a) the number of performance obligations based on the determination under step (ii) above; b) the transaction price under step (iii) above; and c) the stand-alone selling price for each performance obligation identified in the contract for the allocation of transaction price in step (iv) above. The Company uses judgment to determine whether milestones or other variable consideration should be included in the transaction price as described further below. The transaction price is allocated to each performance obligation on a relative stand-alone selling price basis, for which the Company recognizes revenue as or when the performance obligations under the contract are satisfied. In developing the stand-alone price for a performance obligation, the Company considers applicable market conditions and relevant entity-specific factors, including factors that were contemplated in negotiating the agreement with the customer and estimated costs. The Company validates the stand-alone selling price for performance obligations by evaluating whether changes in the key assumptions used to determine the stand-alone selling prices will have a significant effect on the allocation of transaction price between multiple performance obligations. The Company recognizes a contract asset or liability for the difference between the Company's performance (i.e., the goods or services transferred to the customer) and the customer's performance (i.e., the consideration paid by, and unconditionally due from, the customer).

See also Note 3, *Significant Strategic Drug Development Collaborations – Related Parties*.

***Research and Development Expenses***

Research and development expenses consist of expenses incurred in performing research and development activities, including compensation and benefits, facilities expenses, overhead expenses, clinical trial and related clinical manufacturing expenses, fees paid to contract research organizations ("CROs") and contract manufacturing organizations and other outside expenses. The Company expenses research and development costs as incurred. The Company expenses upfront, non-refundable payments made for research and development services as obligations are incurred. The value ascribed to intangible assets acquired but which have not met capitalization criteria is expensed as research and development at the time of acquisition.

The Company is required to estimate accrued research and development expenses at each reporting period. This process involves reviewing open contracts and purchase orders, communicating with Company personnel to identify services that have been performed on its behalf and estimating the level of service performed and the associated cost incurred for the service when the Company has not yet been invoiced or otherwise notified of actual costs. The majority of the Company's service providers invoice it in arrears for services performed, on a pre-determined schedule or when contractual milestones are met. However, some require advanced payments. The Company makes estimates of accrued expenses as of each balance sheet date in the financial statements based on facts and circumstances known at that time. The Company periodically confirms the accuracy of the estimates with the service providers and makes adjustments, if necessary. Examples of estimated accrued research and development expenses include fees paid to:

- program managers in connection with overall program management of clinical trials;
- CROs in connection with clinical trials; and
- investigative sites in connection with clinical trials.

The Company bases its expenses related to clinical trials on its estimates of the services received and efforts expended pursuant to quotes and contracts with multiple research institutions and CROs that conduct and manage clinical trials on the Company's behalf. The financial terms of these agreements are subject to negotiation, vary from contract to contract and may result in uneven payment flows. There may be instances in which payments made to vendors will exceed the level of services provided and result in a prepayment of the expense. In accruing service fees, the Company estimates the time period over which services will be performed and the level of effort to be expended in each period. If the actual timing of the performance of services or the level of effort varies from the estimate, the Company adjusts the accrual or prepaid accordingly. Although it does not expect its estimates to be materially different from amounts actually incurred, the Company's understanding of the status and timing of services performed relative to the actual status and timing of services performed may vary and may result in reporting amounts that are too high or too low in any particular period. To date, there have not been any material adjustments to the Company's prior estimates of accrued research and development expenses. As of December 31, 2018, the Company has recorded accrued program expense of approximately $0.2 million as a component of accrued expenses. In addition, the Company has recorded approximately $0.4 million of deposits held with our clinical trial vendors as a component of prepaid expenses and other current assets as of December 31, 2018. At December 31, 2017, the Company had recorded $33,000 as a component of deferred program expenses as a component of prepaid expenses and other current assets.

***Share-based Expense***

*Stock options and restricted stock units*

The Company grants share-based payments in the form of options and restricted stock units ("RSUs") to employees and non-employees, Joint Share Ownership Plan ("JSOP") awards to employees, as well as agreements to issue common stock in exchange for services provided by non-employees.

Share-based expense is based on the estimated fair value of the option or calculated using the Black-Scholes option pricing model. Determining the appropriate fair value model and related assumptions requires judgment, including estimating share price volatility and expected terms of the awards. The expected volatility rates are estimated based on the actual volatility of the Company and of comparable public companies over the expected term of the option. The expected terms represent the time that options are expected to be outstanding. The Company accounts for forfeitures as they occur and not at the time of grant. The Company has not paid dividends and does not anticipate paying cash dividends in the foreseeable future and, accordingly, uses an expected dividend yield of zero. The risk-free interest rate is based on the rate of U.S. Treasury securities with maturities consistent with the estimated expected term of the awards. Upon exercise, stock options are redeemed for newly issued shares of common stock. RSUs are redeemed for newly issued shares of common stock as the vesting and settlement provisions of the grant are met.

For employee options that vest based solely on service conditions, the fair value measurement date is generally on the date of grant and the related compensation expense is recognized on a straight-line basis over the requisite vesting period of the awards.

For non-employee options, the fair value measurement date is the earlier of the date the performance of services is complete or the date the performance commitment has been reached. The Company generally determines that the fair value of the stock options is more reliably measurable than the fair value of the services received. Compensation expense related to stock options granted to non-employees that vest based solely on service conditions is subject to re-measurement at each reporting period until the options vest and is recognized on a straight-line basis over the requisite vesting period of the awards.

The Company adopted FASB issued ASU 2016-09, *Compensation – Stock Compensation (Topic 718)* ("ASU 2016-09") effective January 1, 2017. ASU 2016-09 simplifies several aspects of employee share-based payment accounting, including income tax consequences, classification of awards as either equity or liabilities, and classification on the statement of cash flows. The adoption of this standard did not have a material impact on the Company's financial statements or related disclosures as:

- There have been no stock option exercises as a U.S. company and, therefore, there are no excess tax benefits related to windfalls. Moreover, the Company maintains a full valuation allowance and expects to do so for the foreseeable future;
- The Company has elected to account for forfeitures as they occur, which the Company adopted using a modified retrospective approach and there was no material cumulative effect adjustment to be recorded to opening retained earnings; and
- The Company will classify cash paid to taxing authorities arising from the withholding of shares from employees in cash flows from financing activities.

*Common stock awards*

The Company grants common stock awards to non-employees in exchange for services provided. The Company measures the fair value of these awards using the fair value of the services provided, as this provides the most reliable measure of the fair value of the awards granted. The fair value measurement date of these awards is generally the date the performance of services is complete. The fair value of the awards is recognized on a straight-line basis as services are rendered. The share-based payments related to common stock awards for the settlement of services provided by non-employees is recorded on the consolidated statement of comprehensive loss in the same manner and charged to the same account as if such settlements had been made in cash.

***Warrants***

In connection with certain financing, consulting and collaboration arrangements, the Company has issued warrants to purchase shares of its common stock. The outstanding warrants are standalone instruments that are not puttable or mandatorily redeemable by the holder and are classified as equity awards. The Company measures the fair value of the awards using the Black-Scholes option pricing model as of the measurement date. Warrants issued to collaboration partners in conjunction with the issuance of common stock are initially recorded at fair value as a reduction in additional paid-in capital of the common stock issued. All other warrants are recorded at fair value as expense on a straight-line basis over the requisite service period or at the date of issuance, if there is not a service period or if service has already been rendered. Warrants granted in connection with ongoing arrangements are more fully described in Note 9, *Stockholders' Equity.*

***Income Taxes***

The Company accounts for income taxes using the asset and liability method. Under this method, deferred tax assets and liabilities are determined based on temporary differences resulting from the different treatment of items for tax and financial reporting purposes. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to reverse. Additionally, the Company must assess the likelihood that deferred tax assets will be recovered as deductions from future taxable income. The Company evaluates the recoverability of its deferred tax assets on a quarterly basis.

***Basic and Diluted Net Loss per Share***

The Company computes basic net loss per share by dividing net loss applicable to common stockholders by the weighted-average number of shares of common stock outstanding during the period. The Company computes diluted net loss per share after giving consideration to the dilutive effect of stock options that are outstanding during the period, except where such non-participating securities would be anti-dilutive. The Company's JSOP awards, prior to exercise, are considered treasury shares by the Company and thus do not impact the Company's net loss per share calculation. As of December 31, 2018 and 2017, there were approximately 0.3 million JSOP awards issued.

For the years ended December 31, 2018 and 2017, basic and diluted net loss per share are the same for each year due to the Company's net loss position. Potentially dilutive, non-participating securities have not been included in the calculations of diluted net loss per share, as their inclusion would be anti-dilutive. As of December 31, 2018 and 2017, approximately 0.8 million and 0.6 million potentially dilutive securities, respectively, were deemed anti-dilutive.

***Segment Information***

Operating segments are identified as components of an enterprise about which separate discrete financial information is available for evaluation by the chief operating decision maker, who is the Company's Chief Executive Officer, in making decisions on how to allocate resources and assess performance. The Company views its operations and manages its business in one operating segment.

***Operating Leases***

The Company leases administrative and laboratory facilities under operating leases. Lease agreements may include rent holidays, rent escalation clauses and tenant improvement allowances. The Company recognizes scheduled rent increases on a straight-line basis over the lease term beginning with the date the Company takes possession of the leased space.

***Acquisitions***

The Company has a history of engaging in acquisition transactions that require the Company to evaluate whether the transaction meets the criteria of a business combination and, in some cases, whether it meets the definition of a reverse merger. If the transaction does not meet the business combination requirements, the transaction is accounted for as an asset acquisition or recapitalization and no goodwill is recognized. If the acquisition meets the definition of a business combination, the Company allocates the purchase price, including any contingent consideration, to the assets acquired and the liabilities assumed at their estimated fair values as of the date of the acquisition with any excess of the purchase price paid over the estimated fair value of net assets acquired recorded as goodwill. The fair value of the assets acquired and liabilities assumed is typically determined by using either estimates of replacement costs or discounted cash flow valuation methods.

When determining the fair value of tangible assets acquired, the Company estimates the cost to replace the asset with a new asset, taking into consideration such factors as age, condition and the economic useful life of the asset. When determining the fair value of intangible assets acquired, the Company uses judgment to estimate the applicable discount rate, growth rates and the timing and amount of future cash flows. The fair value of assets acquired and liabilities assumed is typically determined using the assistance of an independent third-party specialist.

Business combination related costs are expensed in the period in which the costs are incurred. Asset acquisition related costs are generally capitalized as a component of cost of the assets acquired.

***Recent Accounting Standards***

In June 2018, the FASB issued ASU 2018-07*, Compensation – Stock Compensation (Topic 718): Improvements to Nonemployee Share-Based Payment Accounting.* ASU 2018-07 expands the scope of Topic 718 to include share-based payment transactions for acquiring goods and services from nonemployees. An entity should apply the requirements of Topic 718 to nonemployees awards except for specific guidance on inputs to an option pricing model and the attribution of cost. ASU 2018-07 specifies that Topic 718 applies to all share-based payment transactions in which a grantor acquires goods or services to be used or consumed in a grantor's own operations by issuing share-based payment awards, and that Topic 718 does not apply to share-based payments used to effectively provide (1) financing to the issuer or (2) awards granted in conjunction with selling goods or services to customers as part of a contract accounted for under Topic 606 *Revenue from Contracts with Customers.* ASU 2018-07 is effective for the Company in the first quarter of fiscal 2019. The adoption of ASU 2018-07 is not expected to have a significant impact on the Company's consolidated financial statements.

In January 2017, the FASB issued ASU 2017-04: *Intangibles — Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment* that eliminates the requirement to calculate implied fair value of goodwill to measure a goodwill impairment charge. Instead, the new guidance will require entities to take an impairment charge based on the excess of a reporting unit's carrying amount over its fair value. The guidance is effective for the Company no later than 2020. The adoption of this guidance is not expected to have a material impact on the Company's consolidated financial statements.

In February 2016, FASB issued ASU 2016-02, *Leases (Topic 842)* ("ASU 2016-02"). ASU 2016-02 will require lessees to recognize a lease liability and a right-of-use asset for all leases, with the exception of short-term leases, at the commencement date. This guidance is effective for annual reporting periods beginning after December 15, 2018, including interim periods within those annual periods. Early application is permitted. The adoption of ASU 2016-02 is not expected to have a significant impact on the Company's consolidated financial statements.

The Company has considered other recent accounting standards and concluded that they are either not applicable to the business, or that no material effect is expected on the consolidated financial statements as a result of future adoption.

**3. Significant Strategic Drug Development Collaborations – Related Parties**

***Takeda Pharmaceutical Co. Ltd., ("Takeda") (formerly Shire plc)***

The Company is party to an exclusive research, development and license agreement with Baxalta US Inc. and Baxalta AB, wholly-owned subsidiaries of Takeda, related to the development of a novel series of polysialylated blood coagulation factors. Takeda acquired Shire plc in January 2019. This collaboration with Takeda relies on the Company's PolyXen technology to conjugate PSA with therapeutic blood-clotting factors, with the goal of improving the pharmacokinetic profile and extending the half-life of these biologic molecules. The agreement grants Takeda a worldwide, exclusive, royalty-bearing license to the Company's PSA patented and proprietary technology in combination with Takeda's proprietary molecules designed for the treatment of blood and bleeding disorders. The first program under this agreement was a next generation rFVIII protein product candidate ("SHP656").

In December 2016, Takeda reached a milestone of its Phase I/II clinical trial for the treatment of hemophilia with SHP656, triggering a $3.0 million payment to be paid to the Company pursuant to the agreement with Takeda. The Company determined the milestone to be non-substantive because all significant performance obligations to achieve the contingent payments were the responsibility of Takeda with only negligible amount by the Company of effort to fulfill its obligations, specifically assistance on a research committee. As the amount allocable to the remaining performance period was negligible, the Company recognized the full $3.0 million in milestone revenue in connection with this collaboration during the year ended December 31, 2016. The payment was made in January 2017.

In May 2017 Takeda provided an update on the Phase I/II clinical study indicating that SHP656's efficacy and pharmacokinetic data commensurate with the profile of an extended half-life rFVIII product. Additionally, to the Company's knowledge, there were no drug-related adverse events, serious adverse events, or rFVIII inhibitors reported. However, the pre-defined once-weekly dosing criterion was not met and the rFVIII program was terminated by Takeda.

On October 27, 2017, the Company entered into a Right of Sublicense Agreement (the "Sublicense Agreement") with Baxalta Incorporated, Baxalta US Inc., and Baxalta GmbH (collectively, with their affiliates, "Baxalta") wholly-owned subsidiaries of Takeda. Pursuant to the Sublicense Agreement, the Company granted to Baxalta the right to grant a nonexclusive sublicense to certain patents related to the Company's PolyXen technology that were previously exclusively licensed to Baxalta in connection with products related to the treatment of blood and bleeding disorders ("Covered Products.") Pursuant to the Sublicense Agreement, Baxalta (i) paid the Company a one-time payment of seven million five hundred thousand dollars ($7,500,000) in November 2017 and (ii) agreed to pay to the Company single digit royalty payments based upon net sales of the Covered Products throughout the term. The Company recognized the full $7.5 million as license revenue in connection with this Sublicense Agreement during the year ended December 31, 2017. There have been no royalty payments under the Sublicense Agreement to date.

***SynBio LLC***

In August 2011, SynBio LLC ("SynBio") and the Company entered into a stock subscription and collaborative development of pharmaceutical products agreement (the "Co-Development Agreement"). The Company granted an exclusive license to SynBio to develop pharmaceutical products using certain molecule(s) based on SynBio's technology and the Company's proprietary technology (PolyXen, OncoHist and ImuXen) that prolongs the active life and/or improves the pharmacokinetics of certain therapeutic proteins and peptides (as well as conventional drugs). In return, SynBio granted an exclusive license to the Company to use the preclinical and clinical data generated by SynBio in certain agreed products and engage in the development of commercial candidates.

SynBio and the Company are each responsible for funding their own research activities. There are no milestone or other research-related payments due under the agreement other than fees for the supply of each company's respective research supplies based on their technology, which, when provided, are due to mutual convenience and not representative of an ongoing or recurring obligation to supply research supplies. Serum Institute of India Limited ("Serum Institute") has agreed to directly provide the research supplies to SynBio, where the Company is not liable for any failure to supply the research supplies as a result of any act or fault of Serum Institute. Upon successful commercialization of any resultant products, the Company is entitled to receive royalties on sales in certain territories and pay royalties to SynBio for sales outside those certain territories.

Through December 31, 2018, the Company and SynBio continued to engage in research and development activities with no resultant commercial products. The Company did not recognize revenue in connection with the Co-Development Agreement during the years ended December 31, 2018 and 2017.

In 2017, SynBio became a wholly-owned subsidiary of Pharmsynthez and all ownership percentages previously held by SynBio are combined with Pharmsynthez. See Note 9, *Stockholders' Equity.*

***Serum Institute of India Limited***

In August 2011, the Company entered into a collaborative research and development agreement with Serum Institute providing Serum Institute an exclusive license to use the Company's PolyXen technology to research and develop one potential commercial product, Polysialylated Erythropoietin ("PSA-EPO"). Serum Institute is responsible for conducting all preclinical and clinical trials required to achieve regulatory approvals within the certain predetermined territories at Serum Institute's own expense. Royalty payments are payable by Serum Institute to the Company for net sales to certain customers in the Serum Institute sales territory. Royalty payments are payable by the Company to Serum Institute for net sales received by the Company over the term of the license. There are no milestone or other research-related payments due under the collaborative arrangement.

Through December 31, 2018, the Company and Serum Institute continued to engage in research and development activities with no resultant commercial products. No royalty revenue or expense was recognized by the Company related to the Serum Institute arrangement during the years ended December 31, 2018 and 2017.

Serum Institute is a related party of the Company with a share ownership of approximately 6.7% and 7.2% of the total issued common stock of the Company as of December 31, 2018 and 2017, respectively. In addition to its' common stock ownership, Serum Institute holds outstanding warrants to purchase the Company's common stock. See Note 9, *Stockholders' Equity.*

***PJSC Pharmsynthez***

In November 2009, the Company entered into a collaborative research and development license agreement with Pharmsynthez (the "Pharmsynthez Arrangement") pursuant to which the Company granted an exclusive license to Pharmsynthez to develop, commercialize and market six drug candidates based on the Company's PolyXen and ImuXen technology in certain territories. In exchange, Pharmsynthez granted an exclusive license to the Company to use any preclinical and clinical data developed by Pharmsynthez, within the scope of the Pharmsynthez Arrangement, and to engage in further research, development and commercialization of drug candidates outside of certain territories at the Company's own expense.

Pharmsynthez is an affiliate and controlling stockholder of the Company with a share ownership of approximately 57.1% and 61.5% of the total issued common stock of the Company as of December 31, 2018 and 2017, respectively. In addition to its common stock ownership, Pharmsynthez holds outstanding warrants to purchase the Company's common stock, approximately 1.5 million shares of the Company's issued and outstanding Series B Preferred Stock, and all of the Company's issued and outstanding Series A Preferred Stock through its wholly-owned subsidiary, SynBio. See Note 9, *Stockholders' Equity*.

## 4. Property and Equipment, net

Property and equipment, net consists of the following:

| | December 31, 2018 | December 31, 2017 |
|---|---|---|
| Laboratory equipment | $ – | $ 264,583 |
| Office and computer equipment | 42,289 | 46,634 |
| Leasehold improvements | 26,841 | 26,841 |
| Furniture and fixtures | 20,263 | 20,263 |
| Property and equipment – at cost | 89,393 | 358,321 |
| Less accumulated depreciation | (84,437) | (330,475) |
| Property and equipment – net | $ 4,956 | $ 27,846 |

Depreciation expense was approximately $16,000 and $24,000 for the years ended December 31, 2018 and 2017, respectively. During the year ended December 31, 2018, the Company sold certain laboratory equipment for $22,500 resulting in an approximate $15,000 gain.

## 5. Goodwill, Indefinite-Lived Intangible Assets and Other Long-Term Assets

*Goodwill*

A reconciliation of the change in the carrying value of goodwill is as follows:

| | |
|---|---|
| Balance as of January 1, 2017 | $ 3,283,379 |
| No changes | – |
| Balance as of December 31, 2017 | $ 3,283,379 |
| No changes | – |
| Balance as of December 31, 2018 | $ 3,283,379 |

As of October 1, 2018 and 2017, the dates of the Company's annual impairment review, the fair value of the Company's goodwill balance exceeded its carrying value.

*Indefinite-Lived Intangible Assets*

The Company's indefinite-lived intangible asset, OncoHist, is IPR&D relating to the Company's business combination with SymbioTec in 2012. The carrying value of OncoHist was approximately $9.2 million as of December 31, 2018 and 2017. No impairment was recorded during the years ended December 31, 2018 and 2017. OncoHist is not yet commercialized and, therefore, has not yet begun to be amortized as of December 31, 2018.

*Other Long-Term Assets*

On September 15, 2016, the Company issued approximately 0.2 million shares of common stock to Serum Institute in exchange for approximately $0.8 million of research and development and clinical PSA supply as well as settlement of approximately $0.2 million of prior purchases of PSA supply. Approximately $0.1 million of the clinical supply was utilized and expensed during the year ended December 31, 2017. No clinical supply was utilized during the year ended December 31, 2018. The Company has classified the remaining $0.7 million as long-term as it does not anticipate utilizing the majority of the PSA supply within the next 12 months.

## 6. Accrued Expenses

Accrued expenses consist of the following:

| | December 31, 2018 | December 31, 2017 |
|---|---|---|
| Accrued payroll and benefits | $ 53,541 | $ 723,488 |
| Accrued professional fees | 394,075 | 389,086 |
| Accrued research costs | 205,067 | 11,477 |
| Other | 11,346 | 11,602 |
| | $ 664,029 | $ 1,135,653 |

On November 2, 2017, the Company entered into a Settlement Agreement with M. Scott Maguire, former Chief Executive Officer of the Company (the "Settlement Agreement"), which terminated the Employment Agreement dated November 3, 2009, between Xenetic UK and Mr. Maguire. Pursuant to the terms of the Settlement Agreement, Mr. Maguire continued to receive his current base salary and benefits for a period of 12 months, received a lump sum termination payment of £30,000 and was reimbursed for certain tax liabilities as described in the Settlement Agreement. As of December 31, 2017, the Company expensed approximately $0.4 million of accrued payroll and benefits related to future payments required to be made to Mr. Maguire in accordance with the Settlement Agreement. All obligations to Mr. Maguire were paid as of December 31, 2018. Additionally, Mr. Maguire's unvested stock options vested on October 31, 2018, upon the terms and conditions specified in the Settlement Agreement, and Mr. Maguire will have until June 10, 2020 to exercise the vested options.

## 7. Fair Value Measurements

ASC Topic 820, *Fair Value Measurement,* defines fair value as the price that would be received to sell an asset or be paid to transfer a liability in an orderly transaction between market participants at the measurement date. The Company applies the following fair value hierarchy, which prioritizes the inputs used to measure fair value into three levels and bases the categorization within the hierarchy upon the lowest level of input that is available and significant to the fair value measurement. Level 1 inputs are quoted prices in active markets for identical assets or liabilities that the reporting entity has the ability to access at the measurement date. Level 2 utilizes quoted market prices in markets that are not active, broker or dealer quotations, or alternative pricing sources with reasonable levels of price transparency. Level 3 inputs are unobservable inputs for the asset or liability in which there is little, if any, market activity for the asset or liability at the measurement date.

The carrying amount of certain of the Company's financial instruments approximate fair value due to their short maturities.

There were no financial instruments classified as Level 3 in the fair value hierarchy during the years ended December 31, 2018 and 2017.

## 8. Income Taxes

Deferred tax assets and liabilities are determined based on temporary differences resulting from the different treatment of items for tax and financial reporting purposes. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to reverse. Additionally, the Company must assess the likelihood that deferred tax assets will be recovered as deductions from future taxable income. The Company has provided a full valuation allowance on the Company's deferred tax assets because the Company believes it is more likely than not that its deferred tax assets will not be realized. The Company evaluates the recoverability of its deferred tax assets on a quarterly basis. Currently, there is no provision for income taxes as the Company has incurred losses to date.

The components of loss before income taxes are as follows:

| | Year ended December 31, | |
|---|---|---|
| | 2018 | 2017 |
| Domestic (U.S.) | $ (3,824,673) | $ (5,889,926) |
| Foreign (U.K.) | (3,379,268) | 2,398,830 |
| Foreign (Germany) | (96,517) | (104,036) |
| Loss before income taxes | $ (7,300,458) | $ (3,595,132) |

The reconciliation of income tax benefit at the U.S. corporation tax rate, being the rate applicable to the country of domicile of the Company to net income tax benefit is as follows:

| | Year ended December 31, | |
|---|---|---|
| | 2018 | 2017 |
| Federal | $ (1,533,096) | $ (1,222,345) |
| State | (238,952) | (303,315) |
| Increase in tax losses not recognized | 1,695,482 | (359,833) |
| Permanent differences, net | 40,015 | 162,543 |
| Foreign rate differential | 124,294 | (383,601) |
| Share-based payments, net | 20,441 | (22,087) |
| Changes per enacted tax reform | – | 2,320,059 |
| Enhanced research and development tax credits | (108,184) | (191,421) |
| Net provision (benefit) for income taxes | $ – | $ – |

Deferred tax assets and liabilities reflect the net tax effect of temporary differences between the carrying amount of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes. Significant components of the Company's deferred tax assets are as follows:

| | Year ended December 31, | |
|---|---|---|
| | 2018 | 2017 |
| Deferred tax assets: | | |
| U.K. net operating loss carryforwards | $ 8,039,343 | $ 7,641,719 |
| U.K. capital loss carryforwards | 1,298,303 | 1,378,643 |
| U.S. federal net operating loss carryforwards | 3,184,691 | 2,606,017 |
| IPR&D | 6,108,078 | 6,776,473 |
| Share-based payments | 1,859,357 | 1,527,615 |
| Enhanced research and development tax credits | 1,109,026 | 1,060,200 |
| Germany net operating loss carryforwards | 524,093 | 516,401 |
| U.S. state net operating loss carryforwards | 1,298,745 | 1,057,856 |
| Accrued expenses | 59,979 | 198,067 |
| Depreciation | 3,283 | 1,948 |
| Other | – | – |
| Total deferred tax assets before valuation allowance | 23,484,898 | 22,764,939 |
| Valuation allowance for deferred tax assets | (23,484,898) | (22,764,939) |
| Deferred tax liabilities: | | |
| Indefinite-lived intangible asset | (2,918,518) | (2,918,518) |
| Debt discount | – | – |
| Total deferred tax liabilities | (2,918,518) | (2,918,518) |
| Net deferred liability | $ (2,918,518) | $ (2,918,518) |

For the years ended December 31, 2018 and 2017, the Company had U.K. net operating loss carryforwards of approximately $47.3 million and $45.0 million, respectively, U.S. federal net operating loss carryforwards of approximately $16.5 million and $13.5 million, respectively, U.S. state net operating loss carryforwards of approximately $16.2 million and $13.3 million, respectively, and Germany net operating loss carryforwards of approximately $1.7 million and $1.6 million, respectively. The U.K. and Germany net operating loss carryforwards can be carried forward indefinitely. $3.0 million of the U.S. federal net operating loss carryforwards can be carried forward indefinitely and the remaining U.S. federal and state net operating loss carryforwards begin to expire in 2032.

The Company's ability to use its operating loss carryforwards and tax credits generated in the U.S. to offset future taxable income is subject to restrictions under Section 382 of the U.S. Internal Revenue Code (the "Code"). These restrictions may limit the future use of the operating loss carryforwards and tax credits if certain ownership changes described in the Code occur. Future changes in stock ownership may occur that would create further limitations on the Company's use of the operating loss carryforwards and tax credits. In such a situation, the Company may be required to pay income taxes, even though significant operating loss carryforwards and tax credits exist.

The Company's ability to use its operating loss carryforwards and tax credits generated in the U.K. are subject to restrictions under U.K. tax legislation. These regulations may limit the future use of operating loss carryforwards if there is a change in ownership and a change in the nature or conduct of the business carried on by the Company, and in certain circumstances where there is a change in the nature or conduct of the business only. In such cases the carryforwards would cease to be available to set against future income.

On December 22, 2017, the U.S. enacted new tax reform ("Tax Cuts and Jobs Act"). The Tax Cuts and Jobs Act contains provisions with separate effective dates but is generally effective for taxable years beginning after December 31, 2017. Beginning with the year ending December 31, 2018, the corporate statutory rates on U.S. earnings were reduced from 34% to 21%. The impact of the rate reduction for the year ending December 31, 2017, was approximately $2.3 million relating to the revaluation of the net deferred tax assets. Other than the reduction in statutory rate, the Company does not anticipate the regulations will have a material impact on income taxes in future years. The Tax Cuts and Jobs Act also contains a provision requiring companies to repatriate all aggregate post 1986 earnings and profits of foreign corporations. The Company estimated that the repatriation will be zero under a provisional basis under SAB118. The final calculations under tax reform resulted in no change to the amounts estimated.

The Company's ability to use its operating loss carryforwards and tax credits generated in Germany are also subject to restrictions under German tax legislation. These regulations may limit the future use of operating loss carryforwards if there is a change in ownership. In such cases the carryforwards would cease to be available to set against future income.

As of December 31, 2018 and 2017, the Company did not record any uncertain tax positions.

The Company files income tax returns in the U.S. federal tax jurisdiction and Massachusetts state tax jurisdiction, and certain foreign tax jurisdictions. The Company is subject to examination by the U.S. federal, state, foreign, and local income tax authorities for calendar tax years ending 2013 through 2018 due to available net operating loss carryforwards and research and development tax credits arising in those years. The Company has not been notified of any examinations by the Internal Revenue Service or any other tax authorities as of December 31, 2018. The Company has not recorded any interest or penalties for unrecognized tax benefits since its inception.

***Potential 382 Limitation***

The Company's net operating loss and tax credit carryforwards are subject to review and possible adjustment by the Internal Revenue Service. The Company's ability to utilize its net operating loss ("NOL") and research and development credit ("R&D") carryforwards may be substantially limited due to ownership changes that may have occurred or that could occur in the future, as required by Section 382 of the Code, as well as similar state provisions. These ownership changes may limit the amount of NOL and R&D credit carryforwards that can be utilized annually to offset future taxable income and tax, respectively. In general, an ownership change, as defined in Section 382 of the Code, results from a transaction or series of transactions over a three-year period resulting in an ownership change of more than 50% of the outstanding stock of a company by certain stockholders or public groups.

The Company has not completed a study to assess whether one or more ownership changes have occurred since it became a loss corporation as defined in Section 382 of the Code, but the Company believes that it is likely that an ownership change has occurred. If the Company has experienced an ownership change, utilization of the NOL and R&D credit carryforwards would be subject to an annual limitation, which is determined by first multiplying the value of the Company's common stock at the time of the ownership change by the applicable long-term, tax-exempt rate, and then could be subject to additional adjustments, as required. Any such limitation may result in the expiration of a portion of the NOL or R&D credit carryforwards before utilization. Until a study is completed, and any limitation known, no amounts are being considered as an uncertain tax position or disclosed as an unrecognized tax benefit. Any carryforwards that expire prior to utilization as a result of such limitations will be removed from deferred tax assets with a corresponding adjustment to the valuation allowance. Due to the existence of the valuation allowance, it is not expected that any potential limitation will have a material impact on the Company's operating results.

From time to time the Company may be assessed interest or penalties by major tax jurisdictions, namely the Commonwealth of Massachusetts. As of December 31, 2018, the Company had no material unrecognized tax benefits and no adjustments to liabilities or operations were required. No interest and penalties have been recognized by the Company to date.

The Company's net operating loss carryforwards are subject to review and possible adjustment by the Internal Revenue Service and are subject to certain limitations in the event of cumulative changes in the ownership interest of significant stockholders over a three-year period in excess of 50%.

**9. Stockholders' Equity**

***Common Stock***

Each share of common stock entitles the holder to one vote on all matters submitted to a vote of the Company's stockholders. Common stockholders are entitled to dividends when and if declared by the Board of Directors. In the event of any voluntary or involuntary liquidation, dissolution or winding-up of the Company, the holders of common stock are entitled to share ratably in the assets of the Company available for distribution.

In March 2017, the Company issued approximately 0.1 million shares of the Company's common stock to Pharmsynthez in connection with the conversion by Pharmsynthez of its $500,000, 10% convertible promissory note as a result of the Company's underwritten public offering in November 2016 and Pharmsynthez subsequently exercising its rights to the shares. The shares issued to Pharmsynthez represent both owed principal and accrued interest.

The holders of Series B Preferred Stock converted approximately 0.3 million shares and 0.2 million shares into the same number of shares of common stock during the years ended December 31, 2018 and December 31, 2017, respectively.

During the year ended December 31, 2018, 0.4 million warrants were exercised resulting in the issuance of 0.4 million shares of common stock. There were no exercises of warrants during the year ended December 31, 2017.

***Series A Preferred Stock***

The Company has designated 1,000,000 shares as Series A preferred stock with each share having a par value of $0.001 and stated value of $4.80 (the "Series A Preferred Stock"). The following is a summary of the material terms of the Series A Preferred Stock.

*Liquidation*. Upon any dissolution, liquidation or winding up, whether voluntary or involuntary, holders of Series A Preferred Stock will be entitled to receive distributions out of the Company's assets, of an amount equal to $4.80 per share of Series A Preferred Stock (as adjusted for stock splits, combinations, reorganizations and the like) plus any accrued and unpaid dividends thereon before any distributions shall be made on the common stock or any series of preferred stock ranked junior to the Series A Preferred Stock.

*Dividends*. Holders of the Series A Preferred Stock are entitled to receive a non-cumulative, annual cash dividend of $0.24 per share of Series A Preferred Stock, when and if declared by the Company's Board, out of the Company's assets legally available therefor. No dividends or other distribution will be made on the common stock or any series of preferred stock ranked junior to the Series A Preferred Stock unless the dividend on the Series A Preferred Stock has been paid current and a reserve has been made for the next calendar year. The Company's ability to pay dividends on Series A Preferred Stock is subject to restrictions in the Company's Series B Preferred Stock, which ranks senior to the Series A Preferred Stock in right of payment.

*Conversion*. Each share of Series A Preferred Stock is convertible, at any time and from time to time at the option of the holder thereof, with a minimum of 61 days' advance notice to the Company, into one share of common stock.

*Stock Dividends and Stock Splits*. If Xenetic pays a stock dividend or otherwise makes a distribution payable in shares of common stock on shares of common stock or any other common stock equivalents, subdivides or combines outstanding common stock, or reclassifies common stock, the conversion rate will be adjusted to match the conversion rate immediately before such event.

*Fundamental Transaction*. If Xenetic effects a reorganization, undergoes a change in control event, or enters into any plan or arrangement contemplating the Company's dissolution, then upon any subsequent conversion of Series A Preferred Stock, the holder thereof shall have the right to receive, for each share of common stock that would have been issuable upon such conversion immediately prior to the occurrence of such transaction, the number of shares of the successor's or acquiring corporation's common stock or of the Company's common stock, if Xenetic is the surviving corporation, and any additional consideration receivable as a result of such transaction by a holder of the number of shares of common stock into which Series A Preferred Stock is convertible immediately prior to such transaction. A change in control event means a sale of all or substantially all of the Company's assets or an acquisition of the Company by another entity by means of any transaction or series of related transactions (including, without limitation, a reorganization, consolidated or merger) that results in the transfer of fifty percent (50%) or more of the outstanding voting power of the Company.

*Voting Rights*. Except as otherwise provided in the Series A Preferred Stock amended and restated certificate of designation or required by law, the Series A Preferred Stock has no voting rights. The holders of Series A Preferred Stock have voting rights as to proposals that specifically affect their shares by law, in which they will vote separately and the vote necessary to approve such proposals will be as set by law.

*Fractional Shares*. No fractional shares of common stock will be issued upon conversion of Series A Preferred Stock. Rather, the Company will round up to the next whole share.

*Redemption*. Upon 30 days prior written notice, the Company may require the holder of any Series A Preferred Stock to convert any or all of such holder's Series A Preferred Stock to common stock at a rate of one share of Series A Preferred Stock to one share of common stock.

As of December 31, 2018 and 2017, there were approximately 1.0 million shares of Series A Preferred Stock issued and outstanding which are convertible into the same number of shares of common stock.

***Series B Preferred Stock***

The Company has designated 2,500,000 shares as Series B preferred stock with each share having a stated value of $4.00 per share (the "Series B Preferred Stock").

The following is a summary of the material terms of the Company's Series B Preferred Stock.

*Liquidation*. Upon any dissolution, liquidation or winding up, whether voluntary or involuntary, holders of Series B Preferred Stock will be entitled to receive distributions out of the Company's assets, of an amount equal to $4.00 per share of Series B Preferred Stock (as adjusted for stock splits, combinations, reorganizations and the like) plus any accrued and unpaid dividends thereon and any other fees or liquidated damages then due and owing thereon under the amended and restated certificate of designation before any distributions shall be made on the common stock or any series of preferred stock ranked junior to the Series B Preferred Stock, which includes Series A Preferred Stock. A fundamental transaction or change of control under the amended and restated certificate of designation shall constitute a liquidation for purposes of this right. Xenetic will give each holder of Series B Preferred Stock written notice of any liquidation at least 30 days before any meeting of stockholders to approve such liquidation or at least 45 days before the date of such liquidation if no meeting is to be held.

*Dividends*. Subject to any preferential rights of any outstanding series of preferred stock created by the Company's Board from time to time, the holders of shares of the Company's Series B Preferred Stock will be entitled to such cash dividends, non-cumulative, as may be declared from time to time by the Company's Board on shares of the Company's common stock (on an as-converted basis) from funds available therefore. The Company shall not directly or indirectly pay or declare any dividend or make any distribution upon, nor shall any distribution be made in respect of, any junior securities, including Series A Preferred Stock, as long as any dividends due on the Series B Preferred Stock remain unpaid, nor shall any monies be set aside for or applied to the purchase or redemption of any junior securities or shares pari passu with the Series B Preferred Stock.

*Conversion*. Each share of Series B Preferred Stock is convertible, at any time and from time to time at the option of the holder thereof, into one share of common stock, subject to the adjustments described below.

*Stock Dividends and Stock Splits*. If Xenetic pays a stock dividend or otherwise makes a distribution payable in shares of common stock on shares of common stock or any other common stock equivalents, subdivides or combines outstanding common stock, or reclassifies common stock, the conversion rate will be adjusted to match the conversion rate immediately before such event.

*Fundamental Transaction*. If Xenetic effects a reorganization, undergoes a change in control event, or enters into any plan or arrangement contemplating the Company's dissolution, then upon any subsequent conversion of Series B Preferred Stock, the holder thereof shall have the right to receive, for each share of common stock that would have been issuable upon such conversion immediately prior to the occurrence of such transaction, the number of shares of the successor's or acquiring corporation's common stock or of the Company's common stock, if Xenetic is the surviving corporation, and any additional consideration receivable as a result of such transaction by a holder of the number of shares of common stock into which Series B Preferred Stock is convertible immediately prior to such transaction. A change in control event means a sale of all or substantially all of the Company's assets or an acquisition of the Company by another entity by means of any transaction or series of related transactions (including, without limitation, a reorganization, consolidated or merger) that results in the transfer of thirty-three percent (33%) or more of the outstanding voting power of the Company, with the exception of acquisition of additional voting capital stock by Pharmsynthez or its affiliates.

*Subsequent Equity Sales.* The Series B Preferred Stock has full ratchet price based anti-dilution protection, subject to customary carve outs, in the event of a down-round financing at a price per share below the stated value of the Series B Preferred Stock. There is no bifurcation of the embedded conversion option being clearly and closely related to the host instrument. Subsequent to year end, the Company entered into a down-round financing event resulting in an adjustment to the conversion ratio. See Note 14 Subsequent Events for further details.

*Voting Rights*. Except as otherwise provided in the Series B Preferred Stock second amended and restated certificate of designation or required by law, the Series B Preferred Stock has no voting rights. However, as long as any Series B Preferred Stock remains outstanding, the amended and restated certificate of designation provides that the Company shall not, without the affirmative vote of all then-outstanding Series B Preferred Stock, (a) alter or change adversely the powers, preferences or rights given to the Series B Preferred Stock or alter or amend the certificate of designation, (b) authorize or create any class of stock ranking as to dividends, redemption or distribution of assets upon a liquidation senior to, or otherwise pari passu with, the Series B Preferred Stock, (c) amend its certificate of incorporation or other charter documents in any manner that adversely affects any rights of the holders of Series B Preferred Stock, (d) increase the number of authorized shares of Series B Preferred Stock, or (e) enter into any agreement with respect to any of the foregoing. The holders of Series B Preferred Stock have voting rights as to proposals that specifically affect their shares by law, in which they will vote separately and the vote necessary to approve such proposals will be as set by law.

*Fractional Shares*. No fractional shares of common stock will be issued upon conversion of Series B Preferred Stock. Rather, the Company will, at its election, round up to the next whole share or pay a cash adjustment.

As of December 31, 2018 and 2017, there were approximately 1.8 million and approximately 2.1 million shares of Series B Preferred Stock issued and outstanding which are convertible into the same number of shares of common stock. The holders of Series B Preferred Stock converted approximately 0.3 million shares and 0.2 million shares into the same number of shares of common stock during the years ended December 31, 2018 and December 31, 2017, respectively.

***Warrants Related to Collaboration and Consulting Agreements***

In connection with certain of the Company's collaboration agreements and consulting arrangements, the Company has issued warrants to purchase shares of common stock as payment for services. As of December 31, 2018 and December 31, 2017, warrants to purchase 539,202 and 646,249 shares of common stock were outstanding, respectively. The fair value of these warrants was determined at each issuance date using the Black-Scholes option pricing model. The warrants are subject to re-measurement at each reporting period until the measurement date is reached. Expense is recognized on a straight-line basis over the expected service period or at the date of issuance, if there is not a service period. For the years ended December 31, 2018 and 2017, the Company recognized expense of approximately $10,000 and a gain of approximately $0.1 million, respectively, related to collaboration and consulting warrants.

On December 31, 2014, SynBio was granted a warrant to purchase 204,394 new shares of common stock at an exercise price of $25.41 per share ("SynBio 2014 Warrant"). The SynBio 2014 Warrant is exercisable in four equal tranches, each with separate non-market, performance-based vesting criteria. The Company uses its judgment to assess the probability and timing of SynBio achieving these vesting criteria and estimated that it is not probable that the vesting criteria for any tranche will be achieved. None of the vesting criteria were met and, therefore, these warrants were forfeited. As a result, the Company did not recognize expense related to this warrant during the years ended December 31, 2018 and 2017.

In connection with the SynBio 2014 Warrant grant, warrants to purchase 9,697 aggregate new shares of common stock were issued to SynBio and Pharmsynthez non-director designees ("SynBio Partner Warrants") on December 31, 2014 under the same terms and conditions of the SynBio 2014 Warrant. The vesting criteria for any tranche were not met and, as a result, the Company did not recognize expense related to the SynBio Partner Warrants during the years ended December 31, 2018 and 2017.

On December 31, 2014, the Company granted Serum Institute a warrant to purchase 96,970 new shares of common stock at an exercise price of $7.92 per share, as adjusted ("Serum Institute 2014 Warrant"). The Serum Institute 2014 Warrant is exercisable in two equal tranches, each with separate non-market, performance-based vesting criteria. The Company uses its judgment to assess the probability and timing of Serum Institute achieving these vesting criteria and estimated that it is probable that the vesting criteria will be achieved for each tranche. These judgments are reassessed at each reporting period until the measurement date is reached.

In connection with the Serum Institute 2014 Warrant grant, warrants to purchase 4,852 aggregate new shares of common stock were issued to Serum Institute non-director designees ("Serum Institute Partner Warrants") on December 31, 2014 under the same terms and conditions of the Serum Institute 2014 Warrant.

In 2016, the Company issued 212,122 warrants to purchase shares of common stock to Serum Institute with an exercise price of $7.92. The new warrants were fully vested and expensed at the time of grant.

The Company recognized warrant expense (income) of approximately $10,000 and $(0.1) million during the years ended December 31, 2018 and 2017, respectively, related to the Serum Institute 2014 Warrant and Serum Institute Partner Warrants. No collaboration or consulting service warrants were exercised or granted during the years ended December 31, 2018 and 2017. These warrants have an average weighted exercise price of $10.41 and expiration dates ranging from December 2019 through May 2021.

***Warrants Related to Financing Arrangements***

As of December 31, 2018 and 2017 there were outstanding warrants related to financing agreements to purchase an aggregate of 3,152,225 shares and 3,522,225 shares of Common Stock at an average weighted exercise price of $4.33 and $4.30, respectively. During the year ended December 31, 2018, warrants to purchase 370,000 shares of common stock were exercised resulting in approximately $1.5 million of net proceeds to the Company. There were no warrants exercised during the year ended December 31, 2017. No warrants related to financing agreements were granted during the years ended December 31, 2018 and 2017. These warrants have expiration dates ranging from July 1, 2020 through November 2021.

**10. Share-Based Expense**

Total share-based expense related to stock options, RSUs, common stock awards, and non-financing warrants was approximately $1.4 million and $1.8 million for the years ended December 31, 2018 and 2017, respectively. (See Note 9, *Stockholders' Equity* for a discussion of the non-financing warrants.)

Share-based expense is classified in the consolidated statements of comprehensive loss as follows:

| | Year Ended December 31, | |
|---|---|---|
| | **2018** | **2017** |
| Research and development expenses | $ 203,030 | $ 101,401 |
| General and administrative expenses | 1,228,757 | 1,691,692 |
| | $ 1,431,787 | $ 1,793,093 |

***Stock Option Modifications***

During the year ended December 31, 2017 the Company modified certain former employee stock option awards to extend the expiry dates through March 31, 2018. As a result of the modification, the Company recognized approximately $4,000 in incremental compensation expense during the year ended December 31, 2017, which was charged to general and administrative expense in the consolidated statements of comprehensive loss.

In November 2017, the Company accelerated the vesting and extended the exercise period post termination for certain employees, including the Company's former Chief Executive Officer. These modifications resulted in a change in incremental value and catch up of share-based amortization of approximately $0.2 million, which was charged to general and administrative expense.

***Stock Options***

The Company grants stock option awards and RSUs to employees and non-employees with varying vesting terms under the Xenetic Biosciences, Inc. Amended and Restated Equity Incentive Plan ("Stock Plan"). The Company measures the fair value of stock option awards using the Black-Scholes option pricing model, which uses the assumptions noted in the tables below, including the risk-free interest rate, expected term, share price volatility, dividend yield and forfeiture rate. The risk-free interest rate is based upon the U.S. Treasury yield curve in effect at the time of grant, with a term that approximates the expected life of the option. For employee stock options issued in 2018 and 2017 that qualify as "plain vanilla" stock options, the expected term is based on the simplified method. The Company has a limited history of stock option exercises, which does not provide a reasonable basis for the Company to estimate the expected term of employee stock options. For all other employee stock options, the Company estimates the expected life using judgment based on the anticipated research and development milestones of the Company's clinical projects and behavior of the Company's employees. The expected life of non-employee options is the contractual life of the option. The Company determines the expected volatility based on a blended volatility rate of its own historical volatility with that of comparable publicly traded companies with drug candidates in similar therapeutic areas and stages of nonclinical and clinical development to the Company's drug candidates. The Company has applied an expected dividend yield of 0% as the Company has not historically declared a dividend and does not anticipate declaring a dividend during the expected life of the options. Effective January 1, 2017, the Company adopted ASU 2016-09 and elected to account for forfeitures as they occur.

***Employee Stock Options***

During the years ended December 31, 2018 and 2017, 100,000 and 700,000 total stock options to purchase shares of common stock were granted by the Company, respectively. The weighted average grant date fair value per option share was $2.63 and $2.70, respectively. No stock options were exercised during the years ended December 31, 2018 and 2017.

During the years ended December 31, 2018 and 2017, 524,540 and 340,930 total stock options vested, with total fair values of approximately $1.6 million and $1.9 million, respectively. As of December 31, 2018, there was approximately $1.0 million of unrecognized share-based payments related to employee stock options that are expected to vest. The Company expects to recognize this expense over a weighted-average period of approximately 1.3 years.

Key assumptions used in the Black-Scholes option pricing model for options granted to employees during the years ending December 31, 2018 and 2017 are as follows:

| | Year Ended December 31, | |
|---|---|---|
| | **2018** | **2017** |
| Weighted-average expected dividend yield (%) | – | – |
| Weighted-average expected volatility (%) | 118.03 | 111.37 |
| Weighted-average risk-free interest rate (%) | 2.90 | 1.79 |
| Weighted-average expected life of option (years) | 5.90 | 5.36 |
| Weighted-average exercise price ($) | 3.05 | 3.34 |

The following is a summary of employee stock option activity for the years ended December 31, 2018 and 2017:

| | **Number of shares** | **Weighted-average exercise price** | **Weighted-average remaining life (years)** | **Aggregate intrinsic value** |
|---|---|---|---|---|
| Outstanding as of January 1, 2017 | 1,193,712 | $ 4.43 | 8.94 | $ 526,073 |
| Granted | 700,000 | 3.34 | | |
| Expired | (113,343) | 4.61 | | |
| Outstanding as of December 31, 2017 | 1,780,369 | 3.99 | 8.53 | $ 5,273 |
| Granted | 100,000 | 3.05 | | |
| Expired | (110,929) | 5.73 | | |
| Outstanding as of December 31, 2018 | 1,769,440 | $ 3.83 | 8.17 | $ – |
| | | | | |
| Vested or expected to vest as of December 31, 2018 | 1,744,440 | $ 3.85 | 8.16 | $ – |
| | | | | |
| Exercisable as of December 31, 2017 | 731,895 | $ 4.84 | 7.44 | $ 5,273 |
| Exercisable as of December 31, 2018 | 1,152,173 | $ 4.11 | 7.92 | $ – |

A summary of the status of the Company's non-vested employee stock option shares as of December 31, 2018, and the changes during the year ended December 31, 2018, is as follows:

| | **Number of shares** | **Weighted-average grant date fair value** |
|---|---|---|
| Balance as of January 1, 2018 | 1,048,474 | $ 2.86 |
| Granted | 100,000 | $ 2.63 |
| Forfeited | (6,667) | $ 2.91 |
| Vested | (524,540) | $ 3.05 |
| Balance as of December 31, 2018 | 617,267 | $ 2.65 |

***Restricted Stock Units***

For the year ended December 31, 2017, the Company granted 50,000 RSUs. There were no RSU grants for the year ended December 31, 2018. The RSUs vest annually over a 3-year period and had a grant date fair value of $2.11. During the year ended December 31, 2018, 16,667 RSUs were vested and none expired.

***Non-Employee Stock Options***

Share-based expense related to stock options granted to non-employees is recognized as the services are rendered on a straight-line basis. The Company determined that the fair value of the stock options is more reliably measurable than the fair value of the services received. Compensation expense related to stock options granted to non-employees is subject to re-measurement at each reporting period until the options vest.

During the year ended December 31, 2018, 10,000 total stock options to purchase shares of common stock were granted by the Company to non-employees. No options were granted to non-employees and none were exercised during the year ended December 31, 2017.

During the year ended December 31, 2018 and 2017, 10,000 and 10,101 total stock options vested, with total fair values of approximately $36,000 and $0.1 million, respectively. As of December 31, 2018, all non-employees stock options had vested. For the years ended December 31, 2018 and 2017, the Company recognized approximately $36,000 and $0.1 million, respectively, of compensation expense related to non-employee options.

The following is a summary of non-employee stock option activity for the years ended December 31, 2018 and 2017:

| | Number of shares | Weighted-average exercise price | Weighted-average remaining life (years) | Aggregate intrinsic value |
|---|---|---|---|---|
| Outstanding as of January 1, 2017 | 57,442 | $ 7.57 | 7.23 | $ – |
| Expired | (723) | 10.34 | | |
| Outstanding as of December 31, 2017 | 56,719 | 7.53 | 6.31 | $ – |
| Granted | 10,000 | 1.93 | | |
| Expired | (3,148) | 18.25 | | |
| Outstanding as of December 31, 2018 | 63,571 | $ 6.12 | 5.40 | $ – |
| | | | | |
| Vested or expected to vest as of December 31, 2018 | 63,571 | $ 6.12 | 5.40 | $ – |
| | | | | |
| Exercisable as of December 31, 2017 | 56,719 | $ 7.53 | 6.31 | $ – |
| Exercisable as of December 31, 2018 | 63,571 | $ 6.12 | 5.40 | $ – |

A summary of the status of the Company's non-vested non-employee stock option shares as of December 31, 2018, and the changes during the year ended December 31, 2018 is as follows:

| | Number of shares | Weighted-average grant date fair value |
|---|---|---|
| Balance as of January 1, 2018 | – | $ – |
| Granted | 10,000 | $ 1.73 |
| Vested | (10,000) | $ 1.73 |
| Balance as of December 31, 2018 | – | $ – |

***Common Stock Awards***

The Company granted common stock awards to non-employees in exchange for services provided. The Company measures the fair value of these awards using the fair value of the services provided or the fair value of the awards granted, whichever is more reliably measurable. The fair value measurement date of these awards is generally the date the performance of services is complete. The fair value of the awards is recognized as services are rendered on a straight-line basis. A summary of the Company's common stock awards granted and issued during the years ended December 31, 2018 and 2017 are as follows:

| | Number of shares |
|---|---|
| Balance as of January 1, 2017 | 29,790 |
| Granted | 41,800 |
| Issued | (8,773) |
| Balance as of December 31, 2017 | 62,817 |
| Granted | 26,000 |
| Issued | – |
| Balance as of December 31, 2018 | 88,817 |

The Company granted 26,000 and 41,800 shares of common stock during the years ended December 31, 2018 and 2017, respectively, in exchange for professional services. As all services were rendered in each respective period, expense related to common stock awards of approximately $0.1 million and $0.1 million was recognized during the years ended December 31, 2018 and 2017, respectively. The balance of the common stock awards has not been issued as of December 31, 2018.

***Joint Share Ownership Plan***

As of December 31, 2018 and 2017, there were approximately 0.3 million JSOP awards issued and outstanding to two former senior executives, respectively. Under the JSOP, shares in the Company are jointly purchased at fair market value by the participating executives and the trustees of the JSOP trust, with such shares held in the JSOP trust. For U.S. GAAP purposes the awards were valued as employee options and recorded as a reduction in equity as treasury shares until they are exercised by the employee. The JSOP awards are fully vested and have no expiration date. There were no compensation charges during the years ended December 31, 2018 and 2017, respectively.

**11. Employee Benefit Plans**

The Company has a defined contribution 401(k) savings plan (the "401(k) Plan"). The 401(k) Plan covers substantially all U.S. employees, and allows participants to defer a portion of their annual compensation on a pre-tax basis or make post-tax contributions. Company contributions to the 401(k) Plan may be made at the discretion of the Board of Directors. There were no company contributions to the 401(k) Plan during the year ended December 31, 2018. The Company made contributions of approximately $51,000 to the 401(k) Plan for the year ended December 31, 2017.

In the U.K., the Company has adopted a defined contribution plan (the "UK Plan") which qualifies under the rules established by HM Revenue & Customs. The UK Plan generally allows all U.K. employees to contribute a minimum of 3% of salary with no maximum limit. The Company contributes to the plan between 8% and 12% of the employee's salary, depending upon seniority of the employee. The Company, at its discretion, may also contribute to an employee's personal pension plan. There were no contributions for the years ended December 31, 2018 and December 31, 2017, respectively.

**12. Commitments and Contingent Liabilities**

***Leases***

In August 2013, the Company entered into the Lexington Lease to lease office and laboratory space under an operating lease with a commencement date of January 1, 2014 and a termination date of January 31, 2019. With the execution of this lease, the Company is required to maintain a $66,000 letter of credit as a security deposit. The letter of credit is secured by a certificate of deposit, which is classified as restricted cash within the consolidated balance sheets. The letter of credit is required to be maintained through May 1, 2019.

In December 2016, the Company entered into a one-year lease of office space in Miami, Florida, under an operating lease with a commencement date of December 1, 2016, and a termination date of November 30, 2017. The Company renewed this lease in November 2017 for an additional two years with a revised termination date of November 30, 2019.

The Company's contractual commitments under all non-cancelable operating leases as of December 31, 2018, are as follows:

| As of December 31, | Total Operating Leases |
|---|---|
| 2019 | $ 24,583 |
| 2020 | – |
| Total minimum lease payments | $ 24,583 |

Rent expense is calculated on a straight-line basis over the term of the leases. Rent expense under the Company's operating leases was approximately $0.1 million for the years ended December 31, 2018 and 2017, respectively.

Subsequent to year end, the Lexington Lease expired and the Company relocated its corporate headquarters to Framingham, Massachusetts. The new lease commenced in January 2019 and has a termination date of September 30, 2020. The total contractual commitment of approximately $50,000 associated with the new lease is not reflected in the table above.

***Litigation***

On August 27, 2015, Eurogentec S.A. ("EGT"), a former supplier of the Company, brought an action against the Company in the Commercial Court of the Canton of Zurich Switzerland (the "Court") alleging nonpayment of invoices for services provided by EGT. The Company requested dismissal of the claim based on the argument that EGT knew, or should have known, that the services provided by EGT should not have been performed or had not been properly performed. On July 12, 2017, the Court rendered a decision in favor of EGT ordering the Company to pay approximately $0.7 million to EGT, representing all amounts that EGT alleged were owed by the Company, plus interest and court and legal fees. The Company had previously recorded $0.6 million related to this contract when the relevant services were provided and accrued an additional $0.1 million related to interest and fees in 2017 as a result of the ruling. In December 2017, the Company entered into a Settlement Agreement and paid approximately $0.6 million to settle all claims associated with this matter.

**13. Related Party Transactions**

The Company has entered into various research, development, license and supply agreements with Takeda, SynBio, Serum Institute and Pharmsynthez, each a related party whose relationship, ownership, and nature of transactions is disclosed within other sections of these footnotes.

During the year ended December 31, 2017, the Company received research and consulting services from a director of Pharmsynthez, a controlling stockholder of the Company. The total amount of services received was approximately $0.1 million for the year ended December 31, 2017. This consulting agreement was terminated in July 2017.

Please refer to Note 3, *Significant Strategic Drug Development Collaborations – Related Parties* and Note 9, *Stockholder's Equity*, for details on arrangements with collaboration partners that are also related parties.

**14. Subsequent Events**

The Company performed a review of events subsequent to the balance sheet date through the date the financial statements were issued and determined that there were no such events requiring recognition or disclosure in the financial statements except as described below.

***XCART Transaction***

On March 1, 2019 (the "Signing Date"), the Company entered into the Share Purchase Agreement with Hesperix, the owners of Hesperix (each, a "Seller" and collectively, the "Sellers"), and Alexey Andreevich Vinogradov, as the representative of each Seller (the "Sellers' Representative"), pursuant to which the Company will purchase from Sellers all of the issued and outstanding shares of capital stock (the "Shares") of Hesperix.

Under the terms of the Share Purchase Agreement, the Company will issue to Sellers an aggregate of Four Million Eight Hundred Seventy-Five Thousand (4,875,000) shares of the Company's common stock (the "Transaction Shares"), regardless of the trading price per share of the Company's common stock at the time of the closing. In addition, the Share Purchase Agreement contains customary representations and warranties relating to each Seller and about the condition of the Company and Hesperix. The Company expects to issue the Transaction Shares pursuant to a registration statement on Form S-4.

The closing of the Transaction is subject to customary closing conditions as well as conditions regarding (i) the Company having adequate financing to fund its future working capital obligations following the closing and (ii) the Company obtaining necessary and appropriate stockholder approvals, evidencing among other matters, approval of the Share Purchase Agreement and the transactions contemplated thereunder, including the issuance of the Transaction Shares. Subject to the satisfaction of the closing conditions, the Transaction is expected to close in the first half of 2019. The Company is currently evaluating the accounting impacts associated with the transaction.

On the Signing Date and in connection with the Transaction, Hesperix entered into an assignment agreement (the "Hesperix Assignment Agreement") with the IBCH, Pharmsynthez, and certain other parties thereto (collectively, the "Assignors"), pursuant to which, the Assignors have agreed, among other things, to sell, assign, transfer, and convey unto Hesperix all of their individual right, title, and interest throughout the world in and to patents related to "Articles And Methods Directed To Personalized Therapy Of Cancer," and the related know-how. Hesperix has agreed to pay each of IBCH and Pharmsynthez a royalty rate in the low single digit range based on the net sales of products in each country in which, in absence of the Hesperix Assignment Agreement, the manufacture, use, offer for sale, sale, or importation of such product would infringe a valid claim of a patent.

Also on the Signing Date, the Company entered into an assignment agreement (the "OPKO Assignment Agreement") with OPKO Pharmaceuticals, LLC ("OPKO"), pursuant to which the Company will acquire and accept, all of OPKO's right, title and interest in and to that certain Intellectual Property License Agreement (the "IP License Agreement"), entered into between the Institute and OPKO regarding certain patents related to "Articles And Methods Directed To Personalized Therapy Of Cancer" and which the Institute agreed to grant an exclusive royalty-bearing license, to the patent rights owned by the Institute to OPKO and OPKO has agreed to pay the Institute a royalty rate in the low single digit range based on the net sales of products in each country in which, in absence of the IP License Agreement, the manufacture, use, offer for sale, sale, or importation of such product would infringe a valid claim of a patent or pending application.

Under the terms of the OPKO Assignment Agreement and the IP License Agreement, the Company will issue One Million Nine Hundred Sixty-Eight Thousand Seven Hundred Fifty (1,968,750) shares of the Company's common stock to OPKO and Six Hundred Fifty-Six Thousand Two Hundred Fifty (656,250) shares of the Company's common stock to the Institute regardless of the trading price per share of the Company's common stock at the time of the closing. In addition, the OPKO Assignment Agreement contains customary representations and warranties relating to OPKO and the IP License Agreement.

***Financing***

On March 5, 2019, the Company entered into a Securities Purchase Agreement (the "Purchase Agreement") with certain purchasers who are parties to the Purchase Agreement (the "Purchasers"), pursuant to which the Company offered to the Purchasers, in a registered direct offering, an aggregate of (i) 1,040,000 shares (the "Shares") of common stock, par value $0.001 per share ("Common Stock") and (ii) pre-funded warrants to purchase 509,000 shares of Common Stock (the "Pre-Funded Warrants"). The Pre-Funded Warrants will be exercisable beginning on March 7, 2019 at an exercise price of $0.001 per share. The Shares were sold at a price of $2.00 per share and the Pre-Funded Warrants were sold at a price of $1.999 per Pre-Funded Warrant, which represents the per share purchase price for the Shares less the $0.001 per share exercise price for each such Pre-Funded Warrant. Aggregate gross proceeds to the Company were approximately $3.1 million, before deducting fees to the placement agent and other estimated offering expenses payable by the Company. The Shares and Pre-Funded Warrants were offered by the Company pursuant to an effective shelf registration statement on Form S-3, which the Company originally filed with the Securities and Exchange Commission on September 27, 2018, and was declared effective on October 12, 2018 (File No. 333-227572).

In a concurrent private placement, the Company also sold to the Purchasers a warrant to purchase one share of the Company's Common Stock for each Share and Pre-Funded Warrant purchased in the offering, representing warrants to purchase up to 1,549,000 shares of the Company's Common Stock (the "Purchase Warrants"). The Purchase Warrants will be exercisable beginning on September 8, 2019 (the "Initial Exercise Date") at an exercise price of $2.25 per share and expire on the seven year anniversary of the Initial Exercise Date.

**APPENDIX A**

**SHARE PURCHASE AGREEMENT**

between

**XENETIC BIOSCIENCES, INC.,**

**HESPERIX SA,**

**SELLERS SET FORTH ON THE SIGNATURE PAGE HERETO.**

and

**ALEXEY ANDREEVICH VINOGRADOV, AS REPRESENTATIVE OF SELLERS**

dated as of

March 1, 2019

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**SHARE PURCHASE AGREEMENT**

This SHARE PURCHASE AGREEMENT (this "**Agreement**"), dated as of March 1, 2019, is entered into between Xenetic Biosciences, Inc., a Nevada corporation ("**Buyer**"), Hesperix SA, a Swiss corporation (the "**Company**"), those owners of the Company set forth on the signature page hereto (each, a "**Seller**" and collectively, the "**Sellers**"), and Alexey Andreevich Vinogradov, as the representative of each Seller as more fully described herein (the "**Sellers' Representative**"). Buyer, the Company, Sellers, and the Sellers' Representative are sometimes referred to herein collectively as the "**Parties**" and each individually as a "**Party**." Capitalized terms used herein but not otherwise defined, shall have the meaning set forth in **Article I**.

**RECITALS**

WHEREAS, Sellers own all of the issued and outstanding shares of capital stock (the "**Shares**") of the Company;

WHEREAS, Sellers wish to sell to Buyer, and Buyer wishes to purchase from Sellers the Shares, subject to the terms and conditions set forth herein;

WHEREAS, as a condition and an inducement to Buyer's willingness to enter into this Agreement certain stockholders of the Company have entered into that certain Voting Agreement with Buyer, of even date herewith, pursuant to which, among other things, each such stockholder and/or its affiliate has agreed to vote such stockholder's and/or its affiliate's respective ownership in Buyer in favor of the transactions contemplated hereby at the Buyer's Stockholders' Meeting (as defined herein) (the "**Voting Agreement**");

WHEREAS, simultaneously with this transaction, Opko Pharmaceuticals, LLC ("Opko") and Buyer are entering into that certain Assignment Agreement on the date hereof (the "**Opko Assignment Agreement**") to assign that certain Intellectual Property License Agreement by and among Scripps and Opko (the "**Opko Scripps License Agreement**"); and

WHEREAS, the acquisition of the Shares by Buyer in exchange for the Transaction Shares (as defined herein) will be a taxable transaction for United States federal tax purposes;

NOW, THEREFORE, in consideration of the mutual covenants and agreements hereinafter set forth and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto agree as follows:

**ARTICLE I**
**Definitions**

The following terms have the meanings specified or referred to in this **Article I**:

"**Acquisition Proposal**" has the meaning set forth in **Section 6.03(a)**.

"**Action**" means any claim, action, cause of action, demand, lawsuit, arbitration, audit, notice of violation, proceeding, litigation, citation, summons, subpoena or investigation of any nature, civil, criminal, administrative, regulatory or otherwise, whether at law or in equity.

"**Affiliate**" of a Person means any other Person that directly or indirectly, through one or more intermediaries, controls, is controlled by, or is under common control with, such Person. The term "control" (including the terms "controlled by" and "under common control with") means the possession, directly or indirectly, of the power to direct or cause the direction of the management and policies of a Person, whether through the ownership of voting securities, by contract or otherwise.

"**Agreement**" has the meaning set forth in the preamble.

**"Approval"** means any approval, authorization, clearance, consent, qualification or registration, or any waiver of any of the foregoing, required to be obtained from, or any notice, statement or other communication required to be filed with or delivered to, any Governmental Authority or any other Person.

"**Assignment and Royalty Agreement"** means that certain Assignment Agreement entered into between the Sellers and the Company prior to or simultaneously with the execution hereof to assign the Company Intellectual Property from such Sellers to the Company in the form attached hereto as Exhibit A to this Agreement, and document the payment of certain running royalties by the Company relating solely to the Company Intellectual Property acquired hereunder.

"**Audited Financial Statements**" has the meaning set forth in **Section 4.05**.

"**Authorized Action**" has the meaning set forth in **Section 2.07(d)**.

"**Balance Sheet**" has the meaning set forth in **Section 4.05**.

"**Balance Sheet Date**" has the meaning set forth in **Section 4.05**.

"**Basket**" has the meaning set forth in **Section 9.04(a)**.

"**Books and Records**" means all books and records of the Company and its Subsidiaries, including files, manuals, price lists, customer lists, sales and promotional materials, documents evidencing intangible rights or obligations, accounting records and litigation files (regardless of the media in which stored).

"**Business Day**" means any day except Saturday, Sunday or any other day on which commercial banks located in New York, New York are authorized or required by Law to be closed for business.

"**Buyer**" has the meaning set forth in the preamble.

"**Buyer Board**" has the meaning set forth in **Section 6.13(a)**.

"**Buyer Common Stock**" means the common stock of Buyer.

"**Buyer Financing**" has the meaning set forth in **Section 8.02(g)**.

"**Buyer Indemnitees**" has the meaning set forth in **Section 9.02**.

"**Call Notice**" has the meaning set forth in **Section 9.07**.

"**Call Option**" has the meaning set forth in **Section 9.07**.

"**Cap**" has the meaning set forth in **Section 9.04(a)**.

"**Certificate of Domestication**" has the meaning set forth in **Section 6.13(d)**.

"**Change of Control Payment**" or "**Change of Control Payments**" means any severance payment or any other payment, or increase in the amount of compensation (including, without limitation, the acceleration of the time of any payment, funding or vesting) due to any current or former manager, officer, employee, independent contractor or consultant of the Company or any Subsidiary in connection with any of the transactions contemplated by this Agreement or the execution of this Agreement.

"**Closing**" has the meaning set forth in **Section 2.04**.

"**Closing Date**" has the meaning set forth in **Section 2.04**.

"**Closing Price**" means the volume weighted average closing trading price of the Buyer Common Stock, as reported by the Nasdaq, for the ten (10) consecutive trading days ending on the trading day immediately prior to the date of final resolution of any indemnification claim against Sellers hereunder.

"**Code**" means the United States Internal Revenue Code of 1986, as amended.

"**Collateral Source**" has the meaning set forth in **Section 9.07**.

"**Company**" has the meaning set forth in the preamble.

"**Company Indebtedness**" means, with respect to the Company and its Subsidiaries, (a) the principal, accreted value, accrued and unpaid interest, prepayment and redemption premiums and penalties (if any), unpaid fees and expenses and other monetary obligations in respect of (i) all outstanding indebtedness of the Company and/or its Subsidiaries for borrowed money, (ii) all outstanding indebtedness evidenced by notes, debentures, bonds or other similar instruments issued the Company and/or its Subsidiaries or the payment of which the Company and/or its Subsidiaries are responsible or liable, and (iii) all outstanding indebtedness of the Company and/or its Subsidiaries secured by any Encumbrance on any property owned by the Company and/or its Subsidiaries; (b) all outstanding obligations of the Company and/or its Subsidiaries for the deferred purchase price of property or services, including any earn out obligation, all conditional sale obligations of the Company and/or its Subsidiaries and all obligations of the Company and/or its Subsidiaries under any title retention agreement (but excluding current (i.e. not past due) trade accounts payable); (c) all outstanding obligations of the Company and/or its Subsidiaries under any financing lease or any lease required to be capitalized in accordance with IFRS; (d) all outstanding obligations of the Company and/or its Subsidiaries for the reimbursement of any obligor on any letter of credit, banker's acceptance, surety bond or similar transaction (but only to the extent such letter of credit, banker's acceptance, surety bond or similar transaction has actually been drawn); (e) all outstanding obligations of the Company and/or its Subsidiaries under interest rate or currency swap or other hedging transactions or agreements (valued at the termination value thereof); (f) all outstanding obligations of the Company and/or its Subsidiaries under customer credits or advances or with respect to deferred revenue;

(g) all bonuses and other like compensation (including any employer-paid portion of any employment or payroll Taxes related thereto) owed to any employee under existing compensation plans or other arrangements of the Company and/or its Subsidiaries attributable to any period prior to the Closing Date, (h) all outstanding obligations of the Company with respect to employee vacation for the pre-Closing period, (i) all severance or bonus plans or arrangements, Change of Control Payments, or similar arrangements payable as a result of the consummation of the transactions contemplated hereby, (j) all amounts owed on the Company's and/or its Subsidiaries' corporate credit accounts that are "due in full" charges (i.e. are not payable over time) and that are not past due; (k) all obligations of the type referred to in clauses (a) through (j) of any third Person of which the Company and/or its Subsidiaries are responsible or liable, directly or indirectly, as obligor, guarantor, surety or otherwise; and (l) all obligations of the type referred to in clauses (a) through (k) of any third Person secured by (or for which the holder of such obligations has an existing right, contingent or otherwise, to be secured by) any Encumbrance on any property or asset of the Company and/or its Subsidiaries (whether or not such obligation is assumed by the Company and/or its Subsidiaries). Notwithstanding the foregoing, any amounts outstanding under that certain Loan Contract, effective as of November 21, 2018, between Dmitry Genkin and the Company shall not constitute Company Indebtedness and the amount actually advanced thereunder in an amount not to exceed $150,000 shall be discharged by Buyer at the Closing.

"**Company Intellectual Property**" means the Company Patents and the Company Know-How.

"**Company Know-How**" means the names of the vendors that are contemplated by the Company to carry out the development of the inventions claimed in the Patents.

"**Company Patents**" means the patent applications listed in Schedule 1 and all of the rights appurtenant thereto including all foreign counterparts thereof and all priority applications thereof.

"**Company Transaction Expenses**" means the fees and expenses incurred as of or prior to the Closing Date by any inventors or scientists who developed the Company Intellectual Property or on behalf of Sellers or the Company or its Subsidiaries payable to any party relating to or arising out of the negotiation, execution or delivery of this Agreement or the consummation of the transactions contemplated hereby, including, without limitation, assignments of Company Intellectual Property to the Company and related agreements pursuant to which the Company acquired the underlying Company Intellectual Property, travel, legal, accounting, success bonuses, investment banking and other professional fees (it being understood that all such fees and expenses shall be the obligation of and payable by the Sellers prior to or at Closing).

"**Contracts**" means all contracts, leases, deeds, mortgages, licenses, instruments, notes, commitments, undertakings, indentures, joint ventures and all other agreements, commitments and legally binding arrangements, whether written or oral.

"**Definitive Proxy Statement**" has the meaning set forth in **Section 6.13(a)**.

"**Direct Claim**" has the meaning set forth in **Section 9.05(b)**.

"**Disclosure Schedules**" means the Disclosure Schedules delivered by Sellers and Buyer concurrently with the execution and delivery of this Agreement.

"**Dollars or $**" means the lawful currency of the United States.

"**Domestication**" means the domestication of Buyer as a corporation pursuant to Section 388 of the Delaware General Corporation Law, as amended, and under the Laws of Nevada, whereby Buyer shall continue its existence in the State of Delaware.

"**Encumbrance**" means any charge, claim, community property interest, pledge, condition, equitable interest, lien (statutory or other), option, security interest, mortgage, easement, encroachment, right of way, right of first refusal, or restriction of any kind, including any restriction on use, voting, transfer, receipt of income or exercise of any other attribute of ownership.

"**Exchange Act**" means the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder.

"**Fairness Opinion**" means the opinion from the Buyer's investment banking firm or other valuation expert delivered to the Buyer Board supporting the valuation of the Purchase Price and any other consideration payable hereunder.

**"FDA"** means the United States Food and Drug Administration, or any successor entity thereto.

"**Financial Statements**" has the meaning set forth in **Section 4.05**.

"**Fundamental Representations**" has the meaning set forth in **Section 9.01**.

"**GAAP**" means generally accepted accounting principles of the United States of America consistently applied, as in effect from time to time.

"**Governmental Authority**" means any federal, state, local or foreign government or political subdivision thereof, or any agency or instrumentality of such government or political subdivision, or any self-regulated organization or other non-governmental regulatory authority or quasi-governmental authority (to the extent that the rules, regulations or orders of such organization or authority have the force of Law), or any arbitrator, court or tribunal of competent jurisdiction.

"**Governmental Order**" means any order, writ, judgment, injunction, decree, stipulation, determination or award entered by or with any Governmental Authority.

"**IBCH**" means the Shemyakin-Ovchinnikov Institute of Bioorganic Chemistry, Russian Academy of Sciences.

"**IFRS**" means Internal Financial Reporting Standards consistently applied, as in effect from time to time.

"**Indemnification Exclusions**" has the meaning set forth in **Section 9.04(c)**.

"**Indemnified Party**" has the meaning set forth in **Section 9.05**.

"**Indemnifying Party**" has the meaning set forth in **Section 9.05**.

"**Independent Accountant**" means RSM LLP.

"**Intellectual Property Licenses**" has the meaning set forth in **Section 4.09(f)**.

"**Interim Balance Sheet**" has the meaning set forth in **Section 4.05**.

"**Interim Balance Sheet Date**" has the meaning set forth in **Section 4.05**.

"**Interim Financial Statements**" has the meaning set forth in **Section 4.05**.

"**Knowledge**" means the actual knowledge of such person or any director, managing member, manager, or officer of such person, if applicable, or the knowledge that such Person would have reasonably obtained in the due exercise of care in the performance of their duties to such person without having made any search or investigation.

"**Law**" means any statute, law, ordinance, regulation, rule, code, order, constitution, treaty, common law, judgment, decree, other requirement or rule of law of any Governmental Authority.

"**Liabilities**" has the meaning set forth in **Section 4.06**.

"**Licensed Intellectual Property**" has the meaning set forth in **Section 1.01(a)**.

"**Lock-Up Agreement**" means that certain Lock-Up Agreement to be executed by each Seller or other Affiliate recipient of the Transaction Shares, as the case may be, in favor of Buyer in the form attached hereto as Exhibit B (which shall restrict such recipient's sale or transfer of any Transaction Shares ultimately received by such recipient as provided therein and as otherwise required by Law).

"**Losses**" means losses, damages, liabilities, deficiencies, Actions, judgments, interest, awards, penalties, fines, costs or expenses of whatever kind, including reasonable attorneys' fees and the cost of enforcing any right to indemnification hereunder and the cost of pursuing any insurance providers.

"**Material Adverse Effect**" means any event, occurrence, fact, condition or change that is, or could reasonably be expected to become, individually or in the aggregate, materially adverse to (a) the business, results of operations, condition (financial or otherwise) or assets of the Company and/or any of its Subsidiaries, or (b) the ability of Sellers to consummate the transactions contemplated hereby on a timely basis; *provided, however,* that "Material Adverse Effect" shall not include any event, occurrence, fact, condition or change, directly or indirectly, arising out of or attributable to: (i) general economic or political conditions; (ii) conditions generally affecting the industries in which the Company and/or any of its Subsidiaries operates; (iii) any changes in financial or securities markets in general; (iv) act of war (whether or not declared), armed hostilities or terrorism, or the escalation or worsening thereof; or (v) any changes in applicable Laws or accounting rules, including without limitation IFRS; *provided further, however,* that any event, occurrence, fact, condition or change referred to in clauses (i) through (v) immediately above shall be taken into account in determining whether a Material Adverse Effect has occurred or could reasonably be expected to occur to the extent that such event, occurrence, fact, condition or change has a disproportionate effect on the Company and/or any of its Subsidiaries compared to other participants in the industries in which the Company and/or any of its Subsidiaries conduct their respective businesses.

"**Material Contracts**" has the meaning set forth in **Section 4.08(a)**.

"**Nasdaq**" means the Nasdaq Stock Market.

"**New Buyer Bylaws**" has the meaning set forth in **Section 6.13(d)**.

"**New Buyer Charter**" has the meaning set forth in **Section 6.13(d)**.

"**Non-Fundamental Survival Period**" has the meaning set forth in **Section 9.01**.

"**NRS**" has the meaning set forth in **Section 5.02**.

"**Organizational Documents**" means (a) in the case of a Person that is a corporation, its articles or certificate of incorporation and its by-laws, regulations or similar governing instruments required by the laws of its jurisdiction of formation or organization; (b) in the case of a Person that is a partnership, its articles or certificate of partnership, formation or association, and its partnership agreement (in each case, limited, limited liability, general or otherwise); (c) in the case of a Person that is a limited liability company, its articles or certificate of formation or organization, and its limited liability company agreement or operating agreement; and (d) in the case of a Person that is none of a corporation, partnership (limited, limited liability, general or otherwise), limited liability company or natural person, its governing instruments as required or contemplated by the laws of its jurisdiction of organization.

"**Owned Intellectual Property**" has the meaning set forth in **Section 1.01(a)**.

"**Party or Parties**" has the meaning set forth in the preamble.

"**Permits**" means all permits, licenses, franchises, approvals, authorizations, registrations, certificates, variances and similar rights obtained, or required to be obtained, from Governmental Authorities.

"**Person**" means an individual, corporation, partnership, joint venture, limited liability company, Governmental Authority, unincorporated organization, trust, association or other entity.

"**Personal Information**" has the meaning set forth in **Section 4.10(f)**.

"**Post-Closing Tax Period**" means any taxable period beginning after the Closing Date and, with respect to any Straddle Period, the portion of such taxable period beginning after the Closing Date.

"**Post-Closing Taxes**" means Taxes of the Company and its Subsidiaries for any Post-Closing Tax Period.

"**Pre-Closing Tax Period**" means any taxable period of the Company and its Subsidiaries ending on or before the Closing Date and, with respect to any Straddle Period, the portion of such taxable period ending on or before the Closing Date.

"**Pre-Closing Taxes**" means Taxes of the Company and its Subsidiaries for any Pre-Closing Tax Period.

"**Preliminary Proxy Statement**" has the meaning set forth in **Section 6.13(a)**.

"**Processing Agreement**" has the meaning set forth in **Section 4.10(f)**.

"**Proxy Statement**" has the meaning set forth in **Section 6.13(a)**.

"**Pro Rata Share**" means a Seller's ownership interest in the Company as set forth opposite such Seller's name on Schedule I.

"**Purchase Price**" has the meaning set forth in **Section 2.02**.

"**Regulatory Authorities**" means the FDA or any other applicable Governmental Authority responsible for the oversight and approval of the research, development, manufacturing, distribution, or commercialization of drug, biologic, or medical device products.

"**Representative**" means, with respect to any Person, any and all directors, managers, officers, employees, consultants, financial advisors, counsel, accountants and other agents of such Person.

"**Restricted Business**" means the invention, development, use or commercialization of a process or product covered by any claim as filed of the Company Patents. Buyer acknowledges that Restricted Business does not include basic research directed toward increasing knowledge in science or a fuller knowledge or understanding of the subject under study.

"**Restricted Period**" has the meaning set forth in **Section 6.07(a)**.

"**Scripps**" means The Scripps Research Institute, a California public benefit corporation.

"**SEC**" means the Securities and Exchange Commission.

"**SEC Reports**" means, collectively, all reports, schedules, forms, statements and other documents required to be filed by Buyer under the Securities Act and the Exchange Act, including the exhibits thereto and documents incorporated by reference therein.

"**Securities Act**" means the Securities Act of 1933, as amended.

"**Seller**" has the meaning set forth in the preamble.

"**Seller Indemnitees**" has the meaning set forth in **Section 9.03**.

"**Sellers' Representative**" has the meaning set forth in the preamble.

"**Shares**" has the meaning set forth in the recitals.

"**Sponsored Research Agreement**" means that certain Sponsored Research Agreement to be executed by Buyer and IBCH at Closing to fund certain other CAR T Technology research at IBCH following the Closing as identified therein (other than the Company Intellectual Property being acquired hereunder), subject to the terms and conditions set forth therein as agreed to by the parties hereto.

"**Software**" means any and all computer software and code, whether in source code, object code, or executable code format, including systems software, application software (including mobile apps), firmware, middleware, programming tools, scripts, routines, interfaces, libraries, and databases.

"**Stockholder Approval**" has the meaning set forth in **Section 6.13(a)**.

"**Stockholders' Meeting**" has the meaning set forth in **Section 6.13(a)**.

"**Straddle Period**" has the meaning set forth in **Section 7.04**.

"**Subsidiary**" of any Person means (i) a corporation of which such Person owns or controls such number of the voting securities which is sufficient to elect at least a majority of its Board of Directors or (ii) a partnership or limited liability company of which such Person (either alone or through or together with any other Subsidiary) is a partner or member.

"**Tax**" or "**Taxes**" means any and all taxes (whether federal, state, local or foreign), including, without limitation, income, gross receipts, profits, sales, use, occupation, value added, transfer, franchise, withholding, payroll, employment, excise, real property, personal property, environmental (including taxes under Section 59A of the Code), customs duties, license, severance, stamp, premium, windfall profits, capital stock, social security (or similar), unemployment, disability, alternative or add-on minimum and estimated taxes, together with any interest, penalties or additions to tax imposed with respect thereto.

"**Tax Claim**" has the meaning set forth in **Section 7.05**.

"**Tax Return**" means any return, declaration, report, claim for refund, information return or statement or other document relating to Taxes, including any schedule or attachment thereto, and including any amendment thereof.

"**Territory**" means worldwide.

"**Third Party Claim**" has the meaning set forth in **Section 9.05(a)**.

"**Transaction Documents**" means this Agreement, the Lock-Up Agreement, the Sponsored Research Agreement, and any other agreements or documents to be executed hereunder.

"**Transaction Filings**" has the meaning set forth in **Section 6.14**.

"**Transaction Shares**" has the meaning set forth in **Section 2.02**.

"**Voting Agreement**" has the meaning set forth in the recitals.

"**Xenetic Stockholder**" mean any holder of Buyer Common Stock.

**ARTICLE II**
**Purchase and sale; purchase price; Sellers' representative; closing; tax treatment**

**Section 2.01 Purchase and Sale**. Subject to the terms and conditions set forth herein, at the Closing, each Seller shall sell to Buyer, free and clear of all Encumbrances, and Buyer shall purchase from each Seller, all of the Shares owned by each such them, free and clear of all Encumbrances, for the consideration specified in **Section 2.02**. The Parties hereto acknowledge and agree that, at or prior to the Closing, the Sellers shall have paid all Company Transaction Expenses and the Company shall be acquired on a cash-free basis with no Company Indebtedness (or all Company Indebtedness discharged or paid for by the Company or the Sellers prior to or at the Closing). For the avoidance of doubt, all amounts outstanding under that certain Loan Contract, effective as of November 21, 2018, between Dmitry Genkin and the Company shall not constitute Company Indebtedness and the amount actually advanced thereunder in an amount not to exceed $150,000 shall be discharged by Buyer at Closing.

**Section 2.02 Purchase Price and Other Consideration**. The aggregate purchase price for the Shares shall be Four Million Eight Hundred Seventy Five Thousand (4,875,000) shares of Buyer Common Stock (the "**Purchase Price,**" and such shares of Buyer Common Stock, the "**Transaction Shares**"), regardless of the trading price per share of the Transaction Shares at the time of Closing.

**Section 2.03 Transactions to be Effected at the Closing**.

(a) At the Closing, Buyer shall deliver to Sellers' Representative:

(i) the Transaction Shares, in the amounts and to the Persons set forth on **Section 2.03(a)(i)** of the Disclosure Schedules;

(ii) all other agreements, documents, instruments or certificates required to be delivered by Buyer at or prior to the Closing pursuant to **Section 8.03** of this Agreement.

(b) At the Closing, Sellers' Representative shall deliver or shall cause to be delivered to Buyer:

(i) certificates representing the Shares (to the extent represented by certificates), duly endorsed in favor of Buyer or accompanied by separate stock powers duly executed by each registered holder of such Shares;

(ii) the Lock-Up Agreement, duly executed by each of the Sellers;

(iii) a Stockholder's Agreement in substantially the form attached hereto as Exhibit C, pursuant to which certain stockholders of the Company have agreed to vote or cause to be voted, or consent or cause to be consented, with respect to the election of directors, whether such matter is brought before any meeting of the stockholders of the Company however called, proposed to be taken by written consent of the stockholders of the Company or otherwise, all of the shares of the Company's common stock owned or held by the stockholders, directly or indirectly, in accordance with the recommendations or directions of the Company's board of directors; and

(iv) all other agreements, documents, instruments or certificates required to be delivered by Seller at or prior to the Closing pursuant to **Section 8.02** of this Agreement.

**Section 2.04 Closing**. Subject to the terms and conditions of this Agreement, the purchase and sale of the Shares contemplated hereby shall take place at a closing (the "**Closing**") to be held at 9:00 a.m., New York time, no later than two (2) Business Days after the last of the conditions to Closing set forth in **Article VIII** have been satisfied or waived (other than conditions which, by their nature, are to be satisfied on the Closing Date), at the offices of Akerman LLP, 98 Southeast 7th Street, Suite 1100, Miami, Florida 33131, or at such other time or on such other date or at such other place as the Company and Buyer may mutually agree upon in writing (the day on which the Closing takes place being the "**Closing Date**").

**Section 2.05 Tax Treatment**. The acquisition of the Shares by the Buyer in exchange for the Transaction Shares will be a taxable transaction for United States federal income tax purposes.

**Section 2.06 Withholding Tax**. Buyer, the Company and its Subsidiaries shall be entitled to deduct and withhold from the Purchase Price all Taxes that Buyer and the Company may be required to deduct and withhold under any provision of Tax Law. All such withheld amounts shall be promptly remitted to the relevant Governmental Authority and, accordingly, shall be treated as delivered to Sellers hereunder and. Buyer shall promptly provide the Sellers' Representative with written notice of its intent to deduct and withhold, and Buyer shall reasonably cooperate with the Sellers' Representative to eliminate or reduce the basis for such deduction or withholding (including by providing the Sellers' Representative with a reasonable opportunity to provide forms or other evidence that would exempt such amounts from withholding). Buyer shall promptly provide the Sellers' Representative with any applicable receipts for payments remitted to a Governmental Authority pursuant to this Section 2.06.

**Section 2.07 Appointment of Sellers' Representative**.

(a) Irrevocable Power of Attorney. Each Seller irrevocably constitutes and appoints Alexey Andreevich Vinogradov as the Sellers' Representative, with full and unqualified power to delegate to one or more Persons the authority granted to such Sellers' Representative hereunder, to act as such Person's true and lawful attorney-in-fact and agent, with full power of substitution, and authorizes the Sellers' Representative acting for such Person and in such Person's name, place and stead, in any and all capacities to do and perform every act and thing required or permitted to be done in connection with the transactions contemplated by this Agreement and the other Transaction Documents, as fully to all intents and purposes as such Person might or could do in person, including, without limitation:

(i) to take any and all action on behalf of such Seller from time to time as Sellers' Representative may deem necessary or desirable to fulfill the interests and purposes of this Agreement and the other Transaction Documents and to engage agents and Representatives to assist in connection therewith;

(ii) to deliver all notices required to be delivered by such Seller or any of them;

(iii) to receive all notices required to be delivered to such Seller or any of them;

(iv) to give such orders and instructions as Sellers' Representative in its sole discretion shall determine with respect to this Agreement and the other Transaction Documents and the transactions contemplated hereby and thereby;

(v) to take all actions necessary to handle and resolve claims by or against Buyer for indemnification by such Seller under this Agreement;

(vi) to retain and to pay legal counsel and other professionals in connection with any and all matters referred to herein or relating hereto or any other Transaction Documents (which counsel or other professionals may, but need not, be counsel or other professionals engaged by the Company);

(vii) to make, acknowledge, verify and file on behalf of any such Seller applications, Approvals to service of process and such other documents, undertakings or reports as may be required by Law as determined by Sellers' Representative in his sole discretion after consultation with counsel; and

(viii) to make, exchange, acknowledge, deliver, amend and terminate all such other contracts, powers of attorney, orders, receipts, notices, requests, instructions, certificates, letters and other writings, and in general to do all things and to take all actions, that Sellers' Representative in his sole discretion may consider necessary or proper in connection with or to carry out the aforesaid, as fully as could such Seller if personally present and acting.

(b) Power of Attorney. Each Seller hereby irrevocably grants unto said attorney-in-fact and agent full power and authority to do and perform each and every act and thing necessary or desirable to be done in connection with the matters described above, as fully to all intents and purposes as the undersigned might or could do in person, hereby ratifying and confirming all that Sellers' Representative may lawfully do or cause to be done by virtue hereof. Each of such Seller further agrees not to take any action inconsistent with the terms of this **Section 2.07** or with the actions (or decisions not to act) of Sellers' Representative hereunder, and in any case shall not take any action or other position under this Agreement without the consent of Sellers' Representative. To the extent of any inconsistency between the actions (or decisions not to act) of Sellers' Representative and of any such Seller hereunder, the actions (or decisions not to act) of Sellers' Representative shall control. EACH SELLER ACKNOWLEDGES THAT IT IS HIS OR ITS EXPRESS INTENTION TO HEREBY GRANT A DURABLE POWER OF ATTORNEY IN FAVOR OF SELLERS' REPRESENTATIVE AND THAT THIS DURABLE POWER OF ATTORNEY IS NOT AFFECTED BY SUBSEQUENT INCAPACITY OF SUCH SELLER. Each Seller further acknowledges and agrees that upon execution of this Agreement, any delivery by Sellers' Representative of any waiver, amendment, agreement, opinion, certificate or other documents executed by Sellers' Representative pursuant to this **Section 2.07,** such Seller shall be bound by such documents as fully as if such Seller had executed and delivered such documents, and any action (or decision not to act) taken or otherwise implemented by Sellers' Representative under this Agreement shall be binding upon all Sellers.

(c) Liability of the Representative. Sellers' Representative shall not be liable to any Seller for any action taken or omitted by him hereunder or under any other document executed or delivered hereunder, or in connection therewith, except that the Sellers' Representative shall not be relieved of any liability imposed by law for gross negligence. Each Seller acknowledges and agrees that Sellers' Representative shall not be obligated to take any actions and shall be entitled to take such actions as Sellers' Representative deems appropriate in such Sellers' Representative's sole discretion, and shall indemnify and hold harmless Sellers' Representative for all Losses incurred by Sellers' Representative in connection with the performance of his duties hereunder or in any way relating to him in his capacity as Sellers' Representative hereunder, except to the extent that such Losses are the direct result of the Sellers' Representative's gross negligence.

(d) Actions of the Representative. Each Seller agrees that Buyer shall be entitled to rely on any action taken by Sellers' Representative, on behalf of the Sellers pursuant to **Section 2.07(a)** above (each, an "**Authorized Action**"), and that each Authorized Action shall be binding on each such Seller as fully as if such Person had taken such Authorized Action. Each Seller acknowledges and agrees that any payment made by Buyer on behalf of such Seller to Sellers' Representative pursuant to this Agreement shall constitute full and complete payment to such Seller and Buyer shall have no further liability therefor. No Seller shall bring any suit, claim or proceeding against Buyer as a result of any actions or inactions of Sellers' Representative.

(e) Death or Disability of the Representative. In the event of the death or permanent disability or resignation of Sellers' Representative, a successor Sellers' Representative shall be appointed by Sellers, with each Seller (or his or its successors or assigns) to be given a vote equal to the number of votes represented by the Shares held by such Seller immediately prior to the Closing.

## ARTICLE III
## Representations and Warranties of Sellers

Except as set forth in the correspondingly numbered Section of the Disclosure Schedules, each Seller, severally but not jointly, and solely with respect to such Seller, represents and warrants to Buyer that the statements contained in this **Article III** are true and correct as of the date hereof.

**Section 3.01 Organization and Authority of Sellers**. Each Seller has all requisite power and authority, and, in the case of any Seller that is an individual, the requisite legal capacity, to execute and deliver this Agreement and each other Transaction Document to which it is a party, and to consummate the transactions contemplated hereby and thereby. The execution, delivery and performance by each Seller of each of the Transaction Documents to which it is a party have been duly authorized by all necessary action on the part of each such Seller. This Agreement and the other Transaction Documents have been duly and validly executed and delivered by each Seller and constitute legal, valid and binding obligations of each Seller, enforceable against such Seller in accordance with their respective terms, subject to applicable bankruptcy, insolvency, reorganization, moratorium and similar Laws affecting creditors' rights and remedies generally and subject, as to enforceability, to general principles of equity (regardless of whether enforcement is sought in a proceeding at Law or in equity).

**Section 3.02 Conflicts; Approvals of Third Parties**. Except as set forth in **Section 3.02** of the Disclosure Schedules, the execution, delivery and performance by each Seller of this Agreement and the other Transaction Documents to which it or he is a party, the consummation of the transactions contemplated hereby or thereby, and compliance by each Seller with the provisions hereof or thereof will not: (a) conflict with, violate, result in the breach or termination of, constitute a default under, result in an acceleration of, constitute a change of control under, or create in any party the right to accelerate, terminate, modify or cancel, any Contract to which such Seller is a party or by which such Seller or its properties, assets or Shares are subject, or require an Approval from any Person in order to avoid any such conflict, violation, breach, termination, default or acceleration; (b) violate any Law or any Governmental Order; or (c) result in the creation of any Encumbrance, subscriptions, options, warrants, calls, proxies, commitments or Contracts of any kind upon any of the Shares. No Approval, Governmental Order, waiver, declaration or filing with, or notification to any Person, including any Governmental Authority, is required on the part of such Seller in connection with the execution, delivery and performance of this Agreement or the other Transaction Documents, or the compliance by such Seller with any of the provisions hereof or thereof.

**Section 3.03 The Shares**.

(a) Each Seller holds of record and owns beneficially all of the Shares set forth opposite such Seller's name in **Section 3.03(a)** of the Disclosure Schedules hereto under the heading "Number of Shares Owned," free and clear of all Encumbrances, subscriptions, commitments and restrictions of any kind. The number of Shares set forth opposite such Sellers's name in **Section 3.03(a)** of the Disclosure Schedules hereto under the heading "Number of Shares Owned" correctly sets forth all of the capital stock of the Company owned of record or beneficially by such Seller, and such Seller (and direct or indirect owner of such Seller if an entity) does not own (or have any rights in or to acquire) any other capital stock of the Company or any other securities convertible into, or exercisable or exchangeable for, capital stock of the Company. Such Seller's Shares were not issued in violation of (i) any Contract to which such Seller is or was a party or beneficiary or by which such Seller or its properties or assets is or was subject or (ii) of any preemptive or similar rights of any Person. The ultimate beneficial ownership of each Seller that is an entity and any direct or indirect entity owner of, or Person which owns any direct or indirect interest in, any such Seller that is an entity is set forth in **Section 3.03(a)** of the Disclosure Schedules.

(b) Except as set forth in **Section 3.03(b)** of the Disclosure Schedules and the Voting Agreement, each Seller (and direct or indirect owner of such Seller if an entity) is not party to (i) any voting agreement, voting trust, proxy, registration rights agreement, stockholder agreement or other Contract with respect to the capital stock of the Company or (ii) any Contract obligating such Seller (or direct or indirect owner) to vote or dispose of any shares of the capital stock of, or other equity or voting interests in, the Company or which has the effect of restricting or limiting the transfer, voting or other rights associated with the Shares.

**Section 3.04 Brokers Fees**. No Seller has any Liability to pay any commissions or similar fees to any investment banker, broker or finder with respect to the transactions contemplated by this Agreement.

## ARTICLE IV
## Representations and Warranties of the Company

Except as set forth in the correspondingly numbered Section of the Disclosure Schedules, the Company and each Seller, severally but not jointly, represent and warrant to Buyer that the statements contained in this **Article IV** are true and correct as of the date hereof.

**Section 4.01 Organization, Authority and Qualification of the Company.** The Company is a corporation duly organized, validly existing and in good standing under the Laws of Switzerland as of the date hereof. The Company has full corporate power and authority to own, operate or lease the properties and assets now owned, operated or leased by it and to carry on its business as it has been and is currently conducted. **Section 4.01** of the Disclosure Schedules sets forth each jurisdiction in which the Company is licensed or qualified to do business, and the Company is duly licensed or qualified to do business and is in good standing in each jurisdiction in which the properties owned or leased by it or the operation of its business as currently conducted makes such licensing or qualification necessary, except where the failure to be so licensed, qualified or in good standing would not have a Material Adverse Effect. All corporate actions taken by the Company in connection with this Agreement and the other Transaction Documents will be duly authorized on or prior to the Closing. This Agreement and the other Transaction Documents have been duly and validly executed and delivered by the Company and constitute legal, valid and binding obligations of the Company, enforceable against the Company in accordance with their respective terms, subject to applicable bankruptcy, insolvency, reorganization, moratorium and similar Laws affecting creditors' rights and remedies generally and subject, as to enforceability, to general principles of equity (regardless of whether enforcement is sought in a proceeding at Law or in equity).

**Section 4.02 Capitalization.**

(a) Sellers are the record owners of and have good and valid title to all of the Shares, free and clear of all Encumbrances and own such Shares in the amounts set forth opposite each Seller's name as set forth on **Section 4.02** of the Disclosure Schedules. The Shares constitute one hundred percent (100%) of the total issued and outstanding shares of capital stock in the Company. The Shares have been duly authorized and are validly issued, fully-paid and non-assessable. Upon consummation of the transactions contemplated by this Agreement, Buyer shall own all of the Shares, free and clear of all Encumbrances.

(b) The Shares were issued in compliance with applicable Laws. The Shares were not issued in violation of the Organizational Documents of the Company or any other agreement, arrangement or commitment to which such Seller or the Company is a party and are not subject to or in violation of any preemptive or similar rights of any Person.

(c) There are no outstanding or authorized options, warrants, convertible securities or other rights, agreements, arrangements or commitments of any character relating to any shares of capital stock in the Company or obligating any Seller or the Company to issue or sell any shares of capital stock (including the Shares), or any other interest, in the Company. Other than the Organizational Documents, there are no voting trusts, proxies or other agreements or understandings in effect with respect to the voting or transfer of any of the Shares.

(d) Each Subsidiary of the Company, if any, is wholly-owned by the Company, and the Company is the record owner of and has good and valid title to the equity interests of its Subsidiaries, free and clear of all Encumbrances. All of the outstanding equity securities of the Company and each of its Subsidiaries are duly authorized, validly issued, fully paid and non-assessable and were not issued in violation of, and are not subject to, any preemptive rights or in violation of any applicable Laws. There are no outstanding options, warrants, calls, demands, stock appreciation rights, Contracts or other rights of any nature to purchase, obtain or acquire, or otherwise relating to, or any outstanding securities or obligations convertible into or exchangeable for, or any voting agreements or any other similar contract, agreement, arrangement, commitment, plan or understanding restricting or otherwise relating to the issuance, sale, purchase, redemption, conversion, exchange, registration, voting, dividend, ownership or transfer rights of any equity securities of the Company or any of its Subsidiaries. There are no outstanding or authorized stock appreciation, phantom equity, profit participation or similar rights with respect to the Company or any of its Subsidiaries.

**Section 4.03 Subsidiaries**. **Section 4.03** of the Disclosure Schedules sets forth a complete list indicating, as of the date of this Agreement, each direct and indirect Subsidiary of the Company, and with respect to each such Subsidiary of the Company: the type of entity of such Subsidiary, and the jurisdictions of organization and foreign qualification of such Subsidiary. Except for the Subsidiaries listed in **Section 4.03** of the Disclosure Schedules, the Company does not have any direct or indirect equity investment (including without limitation, any investment convertible or exchangeable into any equity) or other investment in any Person. Each Subsidiary of the Company is duly organized, validly existing and in good standing (to the extent applicable) under the Laws of its jurisdiction of incorporation or formation. Each Subsidiary of the Company has all requisite power and authority to own, lease and operate its properties and to carry on its business. Each Subsidiary of the Company is duly qualified or licensed to do business and is in good standing (to the extent applicable) as a foreign organization in each jurisdiction in which the conduct of its business or the ownership, leasing, holding or use of its properties makes such qualification necessary.

**Section 4.04 No Conflicts; Approvals**. The execution, delivery and performance by the Company of this Agreement and the other Transaction Documents to which it is a party, and the consummation of the transactions contemplated hereby and thereby, do not and will not: (a) conflict with or result in a violation or breach of, or default under, any provision of the Organizational Documents of the Company, or any Subsidiary of the Company; (b) conflict with or result in a violation or breach of any provision of any Law or Governmental Order applicable to the Company, or any Subsidiary of the Company; (c) except as set forth in **Section 4.04** of the Disclosure Schedules, require the Approval, notice or other action by any Person under, conflict with, result in a violation or breach of, constitute a default or an event that, with or without notice or lapse of time or both, would constitute a default under, result in the acceleration of or create in any party the right to accelerate, terminate, modify or cancel any Contract to which the Company, or any Subsidiary of the Company is a party or by which the Company or any Subsidiary of the Company is bound or to which any of their respective properties and assets are subject (including any Material Contract) or any Permit affecting the properties, assets or business of the Company or any Subsidiary of the Company; or (d) result in the creation or imposition of any Encumbrance on any properties or assets of the Company or any Subsidiary of the Company. No Approval, Permit, Governmental Order, declaration or filing with, or notice to, any Governmental Authority is required by or with respect to any Seller, the Company, or any Subsidiary of the Company in connection with the execution and delivery of this Agreement and the other Transaction Documents and the consummation of the transactions contemplated hereby and thereby.

**Section 4.05 Financial Statements**. Complete copies of the Company's and its Subsidiaries' consolidated audited financial statements consisting of the balance sheet of the Company and its Subsidiaries as at December 31, 2017 and the related statements of income and retained earnings, members' equity and cash flow from the period from September 4, 2017 (inception) through December 31, 2017 (the "**Audited Financial Statements**"), and unaudited financial statements consisting of the balance sheet of the Company and its Subsidiaries as at December 31, 2018 and the related statements of income and retained earnings, members' equity and cash flow for the twelve month period then ended (the "**Interim Financial Statements**" and together with the Audited Financial Statements, the "**Financial Statements**") have been delivered to Buyer. The Financial Statements have been prepared in accordance with IFRS applied on a consistent basis throughout the period involved, subject, in the case of the Interim Financial Statements, to normal and recurring year-end adjustments (the effect of which will not, individually or in the aggregate, be materially adverse) and the absence of notes (that, if presented, would not differ materially from those presented in the Audited Financial Statements). The Financial Statements are based on the Books and Records of the Company and its Subsidiaries, and fairly present, in all material respects, the financial condition of the Company and its Subsidiaries as of the respective dates they were prepared and the results of the operations of the Company for the periods indicated. The balance sheet of the Company and its Subsidiaries as of December 31, 2017 is referred to herein as the "**Balance Sheet**" and the date thereof as the "**Balance Sheet Date**" and the balance sheet of the Company and its Subsidiaries as of December 31, 2018 is referred to herein as the "**Interim Balance Sheet**" and the date thereof as the "**Interim Balance Sheet Date**". The Company maintains a standard system of accounting controls and procedures established and administered in accordance with IFRS.

**Section 4.06 No Activities and No Liabilities**. The Company and its Subsidiaries own no other assets other than the Company Intellectual Property identified on **Section 4.09(b)(i)**. **(i)** of the Disclosure Schedules. Since their respective dates of organization, the Company and its Subsidiaries have (i) not had any operations, (ii) not had any employees, consultants or independent contractors that rendered any services (except for attorneys and accountants in connection with their organizations and any matters with respect to the Company Intellectual Property and in connection with this Agreement and the transactions contemplated hereby) and have not had any pension, benefit, retirement, compensation, employment, consulting, profit-sharing, deferred compensation, incentive, bonus, performance award, phantom equity or other equity, change in control, retention, severance, vacation, paid time off, welfare, fringe-benefit and other similar agreement, plan, policy, program or arrangement in existence, (iii) not owned, leased or subleased any real or personal property, and (iv) not incurred any Company Indebtedness or any liabilities, obligations or commitments of any nature whatsoever, asserted or unasserted, known or unknown, absolute or contingent, accrued or unaccrued, matured or unmatured or otherwise ("**Liabilities**"), except for the Assignment and Royalty Agreement and those which are adequately reflected or reserved against in the Balance Sheet as of the Balance Sheet Date and except as set forth on Section 4.06 of the Disclosure Schedules.

**Section 4.07 Absence of Certain Changes, Events and Conditions**. Since the Balance Sheet Date, and other than as set forth on **Section 4.07** of the Disclosure Schedules, there has not been, with respect to the Company or any of its Subsidiaries, any:

(i) event, occurrence or development that has had, or could reasonably be expected to have, individually or in the aggregate, a Material Adverse Effect;

(ii) amendment of the Organizational Documents of the Company or any of its Subsidiaries;

(iii) split, combination or reclassification of any shares of capital stock in the Company or the equity interests of any Subsidiary of the Company;

(iv) issuance, sale or other disposition of, or creation of any Encumbrance on, any shares of capital stock in the Company or equity interest in any Subsidiary of the Company, or grant of any options, warrants or other rights to purchase or obtain (including upon conversion, exchange or exercise) any shares of capital stock or equity interest in the Company or any of its Subsidiaries;

(v) declaration or payment of any distributions on or in respect of any shares of capital stock in the Company or equity interest in any Subsidiary, or redemption, purchase or acquisition of any of the Company's outstanding shares of capital stock or any equity interest of any Subsidiary of the Company;

(vi) material change in any method of accounting or accounting practice of the Company or any Subsidiary thereof, except as required by IFRS or as disclosed in the notes to the Financial Statements;

(vii) entry into any Contract that would constitute a Material Contract;

(viii) incurrence, assumption or guarantee of any indebtedness for borrowed money;

(ix) transfer, assignment, sale or other disposition of any of the assets shown or reflected in the Balance Sheet;

(x) transfer, assignment or grant of any license or sublicense of any material rights under or with respect to any Company Intellectual Property;

(xi) any capital investment in, or any loan to (or forgiveness of any loan to), any other Person;

(xii) acceleration, termination, material modification to or cancellation of any material Contract (including, but not limited to, any Material Contract) to which the Company or any of its Subsidiaries is a party or by which it is bound;

(xiii) any material capital expenditures;

(xiv) imposition of any material Encumbrance upon any of the Company's (or any Subsidiary of the Company's) material properties or assets, tangible or intangible;

(xv) entry into any transaction with or paying any fees or expenses to any Affiliate or any of their members or current or former managers or officers or any other respective Affiliates;

(xvi) adoption of any plan of merger, consolidation, reorganization, liquidation or dissolution or filing of a petition in bankruptcy under any provisions of federal or state bankruptcy Law or Approval to the filing of any bankruptcy petition against it under any similar Law;

(xvii) purchase, lease or other acquisition of the right to own, use or lease any property or assets;

(xviii) acquisition by merger or consolidation with, or by purchase of a substantial portion of the assets, stock or other equity of, or by any other manner, any business or any Person or any division thereof;

(xix) action by the Company or any of its Subsidiaries to make, change or rescind any Tax election, amend any Tax Return or take any position on any Tax Return, take any action, omit to take any action or enter into any other transaction that would have the effect of materially increasing the Tax liability or reducing any Tax asset of Buyer in respect of any Post-Closing Tax Period; or

(xx) any Contract to do any of the foregoing, or any action or omission that would result in any of the foregoing.

**Section 4.08 Material Contracts.**

(a) **Section 4.08(a)** of the Disclosure Schedules lists each Contract of the Company and/or its Subsidiaries, including, without limitation, the Assignment and Royalty Agreement (such Contracts, together with all Contracts concerning any Intellectual Property listed or otherwise disclosed in **Section 4.08(a)** of the Disclosure Schedules, being "**Material Contracts**"). Other than the Assignment and Royalty Agreement, there are no other royalty or licensing agreements relating to the Company or any Subsidiary of the Company or the Company Intellectual Property or other arrangements or amounts owed to any third parties with respect thereto or under any other similar agreements or arrangements, whether conditioned on the achievement of milestones, passage of time or otherwise.

(b) Each Material Contract is valid and binding on the Company and/or its Subsidiaries, as applicable, in accordance with its terms and is in full force and effect. None of the Company or, to Sellers' Knowledge, any other party thereto is in breach of or default under (or is alleged to be in breach of or default under), or has provided or received any notice of any intention to terminate, any Material Contract. No event or circumstance has occurred that, with notice or lapse of time or both, would constitute an event of default under any Material Contract or result in a termination thereof or would cause or permit the acceleration or other changes of any right or obligation or the loss of any benefit thereunder. Complete and correct copies of each Material Contract (including all modifications, amendments and supplements thereto and waivers thereunder) have been made available to Buyer.

**Section 4.09 Intellectual Property**.

(a) To the Knowledge of the Company and to the Knowledge of the Sellers, the Company owns, free and clear from all Encumbrances the Company Patents ("**Owned Intellectual Property**") other than Scripps ownership rights to the Company Patents (the "**Scripps Rights**") and possesses legally enforceable rights pursuant to a valid and enforceable written license, sublicense, agreement, or permission to use the intellectual property licensed by the Company ("**Licensed Intellectual Property**"); the Company owns or is the valid licensee of all Company Intellectual Property and the Licensed Intellectual Property and each item of the Company Intellectual Property owned by the Company immediately prior to the Closing will be owned or available for use by the Company on identical terms and conditions immediately subsequent to the Closing hereunder; neither the execution, delivery, or performance of this Agreement, nor the consummation of the transactions contemplated hereunder, will result in the loss or impairment of or payment of any additional amounts other than as provided for in the Assignment and Royalty Agreement, and in that certain Opko Scripps License Agreement, with respect to, or require the consent of any other Person in respect of, the Company's right to own or use any Company Intellectual Property or Licensed Intellectual Property.

(b) **Section 4.09(b)(i)** of the Disclosure Schedules sets forth a true, correct, and complete list of all Patents in which the Company has an ownership interest (indicating whether such interest is sole ownership or joint ownership) that is issued by or registered with a Governmental Authority or for which an application for issuance or registration has been filed with a Governmental Authority. **Section 4.09(b)(ii)** of the Disclosure Schedules sets forth a true, correct, and complete list of all Licensed Intellectual Property.

(c) Including (i) the importing of product into the United States, (ii) selling or using in the United States, a product made by a patented process, or (iii) such use of Company Intellectual Property which to the Knowledge of the Company constitutes unfair competition or trade practice under the Laws of any jurisdiction, to the Knowledge of the Company, the use of the Company Intellectual Property and the operation of the Company's business as currently used and conducted, has not and will not infringe upon or misappropriate any valid and enforceable Intellectual Property rights of third parties other than the Scripps Rights and, to Sellers' Knowledge, there are no facts indicating a likelihood of the foregoing other than with respect to the Scripps Rights. The Company has never received any written charge, complaint, claim, demand, or notice alleging any such infringement or misappropriation (including any written claim that the Company must license or refrain from using any Intellectual Property rights of any third party). The Company is not a party to any past, nor is there any pending or, to Sellers' Knowledge, written threat, action, lawsuit, or other judicial, arbitral or administrative proceeding involving any Company Intellectual Property, including, without limitation, involving any claim that Company infringed, misappropriated or violated the Intellectual Property Rights of any third party.

(d) The Company has, and to Sellers' Knowledge, all applicable third parties and licensees have, complied with all applicable Laws relating to the Company Intellectual Property, including without limitation the Company Patents. The Company has taken steps to protect and preserve the confidentiality of all confidential Company Intellectual Property.

(e) To the Company's and Sellers' Knowledge, the Company has complied with and is presently in compliance with all foreign, federal, state, local, governmental (including, but not limited to, the Federal Trade Commission and State Attorneys General), administrative, or regulatory Laws applicable to any Company Intellectual Property, and the Company shall take all steps necessary to ensure such compliance until Closing.

(f) The only licenses, settlement agreements, covenants not to sue or other agreements in which the Company or any Company predecessor has granted any rights or interest in or to, or permitted use of, any material Company Intellectual Property by any third party or affiliate are identified in **Section 4.09(f)** of the Disclosure Schedules (the "**Intellectual Property Licenses**"). The Intellectual Property Licenses are valid, binding, and enforceable between the Company and the other parties thereto and are in full force and effect. To the Company's Knowledge, there is no written notice of material breach of any Intellectual Property License by the Company or, to the Knowledge of Sellers, by any other party thereto.

(g) To the Company's Knowledge, and to the Knowledge of the Sellers, the Owned Intellectual Property and the Licensed Intellectual Property are valid and enforceable and in full force; the Owned Intellectual Property and the Licensed Intellectual Property: (i) are not subject to any opposition, cancellation, interference, reissue, reexamination, derivation, revocation or post-grant proceeding and, to the Knowledge of Sellers, no such proceeding is or has been threatened in writing; (ii) has not expired, lapsed, or become expressly abandoned (iii) are validly applied for; and (iv) are not the subject of any judicial, administrative or arbitral order, award, decree, injunction, lawsuit, proceeding or stipulation, or of any other proceeding or action pending before any Governmental Authority anywhere in the world other than those in the ordinary course of patent prosecution; all required filings and fees related to the Company Intellectual Property applications have been timely submitted with and paid to the relevant Governmental Authorities; the Company has provided Buyer with true and complete copies of all file histories, documents, office actions, official correspondence, assignments, and other instruments relating to Company Intellectual Property; and all maintenance fees and annuities required with respect to such Company Intellectual Property to date have been timely paid in full.

(h) To the Company's Knowledge and to the Knowledge of the Sellers: the Company and all prior and current owners (other than the Scripps Rights) of any Owned Intellectual Property have (A) complied with the duty of candor and disclosure to the United States Patent and Trademark Office and analogous Laws outside the United States with respect to Owned Intellectual Property; (B) not knowingly misrepresented or failed to disclose any fact or circumstance (including, with respect to Company Patents, the name of any inventor of subject matter claimed in any Company Patent) in connection with the prosecution of any Owned Intellectual Property; and (C) not otherwise knowingly engaged in any conduct, or failed to perform any act, the result of which could reasonably be expected to adversely affect the validity, enforceability, or ownership of any Owned Intellectual Property.

(i) To the Company's Knowledge and to the Knowledge of Sellers: (i) no fact or circumstance (other than with respect any facts or circumstances relating to the Scripps Rights) exists that could reasonably be expected to otherwise adversely affect the enforceability or ownership of any Company Intellectual Property.

(j) The Company has not sent any notice to or asserted or threatened any action or claim against any third party involving or relating to the Company Intellectual Property and, to Sellers' Knowledge, at no time has any Person infringed or misappropriated any Company Intellectual Property.

(k) The Company has not made a previous assignment, transfer, or agreement in conflict herewith or constituting a present or future assignment of or encumbrance of any of the Company Intellectual Property.

(l) Sellers acknowledge that they and any of their direct or indirect owners and Affiliates, and the scientists and inventors who assisted in the creation and development of the Company Intellectual Property, (i) retain no ownership interest or right to use the Owned Intellectual Property other than as may be provided under the Bayh-Dole Act or any similar foreign statute, regulation or rule; (ii) grant to the Company a present, irrevocable assignment of any ownership interest such Seller may have in or to such Intellectual Property; and (iii) irrevocably waive any right or interest, including any moral rights, regarding any such Intellectual Property, to the extent permitted by applicable Law other than as may be provided under the Bayh-Dole Act or any similar foreign statute, regulation or rule. All assignments and other instruments necessary to establish, record, and perfect the Company's ownership interest in the Company Intellectual Property have been validly executed, delivered, and filed with the relevant Governmental Authorities and authorized registrars. Except as disclosed in **Section 4.09(l)(ii)** of the Disclosure Schedules, no Company Intellectual Property is co-owned by, exclusively licensed to, or otherwise controlled by any other Person (other than the Scripps Rights), including any Seller or current or former employee, officer, director, consultant, contractor, scientist or inventor or clinical or research partner of or associated with the Company other than as may be provided under the Bayh-Dole Act or any similar foreign statute, regulation or rule. The Company does not owe any compensation or remuneration (other than the general compensation for employment or services) to any Seller or any current or former employee, officer, director, consultant, contractor, scientist or inventor for any Owned Intellectual Property other than under the Assignment Agreement or the Opko Scripps License Agreement.

(m) Except as disclosed on **Schedule 4.09(m)** of the Disclosure Schedules, by executing and performing its obligations under this Agreement, the Company and each Seller are not in violation of any agreement between the Company or any Seller and any third party relating to any of the Company Intellectual Property.

**Section 4.10 Regulatory Compliance**.

(a) The Company has all material Permits and Approvals necessary to conduct its business as presently conducted.

(b) Neither the Company nor any Subsidiary nor, to Sellers' Knowledge, any of their respective owners, officers, directors, employees and agents, have manufactured, produced, distributed or sold regulated products, or have conducted preclinical or human clinical trials. The Company and its Subsidiaries have not failed to disclose a material fact required to be disclosed to any Regulatory Authority.

(c) Neither the Company nor any Subsidiary nor, to Sellers' Knowledge, any owners, officers, directors, employees and agents, have made an untrue statement of material fact in any filing or other written submission to the FDA or any other Regulatory Authority, or to Sellers' Knowledge, in any records or documentation prepared or maintained to comply with applicable Laws. The Company has not failed to disclose a material fact required to be disclosed to any Regulatory Authority.

(d) The Company and its Subsidiaries are not the subject of any pending or, to the Knowledge of Sellers, threatened investigation in respect of the Company or any Subsidiary or any of their respective products by any Regulatory Authority, including without limitation by the FDA pursuant to its "Fraud, Untrue Statements of Material Facts, Bribery, and Illegal Gratuities" Final Policy set forth in 56 Fed. Reg. 46191 (September 10, 1991) and any amendments thereto. Neither the Company nor any Subsidiary nor, to Sellers' Knowledge, any of their owners, officers, directors, employees and agents, have paid or given, offered or promised to pay or give, or authorized or ratified the illegal payment or giving, directly or indirectly, of any monies or anything of value to any national, provincial, municipal or other government official or employee or any political party or candidate for political office or Governmental Authority for the direct or indirect purpose of influencing any act or decision of such Person or of the Governmental Authority to obtain or retain business, or direct business to any person or to secure any other improper benefit or advantage.

(e) Neither the Company nor any Subsidiary nor, to the Knowledge of Sellers, any officer, employee, consultant, contractor, principal investigator, clinical investigator or agent of the Company or any Subsidiary is or has been (i) suspended, excluded, debarred, or convicted of any federal or state crime that would reasonably be expected to result in mandatory or permissive suspension, exclusion, or debarment, under 21 U.S.C. Section 335a or any similar federal, state or foreign legal requirement or (ii) suspended, excluded, debarred, or convicted of any federal or state crime that would reasonably be expected to result in mandatory or permissive suspension, exclusion, or debarment under 42 U.S.C. Section 1320a–7, or suspension or debarment or ineligibility on the United States General Services Administration System for Award Management list (formerly known as the "Excluded Parties List System" or "EPLS"), or in each case any similar federal, state or foreign applicable legal requirement which would prohibit an individual or entity from conducting business with a federal or state agency.

(f) The Company and its Subsidiaries have complied with all applicable Laws governing data protection, privacy, security, and the use, disclosure, processing or storage of personal or individually identifiable information, howsoever defined under such Laws, Contracts or policies ("**Personal Information**"). **Section 4.10(f)** of the Disclosure Schedules sets forth any agreement between the Company or any Subsidiary and any third party with respect to the privacy, security, or processing of Personal Information that is regulated by any Law of any jurisdiction outside the United States, including without limitation any model contracts for the transfer of personal data to third countries adopted by the European Commission (each a "**Processing Agreement**"). The Company and its Subsidiaries are not in material violation of or in material default under any such Processing Agreement. Except as set forth on **Section 4.10(f)** of the Disclosure Schedules, no Approval, permission, or notice is required to be made to or obtained from any third party with respect to any Personal Information owned or used by or on behalf of the Company or any Subsidiary in connection with the execution, delivery, and performance of this Agreement.

**Section 4.11 Legal Proceedings; Governmental Orders.**

(a) Except as set forth in **Section 4.11(a)** of the Disclosure Schedules, there are no Actions pending or, to Sellers' Knowledge, threatened (a) against or by the Company or its Subsidiaries affecting any of its properties or assets, including, without limitation, the ownership or efficacy of the Company Intellectual Property (or by or against Sellers or any Affiliate thereof and relating to the Company or any of its Subsidiaries); or (b) against or by the Company, its Subsidiaries, Sellers or any Affiliate of Sellers that challenges or seeks to prevent, enjoin or otherwise delay the transactions contemplated by this Agreement. To the Knowledge of the Sellers, no event has occurred or circumstances exist that may give rise to, or serve as a basis for, any such Action.

(b) Except as set forth in **Section 4.11(b)** of the Disclosure Schedules, there are no outstanding Governmental Orders and no unsatisfied judgments, penalties or awards against or affecting the Company, its Subsidiaries or any of their respective properties or assets.

(c) Except as set forth in **Section 4.11(c)** of the Disclosure Schedules, none of the Company or any of its Subsidiaries has had any complaints or notices or Actions from or by any Persons, whether to the Company, its Subsidiaries or any Governmental Authority, and there exists no reasonable basis to believe that any Governmental Authority or any other Person would receive any such notice, complaints or Actions as result of any actions, inactions or practices of the Company and/or its Subsidiaries.

**Section 4.12 Compliance With Laws; Permits.**

(a) The Company and each of its Subsidiaries have complied, and are now complying, [in all material respects] with all Laws applicable to it or its business, properties or assets.

(b) All Permits required for the Company and/or its Subsidiaries to conduct its or their business have been obtained and are valid and in full force and effect. All fees and charges with respect to such Permits as of the date hereof have been paid in full. **Section 4.12(b)** of the Disclosure Schedules lists all current Permits issued to the Company or any Subsidiary thereof, including the names of the Permits and their respective dates of issuance and expiration. There is no pending or, to the Sellers' Knowledge, threatened termination, expiration or revocation of any such Permits.

**Section 4.13 Taxes.** Except as set forth in **Section 4.13** of the Disclosure Schedules:

(a) All income Tax Returns and all other material Tax Returns required to be filed by the Company and each Subsidiary thereof have been timely filed. Such Tax Returns are true, complete and correct in all material respects. All Taxes due and owing by the Company or any Subsidiary thereof (whether or not shown on any Tax Return) have been timely paid.

(b) The Company and each Subsidiary thereof has withheld and paid each Tax required to have been withheld and paid in connection with amounts paid or owing to any employee, independent contractor, creditor, customer, member or other party, and complied with all information reporting and backup withholding provisions of applicable Law.

(c) Within the past three years, no claim has been made by any taxing authority in any jurisdiction where the Company or any Subsidiary of the Company does not file Tax Returns that it is, or may be, subject to Tax by that jurisdiction, that has not been finally settled or otherwise resolved.

(d) No extensions or waivers of statutes of limitations have been given or requested with respect to any Taxes of the Company or any Subsidiary thereof that remain in effect.

(e) **Section 4.13(e)** of the Disclosure Schedules sets forth:

(i) the taxable years of the Company and its Subsidiaries as to which the applicable statutes of limitations on the assessment and collection of Taxes have not expired;

(ii) those years for which audits by the taxing authorities have been completed; and

(iii) those taxable years for which audits by taxing authorities are presently being conducted.

(f) All deficiencies asserted, or assessments made, against the Company and any Subsidiary thereof as a result of any examinations by any taxing authority with respect to Taxes or Tax Returns of the Company or its Subsidiaries have been fully paid or otherwise finally resolved.

(g) Neither the Company nor any Subsidiary thereof is currently a party to any Action by any taxing authority. There are no pending, or, to Sellers' Knowledge, threatened, Actions by any taxing authority.

(h) There are no Encumbrances for Taxes (other than for current Taxes not yet due and payable) upon the assets of the Company or any Subsidiary thereof.

(i) Neither the Company nor any Subsidiary of the Company is a party to, or bound by, any Tax indemnity, Tax-sharing or Tax allocation agreement other than ancillary provisions in any customary commercial contracts entered into in the ordinary course of business the primary purpose of which is unrelated to Taxes.

(j) No private letter rulings, technical advice memoranda or similar tax agreement or rulings have been requested, entered into or issued by any taxing authority with respect to the Company or any of its Subsidiaries.

(k) The Company has not been a member of an affiliated, combined, consolidated or unitary Tax group for Tax purposes. The Company has no Liability for Taxes of any Person (other than the Company), as transferee or successor, by contract or otherwise.

(l) The Company is not, nor has it been, a United States real property holding corporation (as defined in Section 897(c)(2) of the Code) during the applicable period specified in Section 897(c)(1)(a) of the Code.

(m) Neither the Company nor any Subsidiary thereof is or has been a party to, or a promoter of, a "reportable transaction" within the meaning of Section 6707A(c)(1) of the Code and Treasury Regulations Section 1.6011-4(b).

(n) **Section 4.13(n)** of the Disclosure Schedules sets forth all foreign jurisdictions in which the Company or any Subsidiary thereof is subject to Tax, is engaged in business or has a permanent establishment.

Notwithstanding anything to the contrary contained in this Agreement (including any other representations and warranties contained in this Agreement), the representations and warranties contained in this Section 4.13 are (i) the sole and exclusive representations and warranties made by the Company relating to Tax matters, including compliance with and liabilities arising under Tax laws and (ii) cannot be relied upon with respect to Taxes or Tax Returns attributable to any Tax periods of the Company (or portions thereof) beginning after, or Tax positions or Tax attributes taken after, the Closing Date.

**Section 4.14 Books and Records**. All of the books and records of the Company and its Subsidiaries have been maintained in the ordinary course of business of the Company and its Subsidiaries and fairly reflect, in all material respects, all transactions of the business of the Company and its Subsidiaries.

**Section 4.15 Brokers**. Except as set forth in **Section 4.15** of the Disclosure Schedules, no broker, finder or investment banker is entitled to any brokerage, finder's or other fee or commission in connection with the transactions contemplated by this Agreement or any other Transaction Document based upon arrangements made by or on behalf of the Company or its Subsidiaries.

**Section 4.16 Related Party Transactions**. Except as described in **Section 4.16** of the Disclosure Schedules, the Company and its Subsidiaries do not have outstanding any Company Indebtedness or other obligations to or from, any Affiliate of the Company, any Subsidiary or any Seller. Except as described in **Section 4.16** of the Disclosure Schedules, neither the Company nor its Subsidiaries nor any Seller nor any Affiliate of the Company or any Subsidiary or any Seller nor, to the Knowledge of the Sellers, any officer, director, manager or employee of any of them (i) has during the last three fiscal years owned any direct or indirect interest of any kind in, or controls or is a director, manager, officer, employee or partner of, or consultant to, or lender to or borrower from or has the right to participate in the profits of, any Person that is (A) a competitor, supplier, distributor, customer, landlord, tenant, creditor or debtor of or inventor for the Company or any Subsidiary, (B) engaged in a business related to the Restricted Business, or (C) a participant in any material transaction to which the Company or any Subsidiary has been a party, or (ii) has been a party to any Contract with the Company or any Subsidiary or engaged in any transaction or business with the Company or any Subsidiary, or (iii) owns any assets reasonably required to affect Buyer's ability to successfully commercialize the Company Intellectual Property.

**Section 4.17 Full Disclosure.**. No representation or warranty by Sellers or the Company in this Agreement and no statement contained in the Disclosure Schedules to this Agreement or any certificate or other document furnished or to be furnished to Buyer pursuant to this Agreement contains any untrue statement of a material fact, or omits to state a material fact necessary to make the statements contained therein, in light of the circumstances in which they are made, not misleading.

**Section 4.18 Independent Investigation.** Each Seller has conducted its own independent investigation, review and analysis of the business, results of operations, prospects, condition (financial or otherwise) or assets of Buyer, and acknowledges that it has been provided adequate access to the personnel, properties, assets, premises, books and records, and other documents and data of Buyer for such purpose. Each Seller acknowledges and agrees that: (a) in making its decision to enter into this Agreement and to consummate the transactions contemplated hereby, each Seller has relied solely upon its own investigation and the express representations and warranties of Buyer set forth in **Article V**; and (b) none of Buyer, or any other Person makes or has made any representation or warranty as to Buyer or this Agreement, except as expressly set forth in**Article V**.

## ARTICLE V
## Representations and Warranties of Buyer

Except as set forth in the SEC Reports, which SEC Reports shall be deemed a part hereof and shall qualify any representation or otherwise made herein to the extent of the disclosure contained in the SEC Reports, or as set forth in the correspondingly numbered Section of the Disclosure Schedules, Buyer represents and warrants to Seller that the statements contained in this **Article V** are true and correct as of the date hereof.

**Section 5.01 Organization and Authority of Buyer.** Buyer is a corporation duly organized, validly existing and in good standing under the Laws of the state of Nevada. Subject to the consents and authorizations that will be required at the Stockholders' Meeting, Buyer has full corporate power and authority to enter into this Agreement and the other Transaction Documents to which Buyer is a party, to carry out its obligations hereunder and thereunder and to consummate the transactions contemplated hereby and thereby. The execution and delivery by Buyer of this Agreement and any other Transaction Document to which Buyer is a party, the performance by Buyer of its obligations hereunder and thereunder and the consummation by Buyer of the transactions contemplated hereby and thereby have been duly authorized by all requisite corporate action on the part of Buyer. This Agreement has been duly executed and delivered by Buyer, and (assuming due authorization, execution and delivery by Seller) this Agreement constitutes a legal, valid and binding obligation of Buyer enforceable against Buyer in accordance with its terms.

**Section 5.02 No Conflicts; Approvals**.

(a) All action on the part of Buyer and its board of directors necessary for (i) the authorization, execution and delivery of this Agreement and (ii) the performance of its obligations hereunder, has been taken or will be taken prior to or upon the Closing, as applicable; provided, however, that Buyer cannot consummate the transactions contemplated hereby unless and until it receives the requisite approval of the Nasdaq and the approval of the Xenetic Stockholders pursuant to Chapter 78 of the Nevada Revised Statutes (as amended) ("**NRS**") and the Buyer's Organizational Documents. This Agreement has been duly executed by Buyer and, assuming the due authorization, execution and delivery by the other parties hereto, constitutes a valid and legally binding obligation of Buyer, except (i) as limited by Laws of general application relating to bankruptcy, insolvency and the relief of debtors and (ii) as limited by rules of Law governing specific performance, injunctive relief or other equitable remedies and by general principles of equity.

(b) The execution, delivery and performance by Buyer of this Agreement and the other Transaction Documents to which it is a party, and the consummation of the transactions contemplated hereby and thereby, do not and will not (a) conflict with or result in a violation or breach of, or default under, any provision of the Organizational Documents of Buyer or (b) conflict with or result in a violation or breach of any provision of any Law or Governmental Order applicable to Buyer. Other than Buyer's filings with the SEC and the approval required by Nasdaq as provided herein, no Approval, Permit, Governmental Order, declaration or filing with, or notice to, any Governmental Authority is required by or with respect to Buyer in connection with the execution and delivery of this Agreement and the other Transaction Documents.

**Section 5.03 Brokers**. Except as described in Section 5.03 of the Disclosure Schedules, no broker, finder or investment banker is entitled to any brokerage, finder's or other fee or commission in connection with the transactions contemplated by this Agreement or any other Transaction Document based upon arrangements made by or on behalf of Buyer.

**Section 5.04 Legal Proceedings**. There are no Actions pending or, to Buyer's knowledge, threatened against or by Buyer or any Affiliate of Buyer that challenge or seek to prevent, enjoin or otherwise delay the transactions contemplated by this Agreement. To Buyer's knowledge, no event has occurred or circumstances exist that may give rise or serve as a basis for any such Action.

**Section 5.05 Issuance of Transaction Shares**. The issuance of the Transaction Shares hereunder is duly authorized (subject to the receipt of the Stockholder Approval) and, when issued and delivered in accordance with this Agreement, will be duly and validly issued, fully paid and nonassessable, will have been issued in compliance with applicable securities Laws or exemptions therefrom, will not be issued in violation of any preemptive rights of any stockholder of Buyer or any other Person and shall be issued and delivered by Buyer to each Seller, pursuant to this Agreement free of any Encumbrance, subject to the restrictions set forth herein and applicable securities Laws.

**Section 5.06 Buyer SEC Reports; Financial Statements.** Except as set forth on **Section 5.06** of the Disclosure Schedules, since January 1, 2017, Buyer has filed SEC Reports on a timely basis or has received a valid extension of such time of filing and has filed any such SEC Reports prior to the expiration of any such extension. As of their respective dates, the SEC Reports complied in all material respects with the requirements of the Securities Act and the Exchange Act, as applicable, and none of the SEC Reports, when filed, contained any untrue statement of a material fact or omitted to state a material fact required to be stated therein or necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading. There have been no material adverse developments in the business of Buyer and its subsidiaries since the respective dates of such SEC Reports that are required to be disclosed pursuant to the Exchange Act that have not been disclosed. The financial statements of Buyer included in the SEC Reports comply in all material respects with applicable accounting requirements and the rules and regulations of the SEC with respect thereto as in effect at the time of filing. Such financial statements have been prepared in accordance with GAAP, except as may be otherwise specified in such financial statements or the notes thereto and except that unaudited financial statements may not contain all footnotes required by GAAP, and fairly present in all material respects the financial position of Buyer and its consolidated Subsidiaries as of and for the dates thereof and the results of operations and cash flows for the periods then ended, subject, in the case of unaudited statements, to normal, immaterial, year-end audit adjustments.

**Section 5.07 Tax Matters.**

(a) Except as set forth on **Section 5.07(a)** of the Disclosure Schedules, all income Tax Returns and all other material Tax Returns required to be filed by the Buyer and each Subsidiary thereof have been timely filed. Such Tax Returns are true, complete and correct in all material respects. All Taxes due and owing by the Buyer or any Subsidiary thereof (whether or not shown on any Tax Return) have been timely paid.

(b) Buyer and each Subsidiary thereof has withheld and paid each Tax required to have been withheld and paid in connection with amounts paid or owing to any employee, independent contractor, creditor, customer, member or other party, and complied with all information reporting and backup withholding provisions of applicable Law.

(c) Within the past three years, no claim has been made by any taxing authority in any jurisdiction where the Buyer or any Subsidiary of the Buyer does not file Tax Returns that it is, or may be, subject to Tax by that jurisdiction, that has not been finally settled or otherwise resolved.

**Section 5.08 Independent Investigation.** Buyer has conducted its own independent investigation, review and analysis of the business, results of operations, prospects, condition (financial or otherwise) or assets of the Company, and acknowledges that it has been provided adequate access to the personnel, properties, assets, premises, books and records, and other documents and data of the Company for such purpose. Buyer acknowledges and agrees that: (a) in making its decision to enter into this Agreement and to consummate the transactions contemplated hereby, Buyer has relied solely upon its own investigation and the express representations and warranties of the Company set forth in **Article III** and the Company in **Article IV**; and (b) none of the Sellers, the Company, or any other Person makes or has made any representation or warranty as to the Sellers or the Company or this Agreement, except as expressly set forth in **Article III** or **Article IV**.

## ARTICLE VI
## Covenants

**Section 6.01 Conduct of Business Prior to the Closing**. From the date hereof until the earlier to occur of the Closing or the valid termination of this Agreement in accordance with the terms hereof, except as otherwise provided in this Agreement or consented to in writing by Buyer (which consent shall not be unreasonably withheld or delayed), Sellers shall, and shall cause the Company and its Subsidiaries to, (x) conduct the business of the Company and its Subsidiaries in the ordinary course of business consistent with past practice; and (y) use commercially reasonable effects to maintain and preserve intact the current organization, business, the Company Intellectual Property and franchise of the Company and its Subsidiaries, and to preserve the rights, franchises, goodwill and business relationships of the Company and/or its Subsidiaries. Without limiting the foregoing, from the date hereof until the Closing Date, Seller shall:

(a) cause the Company and/or its Subsidiaries to preserve and maintain all of their Permits;

(b) cause the Company and/or its Subsidiaries to pay their debts, Taxes and other obligations when due;

(c) cause the Company and/or its Subsidiaries to maintain the properties and assets and Company Intellectual Property owned, operated or used by the Company and/or its Subsidiaries, as applicable, in the same condition as they were on the date of this Agreement, subject to reasonable wear and tear;

(d) cause the Company and/or its Subsidiaries to defend and protect their properties and assets from infringement or usurpation;

(e) cause the Company and/or its Subsidiaries to perform all of their obligations under all Contracts relating to or affecting its properties, assets or business;

(f) cause the Company and/or its Subsidiaries to maintain their Books and Records in accordance with past practice;

(g) cause the Company and/or its Subsidiaries to comply in all material respects with all applicable Laws; and

(h) cause the Company and/or its Subsidiaries not to take or permit any action that would cause any of the changes, events or conditions described in **Section 4.07** to occur.

**Section 6.02 Access to Information**. From the date hereof until the earlier to occur of the Closing or the valid termination of this Agreement in accordance with the terms hereof, Sellers shall, and shall cause the Company and/or its Subsidiaries to, (a) afford Buyer and its Representatives full and free access to and the right to inspect all of the assets, Company Intellectual Property, premises, Books and Records, Contracts and other documents and data related to the Company and its Subsidiaries; (b) furnish Buyer and its Representatives with such financial, operating and other data and information related to the Company and its Subsidiaries as Buyer or any of its Representatives may reasonably request; and (c) instruct the Representatives of Sellers, the Company and its Subsidiaries to cooperate with Buyer in its investigation of the Company and its Subsidiaries. Any investigation pursuant to this **Section 6.02** shall be conducted in such manner as not to interfere unreasonably with the conduct of the business of Seller or the Company. No investigation by Buyer or other information received by Buyer shall operate as a waiver or otherwise affect any representation, warranty or agreement given or made by any Seller or the Company in this Agreement.

**Section 6.03 No Solicitation of Other Bids.**

(a) From the date hereof until the earlier to occur of the Closing or the valid termination of this Agreement in accordance with the terms hereof, the Company and Sellers shall not, and shall not authorize or permit any of their Affiliates or any of its or their Representatives to, directly or indirectly, (i) encourage, solicit, initiate, facilitate or continue inquiries regarding an Acquisition Proposal; (ii) enter into discussions or negotiations with, or provide any information to, any Person concerning a possible Acquisition Proposal; or (iii) enter into any agreements or other instruments (whether or not binding) regarding an Acquisition Proposal. The Company and Sellers shall immediately cease and cause to be terminated, and shall cause their Affiliates and all of their Representatives to immediately cease and cause to be terminated, all existing discussions or negotiations with any Persons conducted heretofore with respect to, or that could lead to, an Acquisition Proposal. For purposes hereof, "**Acquisition Proposal**" shall mean any inquiry, proposal or offer from any Person (other than Buyer or any of its Affiliates) concerning (i) a merger, consolidation, liquidation, recapitalization or other business combination transaction involving the Company and/or its Subsidiaries; (ii) the issuance or acquisition of equity interests in the Company and/or its Subsidiaries; or (iii) the sale, lease, exchange or other disposition of any Company Intellectual Property or any significant portion of the Company's properties or assets.

(b) In addition to the other obligations under this **Section 6.03**, the Company and Sellers shall promptly (and in any event within three (3) Business Days after receipt thereof) advise Buyer orally and in writing of any Acquisition Proposal, any request for information with respect to any Acquisition Proposal, or any inquiry with respect to or which could reasonably be expected to result in an Acquisition Proposal, the material terms and conditions of such request, Acquisition Proposal or inquiry, and the identity of the Person making the same.

(c) Sellers agree that the rights and remedies for noncompliance with this **Section 6.03** shall include having such provision specifically enforced by any court having equity jurisdiction, it being acknowledged and agreed that any such breach or threatened breach shall cause irreparable injury to Buyer and that money damages would not provide an adequate remedy to Buyer.

**Section 6.04 Notice of Certain Events.**

(a) From the date hereof until the earlier to occur of the Closing or the valid termination of this Agreement in accordance with the terms hereof, Sellers' Representative shall promptly notify Buyer in writing of:

(i) any fact, circumstance, event or action the existence, occurrence or taking of which (A) has had, or could reasonably be expected to have, individually or in the aggregate, a Material Adverse Effect, (B) has resulted in, or could reasonably be expected to result in, any representation or warranty made by the Company or Sellers hereunder not being true and correct or (C) has resulted in, or could reasonably be expected to result in, the failure of any of the conditions set forth in **Section 8.02** to be satisfied;

(ii) any notice or other communication from any Person alleging that the Approval of such Person is or may be required in connection with the transactions contemplated by this Agreement;

(iii) any notice or other communication from any Governmental Authority, whether or not in connection with the transactions contemplated by this Agreement; and

(iv) any Actions commenced or, to Seller's Knowledge, threatened against, relating to or involving or otherwise affecting Seller or the Company that, if pending on the date of this Agreement, would have been required to have been disclosed pursuant to **Section 4.11** or that relates to the consummation of the transactions contemplated by this Agreement.

(b) Buyer's receipt of information pursuant to this **Section 6.04** shall not operate as a waiver or otherwise affect any representation, warranty or agreement given or made by the Company or Sellers in this Agreement (including **Section 9.02** and **Section 10.01(b)**) and shall not be deemed to amend or supplement the Disclosure Schedules.

**Section 6.05 Resignations and Appointments**.

(a) The Company shall deliver to Buyer written resignations, effective as of the Closing Date, of the officers and managers of the Company and/or its Subsidiaries set forth on **Section 6.05(a)** of the Disclosure Schedules at least three (3) Business Days prior to the Closing.

(b) Effective as of the Closing Date (and upon receipt of Stockholder Approval) and subject to reasonable background searches, Dr. Alexey Vinogradov shall be appointed to the Buyer Board.

**Section 6.06 Confidentiality**. Sellers acknowledge that any confidentiality agreement executed with the Company shall survive the execution of this Agreement and shall be automatically terminated as of the Closing Date. From and after the Closing, each Seller shall, and shall cause its respective Affiliates to, hold, and shall use its reasonable best efforts to cause its or their respective Representatives to hold, in confidence any and all information, whether written or oral, concerning the Company and/or its Subsidiaries and the Company Intellectual Property, except to the extent that such Seller can show that such information (a) is generally available to and known by the public through no fault of any Seller, any of its Affiliates or their respective Representatives; or (b) is lawfully acquired by such Seller, any of its Affiliates or their respective Representatives from and after the Closing from sources which are not prohibited from disclosing such information by a legal, contractual or fiduciary obligation. If any Seller or its Affiliates or their respective Representatives are compelled to disclose any information by judicial or administrative process or by other requirements of Law, such Seller shall promptly notify Buyer in writing and shall disclose only that portion of such information which such Seller is advised by its counsel in writing is legally required to be disclosed, *provided that* such Seller shall use reasonable best efforts to obtain an appropriate protective order or other reasonable assurance that confidential treatment will be accorded such information.

**Section 6.07 Non-competition; Non-solicitation**.

(a) For a period of five (5) years commencing on the Closing Date (the "**Restricted Period**"), each Seller shall not, and shall not permit any of its Affiliates to, directly or indirectly, (i) engage in or assist others in engaging in the Restricted Business in the Territory; (ii) have an interest in any Person that engages directly or indirectly in the Restricted Business in any capacity, including as a partner, stockholder, member, manager, inventor, employee, principal, agent, trustee or consultant; or (iii) intentionally interfere in any material respect with the business relationships (past or present) of the Company, Buyer and/or any of their Subsidiaries. Notwithstanding the foregoing, each Seller may own, directly or indirectly, solely as an investment, securities of any Person traded on any national securities exchange if such Seller is not a controlling Person of, or a member of a group which controls, such Person and, except as set forth on **Section 6.07(b)** of the Disclosure Schedules, does not, directly or indirectly, own 5% or more of any class of securities of such Person (other than the Transaction Shares).

(b) During the Restricted Period, each Seller shall not, and shall not permit any of its Affiliates to, directly or indirectly, hire or solicit any inventor or scientist of the Company or any Affiliate or any party involved in the creation and/or development of the Company Intellectual Property (irrespective of whether any such party performed work on behalf of the Company or any Affiliate), or interfere with the relationship between any such party and the Company or any Affiliate, or hire any such party who is no longer involved with the Company or any Affiliate, except pursuant to a general solicitation which is not directed specifically to any such party; *provided, that* nothing in this Section 6.06(b) shall prevent any Seller or any of its Affiliates from hiring (i) any inventor or scientist whose employment has been terminated by the Company or Buyer or (ii) after one hundred and eighty (180) days from the date of termination of employment, any inventor or scientist whose employment has been terminated by the employee.

(c) During the Restricted Period, Sellers shall not, and shall not permit any of their Affiliates to, directly or indirectly, solicit or entice away or divert, or attempt to solicit or entice away or divert, any business relationships of the Company and/or its Subsidiaries.

(d) Each Seller acknowledges that a breach or threatened breach of this **Section 6.07** would give rise to irreparable harm to Buyer, for which monetary damages would not be an adequate remedy, and hereby agrees that in the event of a breach or a threatened breach by Sellers of any such obligations, Buyer shall, in addition to any and all other rights and remedies that may be available to it in respect of such breach, be entitled to equitable relief, including a temporary restraining order, an injunction, specific performance and any other relief that may be available from a court of competent jurisdiction (without any requirement to post bond).

(e) Each Seller acknowledges that the restrictions contained in this **Section 6.07** are reasonable and necessary to protect the legitimate interests of Buyer and constitute a material inducement to Buyer to enter into this Agreement and consummate the transactions contemplated by this Agreement. In the event that any covenant contained in this **Section 6.07** should ever be adjudicated to exceed the time, geographic, product or service, or other limitations permitted by applicable Law in any jurisdiction, then any court is expressly empowered to reform such covenant, and such covenant shall be deemed reformed, in such jurisdiction to the maximum time, geographic, product or service, or other limitations permitted by applicable Law. The covenants contained in this **Section 6.07** and each provision hereof are severable and distinct covenants and provisions. The invalidity or unenforceability of any such covenant or provision as written shall not invalidate or render unenforceable the remaining covenants or provisions hereof, and any such invalidity or unenforceability in any jurisdiction shall not invalidate or render unenforceable such covenant or provision in any other jurisdiction. In addition, any breach by Buyer of any provision of this Agreement or any related agreement shall not diminish or affect the validity or enforceability of this **Section 6.07**.

(f) PJSC «Pharmsynthez» and Shemyakin-Ovchinnikov Institute of Bioorganic Chemistry, Russian Academy of Sciences, which entities are being provided royalties by the Company pursuant to the Assignment and Royalty Agreement shall execute separate non-competition and non-solicitation agreements as of the Closing containing the same or similar language as set forth in this **Section 6.07** (the "**Royalty Restrictive Covenant Agreements**").

**Section 6.08 Governmental Approvals and Consents.**

(a) Each Party hereto shall, as promptly as possible, (i) make, or cause or be made, all filings and submissions required under any Law applicable to such Party or any of its Affiliates; and (ii) use reasonable best efforts to obtain, or cause to be obtained, all Approvals, authorizations, orders and consents from all Governmental Authorities that may be or become necessary for its execution and delivery of this Agreement and the performance of its obligations pursuant to this Agreement and the other Transaction Documents. Each Party shall cooperate fully with the other party and its Affiliates in promptly seeking to obtain all such Approvals, authorizations, orders and approvals. The Parties hereto shall not willfully take any action that will have the effect of delaying, impairing or impeding the receipt of any required Approvals, authorizations, orders and approvals.

(b) Sellers shall use reasonable best efforts to give all notices to, and obtain all Approvals from, all third parties that are described in **Section 4.04** of the Disclosure Schedules.

(c) If any consent, Approval or authorization necessary to preserve any right or benefit under any Contract to which the Company is a party is not obtained prior to the Closing, Sellers shall, subsequent to the Closing, cooperate with Buyer and the Company in attempting to obtain such consent, Approval or authorization as promptly thereafter as practicable. If such consent, Approval or authorization cannot be obtained, Sellers shall use their reasonable best efforts to provide the Company with the rights and benefits of the affected Contract for the term thereof, and, if Sellers provide such rights and benefits, the Company shall assume all obligations and burdens thereunder.

**Section 6.09 Books and Records.**

(a) In order to facilitate the resolution of any claims made against or incurred by Sellers prior to the Closing, or for any other reasonable purpose, for a period of five (5) years after the Closing (or such longer period of time as required by law with respect to retention of Books and Records), Buyer shall:

(i) retain the Books and Records of the Company and its Subsidiaries relating to periods prior to the Closing in a manner reasonably consistent with the prior practices of the Company and its Subsidiaries; and

(ii) upon reasonable notice, afford Sellers or their Representatives reasonable access (including the right to make, at Seller's expense, photocopies), during normal business hours, to such Books and Records; *provided, however*, that any Books and Records related to Tax matters shall be retained pursuant to the periods set forth in **Article VII**.

(b) In order to facilitate the resolution of any claims made by or against or incurred by Buyer or the Company and/or its Subsidiaries after the Closing, or for any other reasonable purpose, for a period of five (5) years following the Closing, Sellers shall:

(i) retain the Books and Records of such Seller in its possession which relate to the Company and/or its Subsidiaries and their operations for periods prior to the Closing; and

(ii) upon reasonable notice, afford the Representatives of Buyer or the Company reasonable access (including the right to make, at Buyer's expense, photocopies), during normal business hours, to such Books and Records; *provided, however*, that any Books and Records related to Tax matters shall be retained pursuant to the periods set forth in **Article VII**.

(c) Neither Buyer nor Sellers shall be obligated to provide the other party with access to any Books or Records pursuant to this **Section 6.09** where such access would violate any Law.

**Section 6.10 IP Development**. From and after the Closing, Buyer shall use its commercially reasonable efforts to develop the Company Intellectual Property.

**Section 6.11 Road Shows**. From the date hereof until the Closing, the Company shall, and Sellers shall cause the Company to, make its scientists or inventors and other Representatives available for any "road show" and/or presentations, and use its reasonable best efforts to make any scientist who played a significant role in the development of the Company Intellectual Property (irrespective of whether such scientist was employed or engaged by the Company) to also be available for any such "road show" and/or presentations, in each case, as reasonably requested by Buyer and its Representatives in connection with efforts to procure the proposed Buyer Financing.

**Section 6.12 Closing Conditions**. From the date hereof until the Closing, each Party hereto shall, and Sellers shall cause the Company and/or its Subsidiaries to, use reasonable best efforts to take such actions as are necessary to expeditiously satisfy the closing conditions set forth in **Article VIII** hereof.

**Section 6.13 Stockholders' Meeting; Buyer Domestication**.

(a) Buyer shall cause a meeting of its stockholders (the "**Stockholders' Meeting**") to be duly called and held as soon as reasonably practicable for the purpose of voting on (i) the approval and adoption of this Agreement and the Opko Assignment Agreement, (ii) the approval of the Domestication, to the extent Buyer, in its discretion, determines that such Domestication will be effectuated at the Closing Date, (iii) the approval of the transactions contemplated hereby and in the Opko Assignment Agreement, (iv) the approval of the Buyer Financing, (v) the election of Dr. Alexey Vinogradov to the Buyer Board, and (vi) the approval of the issuance of Transaction Shares in connection with the transactions contemplated hereby and the issuance of Buyer Common Stock in connection with the Opko Assignment Agreement as necessary under the rules and regulations of Nasdaq. Subject to its fiduciary duties, the board of directors of Buyer (the "**Buyer Board**") shall recommend to its stockholders that they vote in favor of such approvals and adoption. In connection with the Stockholders' Meeting, Buyer (a) will use commercially reasonable efforts to file with the SEC as promptly as practicable after the date of this Agreement, and in any event no later than 45 days following the date of this Agreement, a SEC a Registration Statement on Form S-4, including a proxy statement, which shall serve as a proxy statement pursuant to Section 14(a), Regulation 14A and Schedule 14A under the Exchange Act, and all other proxy materials for the Stockholders' Meeting and registration statement on Form S-4 (the "**Preliminary Proxy Statement**"), (b) as promptly as practicable following receipt of approval from the SEC of the Preliminary Proxy Statement, will file with the SEC and mail to its stockholders a definitive Proxy Statement (the "**Definitive Proxy Statement**" and together the Preliminary Proxy Statement, the "**Proxy Statement**") and other proxy materials, (c) will use commercially reasonable efforts to obtain the necessary or appropriate approvals by its stockholders under the Buyer's Organizational Documents and applicable Law of (i) the approval and adoption of this Agreement and the Opko Assignment Agreement, (ii) the approval of the Domestication, to the extent Buyer, in its discretion, determines that such Domestication will be effectuated at the Closing Date, (iii) the approval of the transactions contemplated hereby and the Opko Assignment Agreement, (iv) the approval of the Buyer Financing, (v) the election of Dr. Alexey Vinogradov, who shall be appointed to fill a vacancy on the Buyer Board, and (vi) the approval of the issuance of Transaction Shares in connection with the transactions contemplated hereby and the issuance of Buyer Common Stock in connection with the Opko Assignment Agreement as necessary under the rules and regulations of Nasdaq (items (i) through (vi), collectively, the "**Stockholder Approval**"), and (d) will otherwise comply with all Laws applicable to the Stockholders' Meeting.

(b) Buyer will timely provide the Company with all material correspondence received from and to be sent to the SEC. Buyer and the Company will cooperate with each other in finalizing each proposed response; provided that Buyer shall control the final form and substance of any such response.

(c) The Company shall use commercially reasonable efforts to provide promptly to Buyer such information concerning its and its Subsidiaries' business affairs and financial statements as is required under applicable Law for inclusion in the Proxy Statement (including the Audited Financial Statements and any other required audited, unaudited and pro forma financial statements), shall direct that its counsel cooperate with Buyer's counsel in the preparation of the Proxy Statement and shall request the cooperation of its auditors in the preparation of the Proxy Statement. None of the information supplied or to be supplied by or on behalf of the Company for inclusion or incorporation by reference in the Proxy Statement will, at the time the Proxy Statement is filed with the SEC or at the time it is mailed to Buyer's stockholders, contain any untrue statement of a material fact or omit to state any material fact required to be stated therein or necessary in order to make the statements therein, in the light of the circumstances under which they are made, not misleading. If any information provided by the Company or Sellers is discovered or any event occurs with respect to the Company, or any change occurs with respect to the other information provided by the Company or Sellers included in the Proxy Statement which is required to be described in an amendment of, or a supplement to, the Proxy Statement so that such document does not include any misstatement of a material fact or omit to state any material fact necessary to make the statements therein, in light of the circumstances under which they were made, not misleading, the Company, Sellers (as applicable) shall notify Buyer promptly of such event.

(d) To the extent Buyer, in its discretion, determines that Domestication will be effectuated at the Closing Date, promptly following the receipt of the Stockholder Approval, if obtained, but immediately prior to the Closing Date, Buyer shall file (i) with the Secretary of State of the State of Nevada a plan of conversion as contemplated by NRS 92A.105 and take such other steps as are required under the Laws of the State of Nevada with respect to the conversion of Buyer to a State of Delaware corporation and (ii) with the Secretary of State of the State of Delaware a Certificate of Corporate Domestication ("**Certificate of Domestication**") and a Certificate of Incorporation in substantially the form of Buyer's previously existing certificate of incorporation (the "**New Buyer Charter**"), and shall use commercially reasonable efforts to cause the Buyer Board to adopt Bylaws in substantially the form of Buyer's previously existing Bylaws (the "**New Buyer Bylaws**").

**Section 6.14 Transaction Filings**. As promptly as practicable (but in no event, with respect to filing, later than the date required under applicable Law), Buyer will prepare and file any filings required to be filed by it under the Nasdaq, Exchange Act, the Securities Act or any other federal or blue sky laws or other Laws relating to the execution of this Agreement, the completion of the Domestication (in Buyer's discretion) and the consummation of the transactions contemplated hereby, as well as under regulations of or as required by Nasdaq and such Governmental Authorities as may require the filing of such other filings (collectively, the "**Transaction Filings**"). The Company and Sellers will work together with Buyer as promptly as practicable to prepare the Transaction Filings and provide Buyer whatever information is necessary to accurately complete such filings in a timely manner.

**Section 6.15 Listing Application**. Buyer shall use its commercially reasonable efforts, to the extent allowed under the rules of Nasdaq, to take all actions and prepare all filings and other documents necessary to be filed with Nasdaq in connection with the listing application for the inclusion of the Buyer Common Stock on Nasdaq in connection with this transaction, conduct ongoing negotiations with Nasdaq with respect to such listing and perform all acts reasonably requested by Nasdaq.

**Section 6.16 Public Announcements**. Except as required by and in accordance with applicable Law or Nasdaq requirements (based upon the reasonable advice of counsel), no Party to this Agreement shall make any public announcements in respect of this Agreement or the transactions contemplated hereby or otherwise communicate with any news media without the prior written consent of the other party (which consent shall not be unreasonably withheld or delayed), and the parties shall cooperate as to the timing and contents of any such announcement.

**Section 6.17 Further Assurances**. Following the Closing, each of the Parties hereto shall, and shall cause their respective Affiliates to, execute and deliver such additional documents, instruments, conveyances and assurances and take such further actions as may be reasonably required to carry out the provisions hereof and give effect to the transactions contemplated by this Agreement.

**Section 6.18 No Termination of Assignment and Royalty Agreement** . Between the execution of this Agreement and the Closing, there shall be no termination of the Assignment and Royalty Agreement by any party thereto.

**ARTICLE VII**
**Tax Matters**

**Section 7.01 Tax Covenants.**

(a) (1) Tax Elections. Without the prior written consent of Buyer (which consent shall not be unreasonably withheld, conditioned or delayed), Sellers (and, prior to the Closing, the Company, its Affiliates and their respective Representatives) shall not, to the extent it may affect, or relate to, the Company and/or its Subsidiaries, make, change or rescind any Tax election, amend any Tax Return or take any position on any Tax Return, take any action, omit to take any action or enter into any other transaction that would have the effect of increasing the Tax liability or reducing any Tax asset of Buyer or the Company and/or its Subsidiaries in respect of any Post-Closing Tax Period.

(a)(2) Amended Returns. Buyer shall not, without the prior written consent of the Sellers' Representative (which consent shall not be unreasonably withheld, conditioned or delayed), with respect to Taxes or Tax Returns of the Company or its Subsidiaries for any taxable period ending on or before the Closing Date or any Straddle Period, (i) file (other than in accordance with Section 7.01(c)), re-file or amend or cause to be filed (other than in accordance with Section 7.01(c)), re-filed or amended any Tax Return, (ii) commence, enter or cause to be commenced or entered into discussions regarding any voluntary disclosure to a Governmental Authority, or (iii) consent to any extension or waiver of the limitation period applicable to any claim or assessment in respect of such Taxes or Tax Returns.

(b) All transfer, documentary, sales, use, stamp, registration, value added and other such Taxes and fees (including any penalties and interest) incurred in connection with this Agreement and the other Transaction Documents (collectively, "Transfer Taxes") shall be borne and paid fifty percent (50%) by Sellers and fifty percent (50%) by Buyer when due. Sellers' Representative shall, at Sellers' expense, timely file any Tax Return or other document with respect to such Taxes or fees (and Buyer shall cooperate with respect thereto as necessary). If Sellers are required by applicable Tax law to pay any such Transfer Taxes, the Buyer shall promptly reimburse Sellers within ten (10) days of receipt of written request from Sellers for fifty percent (50%) of such Transfer Taxes. If the Buyer is required by applicable Tax law to pay any such Transfer Taxes, Sellers shall promptly reimburse the Buyer within ten (10) days of receipt of written request from the Buyer for fifty percent (50%) of such Transfer Taxes. Each party hereto shall use its commercially reasonable efforts to minimize the amount of such Transfer Taxes and to cooperate in the preparation, execution and filing of all Tax Returns and other documents required in connection with such Transfer Taxes.

(c) Buyer shall prepare, or cause to be prepared, all Tax Returns required to be filed by the Company after the Closing Date with respect to a Pre-Closing Tax Period. Any such Tax Return shall be prepared in a manner consistent with past practice (unless otherwise required by Law) and without a change of any election or any accounting method and shall be submitted by Buyer to Sellers' Representative (together with schedules, statements and, to the extent requested by Sellers' Representative, supporting documentation) at least forty-five (45) days prior to the due date (including extensions) of such Tax Return. If Sellers' Representative objects to any item on any such Tax Return, it shall, within ten (10) days after delivery of such Tax Return, notify Buyer in writing that it so objects, specifying with particularity any such item and stating the specific factual or legal basis for any such objection. If no such notice is received by Buyer within such time period, then Sellers shall be deemed to have accepted such Tax Return as prepared by Buyer. If a notice of objection shall be duly delivered, Buyer and Sellers' Representative shall negotiate in good faith and use their reasonable best efforts to resolve such items. If Buyer and Sellers' Representative are unable to reach such agreement within ten (10) days after receipt by Buyer of such notice, the disputed items shall be resolved by the Independent Accountant and any determination by the Independent Accountant shall be final. The Independent Accountant shall resolve any disputed items within twenty (20) days of having the item referred to it pursuant to such procedures as it may require. If the Independent Accountant is unable to resolve any disputed items before the due date for such Tax Return, the Tax Return shall be filed as prepared by Buyer and then amended to reflect the Independent Accountant's resolution. The costs, fees and expenses of the Independent Accountant shall be borne equally by Buyer and Sellers' Representative. The preparation and filing of any Tax Return of the Company and/or its Subsidiaries that does not relate to, or otherwise include, a Pre-Closing Tax Period shall be exclusively within the control of Buyer.

**Section 7.02 Termination of Existing Tax Sharing Agreements**. Any and all existing Tax sharing agreements (whether written or not) binding upon the Company and/or its Subsidiaries shall be terminated as of the Closing Date (other than ancillary provisions in any customary commercial contracts entered into in the ordinary course of business the primary purpose of which is unrelated to Taxes). After such date neither the Company, Seller nor any of Seller's Affiliates and their respective Representatives shall have any further rights or Liabilities thereunder.

**Section 7.03 Tax Indemnification**. Sellers shall indemnify the Company, its Subsidiaries, Buyer, and each Buyer Indemnitee and hold them harmless from and against, without duplication, (a) any Loss attributable to any breach of or inaccuracy in any representation or warranty made in **Section 4.13**; (b) any Loss attributable to any breach or violation of, or failure to fully perform, any covenant, agreement, undertaking or obligation in **Article VII**; (c) all Taxes of the Company and its Subsidiaries for all Pre-Closing Tax Periods; (d) all Taxes of Sellers or the Company arising from transactions involving the transfer of the Company Intellectual Property to the Company; (e ) Taxes of any member of an affiliated, consolidated, combined or unitary group of which the Company or any of its Subsidiaries (or any predecessor of the Company or any of its Subsidiaries) is or was a member on or prior to the Closing Date by reason of a liability under Treasury Regulation Section 1.1502-6 or any comparable provisions of foreign, state or local Law; and (f any and all Taxes of any person imposed on the Company arising under the principles of transferee or successor liability, relating to an event or transaction occurring before the Closing Date (in each of the above cases, together with any out-of-pocket fees and expenses (including attorneys' and accountants' fees) incurred in connection therewith). Sellers shall reimburse Buyer for any Taxes of the Company that are the responsibility of Sellers pursuant to this **Section 7.03** within ten (10) Business Days after payment of such Taxes by Buyer or the Company.

**Section 7.04 Straddle Period**. For purposes of the Tax reimbursement and indemnity provisions of this Agreement, in the case of Taxes that are payable with respect to a taxable period that begins before and ends after the Closing Date (each such period, a "**Straddle Period**"), the portion of any such Taxes that are treated as Pre-Closing Taxes for purposes of this Agreement shall be:

(a) in the case of Taxes (i) based upon, or related to, income, receipts, profits, wages, capital or net worth, (ii) imposed in connection with the sale, transfer or assignment of property, or (iii) required to be withheld, deemed equal to the amount which would be payable if the taxable year ended with the Closing Date; and

(b) in the case of other Taxes, deemed to be the amount of such Taxes for the entire period multiplied by a fraction the numerator of which is the number of days in the period ending on the Closing Date and the denominator of which is the number of days in the entire period.

**Section 7.05 Contests**. Buyer agrees to give written notice to Sellers' Representative of the receipt of any written notice by the Company, Buyer or any of Buyer's Affiliates which involves the assertion of any claim, or the commencement of any Action, in respect of which an indemnity may be sought by Buyer pursuant to this **Article VII** (a "**Tax Claim**"). Buyer shall control the contest or resolution of any Tax Claim; *provided, however*, that Buyer shall obtain the prior written consent of Sellers' Representative (which consent shall not be unreasonably withheld or delayed) before entering into any settlement of a claim or ceasing to defend such claim; and, *provided further*, that Sellers' Representative shall be entitled to participate in the defense of such claim and to employ counsel of its choice for such purpose, the fees and expenses of which separate counsel shall be borne solely by Sellers' Representative.

**Section 7.06 Cooperation and Exchange of Information**. Sellers' Representative and Buyer shall provide each other with such cooperation and information as either of them reasonably may request of the other in filing any Tax Return pursuant to this **Article VII** or in connection with any audit or other proceeding in respect of Taxes of the Company. Such cooperation and information shall include providing copies of relevant Tax Returns or portions thereof, together with accompanying schedules, related work papers and documents relating to rulings or other determinations by tax authorities. Each of Sellers and Buyer shall retain all Tax Returns, schedules and work papers, records and other documents in its possession relating to Tax matters of the Company for any taxable period beginning before the Closing Date until the expiration of the statute of limitations of the taxable periods to which such Tax Returns and other documents relate, without regard to extensions except to the extent notified by the other party in writing of such extensions for the respective Tax periods. Prior to transferring, destroying or discarding any Tax Returns, schedules and work papers, records and other documents in its possession relating to Tax matters of the Company for any taxable period beginning before the Closing Date, Seller or Buyer (as the case may be) shall provide the other party with reasonable written notice and offer the other party the opportunity to take custody of such materials.

**Section 7.07 Tax Refunds**. Buyer shall cause the Company and its Subsidiaries to promptly pay to Sellers any refunds received of Tax paid to a Governmental Authority with respect to any Pre-Closing Tax Period: (i) if received by Buyer, the Company, its Subsidiaries or any Affiliate thereof, or (ii) when used by Buyer, the Company, its Subsidiaries or any Affiliate thereof to credit an account with a Governmental Authority ("Pre-Closing Tax Refunds"). Sellers will promptly reimburse Buyer for any reasonable out-of-pocket expenses incurred in filing, defending or prosecuting any Pre-Closing Tax Refund, and, if any Pre-Closing Tax Refund is disallowed or required to be repaid to a Governmental Authority, Sellers shall promptly reimburse Buyer for such Pre-Closing Tax Refund (plus any interest and penalties payable).

**Section 7.08 Extraordinary Transactions**. Buyer shall not cause to be made any extraordinary transaction or event on the Closing Date that would result in any increased Tax liability for which Sellers would be required to indemnify Buyer or otherwise liable pursuant to applicable Law.

**Section 7.09 Tax Treatment of Indemnification Payments**. Any indemnification payments pursuant to this Agreement shall be treated as an adjustment to the Purchase Price by the parties for Tax purposes, unless otherwise required by Law.

**Section 7.10 Survival**. Notwithstanding anything in this Agreement to the contrary, the provisions of **Section 4.13** and this **Article VII** shall survive for the full period of all applicable statutes of limitations (giving effect to any waiver, mitigation or extension thereof) plus sixty (60) days.

**Section 7.11 Overlap**. To the extent that any obligation or responsibility pursuant to **Article IX** may overlap with an obligation or responsibility pursuant to this **Article VII** or otherwise conflict with any provision of this **Article VII**, the provisions of this **Article VII** shall govern as it relates to Taxes and Tax Returns.

**ARTICLE VIII**
**Conditions to closing**

**Section 8.01 Conditions to Obligations of All Parties**. The obligations of each Party to consummate the transactions contemplated by this Agreement shall be subject to the fulfillment, at or prior to the Closing, of each of the following conditions:

(a) No Governmental Authority shall have enacted, issued, promulgated, enforced or entered any Governmental Order which is in effect and has the effect of making the transactions contemplated by this Agreement illegal, otherwise restraining or prohibiting consummation of such transactions or causing any of the transactions contemplated hereunder to be rescinded following completion thereof, and no other Action shall have been commenced against Buyer or any Seller or the Company which would prevent the Closing.

(b) Buyer shall have received approval of its listing application to have the Transaction Shares listed on the Nasdaq, subject to official notification.

(c) All Governmental Authorities' approvals required for the consummation of the transactions contemplated hereby, if any, shall have been obtained.

(d) The Stockholder Approval shall have been obtained.

(e) The Proxy Statement shall have become effective under the Securities Act. No stop order suspending the effectiveness of the Proxy Statement will have been issued by the SEC and no proceedings for that purpose and no similar proceeding in respect of the Proxy Statement will have been initiated or, to the knowledge of Buyer, threatened by the SEC.

**Section 8.02 Conditions to Obligations of Buyer**. The obligations of Buyer to consummate the transactions contemplated by this Agreement shall be subject to the fulfillment or Buyer's waiver, at or prior to the Closing, of each of the following conditions:

(a) The Company or Sellers, as applicable, shall have effected the transactions described in **Section 2.03(b)**.

(b) Other than the representations and warranties of the Company and each Seller contained in **Section 3.01**, **Section 3.02**, **Section 3.03**, **Section 4.01**, **Section 4.02**, **Section 4.03**, **Section 4.04, Section 4.06, Section 4.09, Section 4.15 and Section 4.16** the representations and warranties of the Company and each Seller contained in this Agreement, the other Transaction Documents and any certificate or other writing delivered pursuant hereto shall be true and correct in all respects (in the case of any representation or warranty qualified by materiality or Material Adverse Effect) or in all material respects (in the case of any representation or warranty not qualified by materiality or Material Adverse Effect) on and as of the date hereof and on and as of the Closing Date with the same effect as though made at and as of such date (except those representations and warranties that address matters only as of a specified date, the accuracy of which shall be determined as of that specified date in all respects). The representations and warranties of the Company and each Seller contained in **Section 3.01**, **Section 3.02**, **Section 3.03**, **Section 4.01**, **Section 4.02**, **Section 4.03**, **Section 4.04, Section 4.06, Section 4.09, Section 4.15 and Section 4.16** shall be true and correct in all respects on and as of the date hereof and on and as of the Closing Date with the same effect as though made at and as of such date (except those representations and warranties that address matters only as of a specified date, the accuracy of which shall be determined as of that specified date in all respects).

(c) The Company and Sellers shall have duly performed and complied in all material respects with all agreements, covenants and conditions required by this Agreement and each of the other Transaction Documents to be performed or complied with by them prior to or on the Closing Date.

(d) All Approvals, consents and waivers that are listed on **Section 4.04** of the Disclosure Schedules shall have been received, and executed counterparts thereof shall have been delivered to Buyer in form and substance acceptable to Buyer at or prior to the Closing.

(e) From the date of this Agreement, there shall not have occurred any Material Adverse Effect on the Company or any of its Subsidiaries, nor shall any event or events have occurred that, individually or in the aggregate, with or without the lapse of time, could reasonably be expected to result in a Material Adverse Effect on the Company or any of its Subsidiaries.

(f) Buyer's Board shall have received the Fairness Opinion supporting the enterprise valuation of the Company indicated by the consideration paid hereunder for the Shares;

(g) Buyer shall have received adequate financing (the "**Buyer Financing**"), as reasonably determined by Buyer, whether in the form of a private or public offering of debt or equity securities, to fund future working capital obligations of Buyer and the Company following the Closing.

(h) IBCH shall have executed the Sponsored Research Agreement and delivered same to Buyer.

(i) The Royalty Restrictive Covenant Agreements shall have been executed by the appropriate parties thereto and delivered to Buyer;

(j) The other Transaction Documents shall have been executed and delivered by each Seller, as applicable, and true and complete copies thereof shall have been delivered to Buyer.

(k) Buyer shall have received a certificate, dated the Closing Date and signed by a duly authorized officer of the Company and by each Seller, that each of the conditions set forth in **Section 8.02(a)** and **Section 8.02(c)** have been satisfied.

(l) Buyer shall have received a certificate of the Secretary or an Assistant Secretary (or equivalent officer) of the Company certifying that attached thereto are true and complete copies of all resolutions adopted by the board of directors and stockholders of the Company authorizing the execution, delivery and performance of this Agreement and the other Transaction Documents and the consummation of the transactions contemplated hereby and thereby, and that all such resolutions are in full force and effect and are all the resolutions adopted in connection with the transactions contemplated hereby and thereby, and the incumbency of all officers of the Company executing this Agreement and any document executed and delivered in connection herewith.

(m) The Company shall have delivered to Buyer a good standing certificate (or its equivalent) for the Company and each of its Subsidiaries from the secretary of state or similar Governmental Authority of the jurisdictions under the Laws in which the Company and each Subsidiary is organized.

(n) The Opko Assignment Agreement and the transactions contemplated thereunder shall have been consummated.

(o) The Company and each Seller shall have delivered to Buyer such other documents or instruments as Buyer reasonably requests and are reasonably necessary to consummate the transactions contemplated by this Agreement.

**Section 8.03 Conditions to Obligations of the Company and each Seller**. The obligations of the Company and each Seller to consummate the transactions contemplated by this Agreement shall be subject to the fulfillment or Sellers' Representative's waiver, at or prior to the Closing, of each of the following conditions:

(a) Buyer shall have effected the transactions described in **Section 2.03(a)**.

(b) Other than the representations and warranties of Buyer contained in **Section 5.01**, **Section 5.02** and **Section 5.03**, the representations and warranties of Buyer contained in this Agreement, the other Transaction Documents and any certificate or other writing delivered pursuant hereto shall be true and correct in all respects (in the case of any representation or warranty qualified by materiality) or in all material respects (in the case of any representation or warranty not qualified by materiality) on and as of the date hereof and on and as of the Closing Date with the same effect as though made at and as of such date (except those representations and warranties that address matters only as of a specified date, the accuracy of which shall be determined as of that specified date in all respects). The representations and warranties of Buyer contained in **Section 5.01**, **Section 5.02 and Section 5.03** shall be true and correct in all respects on and as of the date hereof and on and as of the Closing Date with the same effect as though made at and as of such date.

(c) Buyer shall have duly performed and complied in all material respects with all agreements, covenants and conditions required by this Agreement and each of the other Transaction Documents to be performed or complied with by it prior to or on the Closing Date.

(d) The duly authorized Secretary of Buyer shall have delivered to the Company (i) certified copies of the New Buyer Charter and the New Buyer Bylaws (to the extent Buyer in its discretion determines that the Domestication will be completed at Closing), and (ii) resolutions adopted by Buyer's stockholders evidencing the Stockholder Approval, and shall have certified the incumbency of all officers of Buyer executing this Agreement and any document executed and delivered in connection herewith.

(e) The other Transaction Documents shall have been executed and delivered by Buyer, as applicable, and true and complete copies thereof shall have been delivered to the Company.

(f) The Company shall have received a certificate, dated the Closing Date and signed by a duly authorized officer of Buyer, that each of the conditions set forth in **Section 8.03(a)** and **Section 8.03(c)** have been satisfied.

(g) The Company shall have received a certificate of the Secretary or an Assistant Secretary (or equivalent officer) of Buyer certifying that attached thereto are true and complete copies of all resolutions adopted by the board of directors of Buyer authorizing the execution, delivery and performance of this Agreement and the other Transaction Documents and the consummation of the transactions contemplated hereby and thereby, and that all such resolutions are in full force and effect and are all the resolutions adopted in connection with the transactions contemplated hereby and thereby.

(h) Buyer shall have delivered to Dmitry Genkin by wire transfer of immediately available funds an amount equal to the outstanding amount actually advanced by Dmitry Genkin under that certain Loan Contract, dated as of November 21, 2018, between Dmitry and the Company, which amount shall not exceed $150,000.

(i) Buyer shall have completed the Buyer Financing.

## ARTICLE IX
## Indemnification

**Section 9.01 Survival**. Subject to the limitations and other provisions of this Agreement, the representations and warranties contained herein (other than any representations or warranties contained in **Section 4.13** which are subject to **Article VII**) shall survive the Closing and shall remain in full force and effect until the date that is twenty-four (24) months from the Closing Date (the "**Non-Fundamental Survival Period**"); *provided,* that the representations and warranties in **Section 3.01**, **Section 3.02**, **Section 3.03**, **Section 4.01**, **Section 4.02**, **Section 4.03**, **Section 4.04, Section 4.06, Section 4.09, Section 4.15 and Section 4.16 Section 5.01**, **Section 5.02 and Section 5.03** (collectively, the "**Fundamental Representations**") shall survive indefinitely. All covenants and agreements of the parties contained herein (other than any covenants or agreements contained in **Article VII** which are subject to **Article VII**) shall survive the Closing indefinitely or for the period explicitly specified therein. Notwithstanding the foregoing, any claims asserted in good faith with reasonable specificity (to the extent known at such time) and in writing by notice from the non-breaching party to the breaching party prior to the expiration date of the applicable survival period, including, if applicable, the Non-Fundamental Survival Period, shall not thereafter be barred by the expiration of the relevant representation or warranty and such claims shall survive until finally resolved.

**Section 9.02 Indemnification By Sellers**. Subject to the other terms and conditions of this **Article IX**, Sellers shall indemnify and defend each of Buyer and its Affiliates (including the Company) and their respective Representatives (collectively, the "**Buyer Indemnitees**") against, and shall hold each of them harmless from and against, and shall pay and reimburse each of them for, any and all Losses incurred or sustained by, or imposed upon, the Buyer Indemnitees based upon, arising out of, with respect to or by reason of:

(a) any inaccuracy in or breach or alleged breach of any of the representations or warranties of the Company or any Seller contained in this Agreement or in any certificate or instrument delivered by or on behalf of the Company or any Seller pursuant to this Agreement (other than in respect of **Section 4.13**, it being understood that the sole remedy for any such inaccuracy in or breach thereof shall be pursuant to **Article VII**), as of the date such representation or warranty was made or as if such representation or warranty was made on and as of the Closing Date (except for representations and warranties that expressly relate to a specified date, the inaccuracy in or breach of which will be determined with reference to such specified date);

(b) any breach, alleged breach or non-fulfillment of any covenant, agreement or obligation to be performed by the Company or any Seller pursuant to this Agreement (other than any breach or violation of, or failure to fully perform, any covenant, agreement, undertaking or obligation in **Article VII**, it being understood that the sole remedy for any such breach, violation or failure shall be pursuant to **Article VII**); and

(c) any Company Indebtedness and any Company Transaction Expenses to the extent not paid at Closing.

Sellers' indemnification responsibility pursuant to this **Section 9.02** shall be several (in accordance with such Seller's Pro Rata Share.

**Section 9.03 Indemnification By Buyer**. Subject to the other terms and conditions of this **Article IX**, Buyer shall indemnify and defend Sellers and its Affiliates and their respective Representatives (collectively, the "**Seller Indemnitees**") against, and shall hold each of them harmless from and against, and shall pay and reimburse each of them for, any and all Losses incurred or sustained by, or imposed upon, the Seller Indemnitees based upon, arising out of, with respect to or by reason of:

(a) any inaccuracy in or breach or alleged breach of any of the representations or warranties of Buyer contained in this Agreement or in any certificate or instrument delivered by or on behalf of Buyer pursuant to this Agreement, as of the date such representation or warranty was made or as if such representation or warranty was made on and as of the Closing Date (except for representations and warranties that expressly relate to a specified date, the inaccuracy in or breach of which will be determined with reference to such specified date); or

(b) any breach, alleged breach, or non-fulfillment of any covenant, agreement or obligation to be performed by Buyer pursuant to this Agreement (other than any breach or violation of, or failure to fully perform, any covenant, agreement, undertaking or obligation in **Article VII**, it being understood that the sole remedy for any such breach, violation or failure shall be pursuant to **Article VII**).

**Section 9.04 Certain Limitations**. The indemnification provided for in **Section 9.02** and **Section 9.03** shall be subject to the following limitations:

(a) Subject to **Section 9.04(c)**, Sellers shall not be liable to the Buyer Indemnitees for indemnification under **Section 9.02(a)** until the aggregate amount of all Losses in respect of indemnification under **Section 9.02(a)** exceeds $50,000 (the "**Basket**"), in which event Sellers shall be required to pay or be liable for all such Losses in excess of the Basket. Subject to **Section 9.04(c)** and **Section 9.07**, the aggregate amount of all Losses for which Sellers shall be liable pursuant to **Section 9.02(a)** shall not exceed fifteen percent (15%) of the Transaction Shares, based on the Closing Price (the "**Cap**").

(b) Subject to **Section 9.04(c)**, Buyer shall not be liable to the Seller Indemnitees for indemnification under **Section 9.03(a)** until the aggregate amount of all Losses in respect of indemnification under **Section 9.03(a)** exceeds the Basket, in which event Buyer shall be required to pay or be liable for all such Losses in excess of the Basket. Subject to **Section 9.04(c)**, the aggregate amount of all Losses for which Buyer shall be liable pursuant to **Section 9.03(a)** shall not exceed the Cap.

(c) Notwithstanding the foregoing, the limitations set forth in **Section 9.04(a)** and **Section 9.04(b)** shall not apply to Losses based upon, arising out of, with respect to or by reason of (i) any inaccuracy in or breach of any Fundamental Representation, (ii) intentional breach, intentional misrepresentation, criminal misconduct, or fraud by any Indemnifying Party, or (iii) **Section 9.02(c)** (collectively, the "**Indemnification Exclusions**").

(d) For purposes of this **Article IX**, notwithstanding anything contained herein to the contrary, any inaccuracy in or breach or alleged breach of any representation or warranty shall be determined without regard to any materiality, Material Adverse Effect or other similar qualification contained in or otherwise applicable to such representation or warranty.

(e) Sellers acknowledge and agree that, notwithstanding anything contained herein to the contrary, following the Closing Date, Sellers shall not be entitled to or shall not pursue any rights of contribution or similar rights against the Company or any Subsidiary for any Losses paid or payable to any Buyer Indemnitees hereunder by Sellers or Sellers' Representative.

**Section 9.05 Indemnification Procedures.** The party making a claim under this **Article IX** is referred to as the "**Indemnified Party**", and the party against whom such claims are asserted under this **Article IX** is referred to as the "**Indemnifying Party**". Any claim to be made to or by Sellers hereunder shall be made to or by the Sellers' Representative (on behalf of the Sellers).

(a) Third Party Claims. If any Indemnified Party receives notice of the assertion or commencement of any Action made or brought by any Person who is not a party to this Agreement or an Affiliate of a party to this Agreement or a Representative of the foregoing (a "**Third Party Claim**") against such Indemnified Party with respect to which the Indemnifying Party is obligated to provide indemnification under this Agreement, the Indemnified Party shall give the Indemnifying Party reasonably prompt written notice thereof, but in any event not later than thirty (30) calendar days after receipt of such notice of such Third Party Claim. The failure of the Indemnified Party to give reasonably prompt notice of any Third Party Claim shall not release, waive or otherwise affect the Indemnifying Party's obligations with respect thereto unless, and only to the extent, that the Indemnifying Party can demonstrate actual material loss and material prejudice as a result of such failure. Such notice by the Indemnified Party shall describe the Third Party Claim in reasonable detail, shall include copies of all material written evidence thereof and shall indicate the estimated amount, if reasonably practicable, of the Loss that has been or may be sustained by the Indemnified Party.

The Indemnifying Party shall have the right to participate in, or by giving written notice to the Indemnified Party, to assume the defense of any Third Party Claim at the Indemnifying Party's expense and by the Indemnifying Party's own counsel, and the Indemnified Party shall cooperate in good faith in such defense; *provided,* that if the Indemnifying Party is any Seller, such Indemnifying Party shall not have the right to defend or direct the defense of any such Third Party Claim that (x) the Indemnified Party reasonably believes an adverse determination with respect to the Third Party Claim would be materially detrimental to or materially injure the Indemnified Party's reputation or future business prospects, or (y) seeks an injunction or other equitable relief against the Indemnified Party, and the Indemnifying Party shall be liable for the reasonable fees and expenses of counsel to the Indemnified Party in each jurisdiction for which the Indemnified Party reasonably determines counsel is required. In the event that the Indemnifying Party assumes the defense of any Third Party Claim, it shall have the right to take such action as it deems necessary to avoid, dispute, defend, appeal or make counterclaims pertaining to any such Third Party Claim in the name and on behalf of the Indemnified Party. The Indemnified Party shall have the right to participate in the defense of any Third Party Claim with counsel selected by it subject to the Indemnifying Party's right to control the defense thereof. The fees and disbursements of such counsel shall be at the expense of the Indemnified Party, *provided,* that if in the reasonable opinion of counsel to the Indemnified Party, (A) there are legal defenses available to an Indemnified Party that are different from or additional to those available to the Indemnifying Party; (B) there exists a conflict of interest between the Indemnifying Party and the Indemnified Party; or (C) the claim for indemnification relates to or arises in connection with any criminal or quasi criminal or regulatory proceeding, action, indictment, allegation or investigation, the Indemnifying Party shall be liable for the reasonable fees and expenses of counsel to the Indemnified Party in each jurisdiction for which the Indemnified Party determines counsel is required. If the Indemnifying Party elects not to compromise or defend such Third Party Claim, fails to promptly notify the Indemnified Party in writing of its election to defend as provided in this Agreement, or fails to diligently prosecute the defense of such Third Party Claim, the Indemnified Party may, pay, compromise, defend such Third Party Claim and seek indemnification for any and all Losses based upon, arising from or relating to such Third Party Claim. Sellers' Representative and Buyer shall cooperate with each other in all reasonable respects in connection with the defense of any Third Party Claim, including making available (subject to the provisions of **Section 6.06**) records relating to such Third Party Claim and furnishing, without expense (other than reimbursement of actual out-of-pocket expenses) to the defending party, management employees or appropriate persons of the non-defending party as may be reasonably necessary for the preparation of the defense of such Third Party Claim. Notwithstanding any other provision of this Agreement, the Indemnifying Party shall not enter into settlement of any Third Party Claim without the prior written consent of the Indemnified Party.

(b) Direct Claims. Any Action by an Indemnified Party on account of a Loss which does not result from a Third Party Claim (a "**Direct Claim**") shall be asserted by the Indemnified Party giving the Indemnifying Party reasonably prompt written notice thereof, but in any event not later than thirty (30) days after the Indemnified Party has actual knowledge of such Direct Claim. The failure of the Indemnified Party to give reasonably prompt notice of any Direct Claim shall not release, waive or otherwise affect the Indemnifying Party's obligations with respect thereto unless, and only to the extent, that the Indemnifying Party can demonstrate actual material loss and material prejudice as a result of such failure. Such notice by the Indemnified Party shall describe the Direct Claim in reasonable detail, shall include copies of all material written evidence thereof and shall indicate the estimated amount, if reasonably practicable, of the Loss that has been or may be sustained by the Indemnified Party. The Indemnifying Party shall have thirty (30) days after its receipt of such notice to respond in writing to such Direct Claim. The Indemnified Party shall allow the Indemnifying Party and its professional advisors to investigate the matter or circumstance alleged to give rise to the Direct Claim, and whether and to what extent any amount is payable in respect of the Direct Claim and the Indemnified Party shall assist the Indemnifying Party's investigation by giving such information and assistance (including access to the Company's premises and personnel and the right to examine and copy any accounts, documents or records) as the Indemnifying Party or any of its professional advisors may reasonably request. If the Indemnifying Party does not so respond within such thirty (30) day period, the Indemnifying Party shall be deemed to have acknowledged and agreed to pay such claim in full and to have waived any right to dispute such claim.

**Section 9.06 Payments**. Once a Loss is agreed to by the Indemnifying Party or is determined to be payable pursuant to this **Article IX**, the Indemnifying Party shall satisfy its obligations within two (2) Business Days of such determination by wire transfer of immediately available funds, subject to Buyer's election to excise its rights of set-off under **Section 9.07**.

**Section 9.07 Set-Off .** Sellers hereby agree and acknowledge that Buyer may, at its sole discretion, offset any or all amounts of Losses against any amounts otherwise payable in connection herewith to any Seller or any Affiliate of such Seller, including without limitation any amounts payable under the Assignment and Royalty Agreement; *provided, however*, that with respect to any indemnification claim made under **Section 9.02(a)** the aggregate amount of set-off shall not exceed the Cap.

**Section 9.08 Exclusive Remedies**. Subject to **Section 6.07** and **Section 11.11**, the Parties acknowledge and agree that their sole and exclusive remedy with respect to any and all claims (other than claims arising from fraud, criminal activity or willful misconduct on the part of a party hereto in connection with the transactions contemplated by this Agreement) for any breach of any representation, warranty, covenant, agreement or obligation set forth herein or otherwise relating to the subject matter of this Agreement, shall be pursuant to the indemnification provisions set forth in **Article VII** and this **Article IX**. In furtherance of the foregoing, each Party hereby waives, to the fullest extent permitted under Law, any and all rights, claims and causes of action for any breach of any representation, warranty, covenant, agreement or obligation set forth herein or otherwise relating to the subject matter of this Agreement it may have against the other parties hereto and their Affiliates and each of their respective Representatives arising under or based upon any Law, except pursuant to the indemnification provisions set forth in **Article VII** and this **Article IX**. Nothing in this **Section 9.08** shall limit any Person's right to seek and obtain any equitable relief to which any Person shall be entitled or to seek any remedy on account of any party's fraudulent, criminal or intentional misconduct.

**ARTICLE X**
**Termination**

**Section 10.01 Termination**. This Agreement may be terminated at any time prior to the Closing:

(a) by the mutual written consent of Sellers' Representative and Buyer;

(b) by Buyer by written notice to Sellers' Representative if:

(i) Buyer is not then in material breach of any provision of this Agreement and there has been a breach, inaccuracy in or failure to perform any representation, warranty, covenant or agreement made by the Company or any Seller pursuant to this Agreement that would give rise to the failure of any of the conditions specified in **Article VIII** and such breach, inaccuracy or failure has not been cured by the Company or any Seller within ten (10) days of Sellers' Representative's receipt of written notice of such breach from Buyer; or

(ii) any of the conditions set forth in **Section 8.01** or **Section 8.02** shall not have been, or if it becomes apparent that any of such conditions will not be, fulfilled by July 1, 2019, unless such failure shall be due to the failure of Buyer to perform or comply with any of the covenants, agreements or conditions hereof to be performed or complied with by it prior to the Closing;

(c) by Sellers' Representative by written notice to Buyer if:

(i) the Company and Sellers are not then in material breach of any provision of this Agreement and there has been a breach, inaccuracy in or failure to perform any representation, warranty, covenant or agreement made by Buyer pursuant to this Agreement that would give rise to the failure of any of the conditions specified in **Article VIII** and such breach, inaccuracy or failure has not been cured by Buyer within ten (10) days of Buyer's receipt of written notice of such breach from Sellers' Representative; or

(ii) any of the conditions set forth in **Section 8.01** or **Section 8.03** shall not have been, or if it becomes apparent that any of such conditions will not be, fulfilled by July 1, 2019, unless such failure shall be due to the failure of the Company or any Seller to perform or comply with any of the covenants, agreements or conditions hereof to be performed or complied with by any of them prior to the Closing; or

(d) by Buyer or Sellers' Representative in the event that (i) there shall be any Law that makes consummation of the transactions contemplated by this Agreement illegal or otherwise prohibited or (ii) any Governmental Authority shall have issued a Governmental Order restraining or enjoining the transactions contemplated by this Agreement, and such Governmental Order shall have become final and non-appealable.

**Section 10.02 Effect of Termination**. In the event of the termination of this Agreement in accordance with this Article, this Agreement shall forthwith become void and there shall be no liability on the part of any party hereto except:

(a) as set forth in this **Article X** and **Section 6.16** and **Article XI** hereof; and

(b) that nothing herein shall relieve any party hereto from liability for any willful breach or material breach of any provision hereof, or for fraud or criminal misconduct.

## ARTICLE XI
## Miscellaneous

**Section 11.01 Expenses**. Except as otherwise expressly provided herein, all costs and expenses, including, without limitation, fees and disbursements of counsel, financial advisors and accountants, incurred in connection with this Agreement and the transactions contemplated hereby shall be paid by the Party incurring such costs and expenses, whether or not the Closing shall have occurred; *provided, however*, that Sellers shall be responsible for payment of all Company Transaction Expenses prior to or at Closing and Buyer shall pay all brokers' and other fees incurred by it as set forth in **Section 5.03** of the Disclosure Schedules, and Sellers shall pay all brokers' and other fees incurred by it as set forth in **Section 4.15** of the Disclosure Schedules.

**Section 11.02 Notices**. All notices, requests, consents, claims, demands, waivers and other communications hereunder shall be in writing and shall be deemed to have been given (a) when delivered by hand (with written confirmation of receipt); (b) when received by the addressee if sent by a nationally recognized overnight courier (receipt requested); (c) on the date sent by facsimile or e-mail of a PDF document (with confirmation of transmission) if sent during normal business hours of the recipient, and on the next Business Day if sent after normal business hours of the recipient or (d) on the third day after the date mailed, by certified or registered mail, return receipt requested, postage prepaid. Such communications must be sent to the respective parties at the following addresses (or at such other address for a party as shall be specified in a notice given in accordance with this **Section 11.02**):

**If to Sellers or Sellers' Representative**:

Hesperix SA
Agus Corporate Services SA
Via Luganetto 4
PO Box 433
CH-6962 Lugano-Viganello
Facsimile:
E-mail:
Attention: Alexey Andreevich Vinogradov

with a copy (which shall not constitute notice) to:

Alexey Andreevich Vinogradov 119311 Moscow, Russia
4-7-54 Stroiteley str
Facsimile:
E-mail:
Attention: Alexey Andreevich Vinogradov

**If to Buyer**:

Xenetic Biosciences, Inc.
40 Speen Street, Suite 102
Framingham, MA 01701
E-mail: j.eisenberg@xeneticbio.com
Attn: Special Committee
Jeffrey F. Eisenberg, Chief Executive Officer

with a copy (which shall not constitute notice) to:

Akerman LLP
Three Brickell City Centre
98 Southeast Seventh Street
Suite 1100
Miami, Florida 33131
Facsimile: (305) 374.5095
Email: Teddy.Klinghoffer@Akerman.com
Andrea.Fisher@Akerman.com
Attn: Teddy Klinghoffer, Esq.
Andrea Fisher Evans, Esq.

**Section 11.03 Interpretation**. For purposes of this Agreement, (a) words "include," "includes" and "including" shall be deemed to be followed by the words "without limitation"; (b) the word "or" is not exclusive; and (c) the words "herein," "hereof," "hereby," "hereto" and "hereunder" refer to this Agreement as a whole. Unless the context otherwise requires, references herein: (x) to Articles, Sections, Disclosure Schedules and Exhibits mean the Articles and Sections of, and Disclosure Schedules and Exhibits attached to, this Agreement; (y) to an agreement, instrument or other document means such agreement, instrument or other document as amended, supplemented and modified from time to time to the extent permitted by the provisions thereof and (z) to a statute means such statute as amended from time to time and includes any successor legislation thereto and any regulations promulgated thereunder. This Agreement shall be construed without regard to any presumption or rule requiring construction or interpretation against the party drafting an instrument or causing any instrument to be drafted. The Disclosure Schedules and Exhibits referred to herein shall be construed with, and as an integral part of, this Agreement to the same extent as if they were set forth verbatim herein.

**Section 11.04 Headings**. The headings in this Agreement are for reference only and shall not affect the interpretation of this Agreement.

**Section 11.05 Severability**. If any term or provision of this Agreement is invalid, illegal or unenforceable in any jurisdiction, such invalidity, illegality or unenforceability shall not affect any other term or provision of this Agreement or invalidate or render unenforceable such term or provision in any other jurisdiction. Except as provided in **Section 6.07(e)**, upon such determination that any term or other provision is invalid, illegal or unenforceable, the parties hereto shall negotiate in good faith to modify this Agreement so as to effect the original intent of the parties as closely as possible in a mutually acceptable manner in order that the transactions contemplated hereby be consummated as originally contemplated to the greatest extent possible.

**Section 11.06 Entire Agreement**. This Agreement, the Disclosure Schedules and the other Transaction Documents constitute the sole and entire agreement of the parties to this Agreement with respect to the subject matter contained herein and therein, and supersede all prior and contemporaneous understandings and agreements, both written and oral, with respect to such subject matter. No Party is relying on any representation and warranty of the other party not specifically set forth herein. In the event of any inconsistency between the statements in the body of this Agreement and those in the other Transaction Documents, the Exhibits and Disclosure Schedules (other than an exception expressly set forth as such in the Disclosure Schedules), the statements in the body of this Agreement will control.

**Section 11.07 Successors and Assigns**. This Agreement shall be binding upon and shall inure to the benefit of the parties hereto and their respective successors and permitted assigns. Neither Party may assign its rights or obligations hereunder without the prior written consent of the other Party, which consent shall not be unreasonably withheld or delayed; *provided, however*, that prior to the Closing Date, Buyer may, without the prior written consent of Sellers, assign all or any portion of its rights under this Agreement to one or more of its direct or indirect wholly-owned subsidiaries. No assignment shall relieve the assigning party of any of its obligations hereunder.

**Section 11.08 No Third-party Beneficiaries**. Except as provided in **Section 7.03** and **Article IX**, this Agreement is for the sole benefit of the Parties hereto and their respective successors and permitted assigns and nothing herein, express or implied, is intended to or shall confer upon any other Person or entity any legal or equitable right, benefit or remedy of any nature whatsoever under or by reason of this Agreement.

**Section 11.09 Amendment and Modification; Waiver**. This Agreement may only be amended, modified or supplemented by an agreement in writing signed by Buyer and the Sellers' Representative on behalf of the Sellers. No waiver by any party of any of the provisions hereof shall be effective unless explicitly set forth in writing and signed by Buyer or Sellers' Representative on behalf of Sellers. No waiver by any Party shall operate or be construed as a waiver in respect of any failure, breach or default not expressly identified by such written waiver, whether of a similar or different character, and whether occurring before or after that waiver. No failure to exercise, or delay in exercising, any right, remedy, power or privilege arising from this Agreement shall operate or be construed as a waiver thereof; nor shall any single or partial exercise of any right, remedy, power or privilege hereunder preclude any other or further exercise thereof or the exercise of any other right, remedy, power or privilege.

**Section 11.10 Governing Law; Submission to Jurisdiction; Waiver of Jury Trial.**

(a) This Agreement, including the relationship between the Sellers and the Sellers' Representative, shall be governed by and construed in accordance with the internal laws of the State of Delaware without giving effect to any choice or conflict of law provision or rule (whether of the State of Delaware or any other jurisdiction).

(b) ANY LEGAL SUIT, ACTION OR PROCEEDING ARISING OUT OF OR BASED UPON THIS AGREEMENT, THE OTHER TRANSACTION DOCUMENTS OR THE TRANSACTIONS CONTEMPLATED HEREBY OR THEREBY MAY BE INSTITUTED IN THE FEDERAL COURTS OF THE UNITED STATES OF AMERICA OR THE COURTS OF THE STATE OF DELAWARE IN EACH CASE LOCATED IN THE COUNTY OF NEW CASTLE, AND EACH PARTY IRREVOCABLY SUBMITS TO THE EXCLUSIVE JURISDICTION OF SUCH COURTS IN ANY SUCH SUIT, ACTION OR PROCEEDING. SERVICE OF PROCESS, SUMMONS, NOTICE OR OTHER DOCUMENT BY MAIL TO SUCH PARTY'S ADDRESS SET FORTH HEREIN SHALL BE EFFECTIVE SERVICE OF PROCESS FOR ANY SUIT, ACTION OR OTHER PROCEEDING BROUGHT IN ANY SUCH COURT. THE PARTIES IRREVOCABLY AND UNCONDITIONALLY WAIVE ANY OBJECTION TO THE LAYING OF VENUE OF ANY SUIT, ACTION OR ANY PROCEEDING IN SUCH COURTS AND IRREVOCABLY WAIVE AND AGREE NOT TO PLEAD OR CLAIM IN ANY SUCH COURT THAT ANY SUCH SUIT, ACTION OR PROCEEDING BROUGHT IN ANY SUCH COURT HAS BEEN BROUGHT IN AN INCONVENIENT FORUM.

(c) EACH PARTY ACKNOWLEDGES AND AGREES THAT ANY CONTROVERSY WHICH MAY ARISE UNDER THIS AGREEMENT OR THE OTHER TRANSACTION DOCUMENTS IS LIKELY TO INVOLVE COMPLICATED AND DIFFICULT ISSUES AND, THEREFORE, EACH SUCH PARTY IRREVOCABLY AND UNCONDITIONALLY WAIVES ANY RIGHT IT MAY HAVE TO A TRIAL BY JURY IN RESPECT OF ANY LEGAL ACTION ARISING OUT OF OR RELATING TO THIS AGREEMENT, THE OTHER TRANSACTION DOCUMENTS OR THE TRANSACTIONS CONTEMPLATED HEREBY OR THEREBY. EACH PARTY TO THIS AGREEMENT CERTIFIES AND ACKNOWLEDGES THAT (A) NO REPRESENTATIVE OF ANY OTHER PARTY HAS REPRESENTED, EXPRESSLY OR OTHERWISE, THAT SUCH OTHER PARTY WOULD NOT SEEK TO ENFORCE THE FOREGOING WAIVER IN THE EVENT OF A LEGAL ACTION, (B) SUCH PARTY HAS CONSIDERED THE IMPLICATIONS OF THIS WAIVER, (C) SUCH PARTY MAKES THIS WAIVER VOLUNTARILY, AND (D) SUCH PARTY HAS BEEN INDUCED TO ENTER INTO THIS AGREEMENT BY, AMONG OTHER THINGS, THE MUTUAL WAIVERS AND CERTIFICATIONS IN THIS **SECTION 11.10(C)**.

**Section 11.11 Specific Performance**. The Parties agree that irreparable damage would occur if any provision of this Agreement were not performed in accordance with the terms hereof and that the Parties shall be entitled to specific performance of the terms hereof, in addition to any other remedy to which they are entitled at law or in equity.

**Section 11.12 Prevailing Party Fees**. In the event of a dispute arising under this Agreement or any Transaction Documents, whether or not a lawsuit or other proceeding is filed, the prevailing Party shall be entitled to recover its attorneys' fees, costs and expenses, including those incurred in any appellate proceeding or in the process of determining the amount of such fees, or in collection or enforcement of any judgment, award or the like, from the non-prevailing party.

**Section 11.13 Counterparts**. This Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which together shall be deemed to be one and the same agreement. A signed copy of this Agreement delivered by facsimile, e-mail or other means of electronic transmission shall be deemed to have the same legal effect as delivery of an original signed copy of this Agreement.

**IN WITNESS WHEREOF**, the Parties hereto have caused this Agreement to be executed as of the date first written above by their respective officers thereunto duly authorized.

**SELLERS:**

/s/ Dr. Alexander Gabibovich Gabibov
Dr. Alexander Gabibovich Gabibov

/s/ Alexey Vyacheslavovich Stepanov
Alexey Vyacheslavovich Stepanov

/s/ Alexey Anatolievich Belogurov
Alexey Anatolievich Belogurov

/s/ Dr. Dmitry Dmitrievich Genkin
Dr. Dmitry Dmitrievich Genkin

/s/ Dr. Alexey Vinogradov
Dr. Alexey Vinogradov

/s/ Dr. Richard Lerner
Dr. Richard Lerner

/s/ Ivan Vitalievich Smirnov
Ivan Vitalievich Smirnov

[SIGNATURE PAGE TO SHARE PURCHASE AGREEMENT]

**BUYER:**

XENETIC BIOSCIENCES, INC.

By: /s/ Jeffrey Eisenberg
Name: Jeffrey Eisenberg
Title: CEO

**COMPANY:**

**HESPERIX SA**

By: /s/ Robert Frigerio
Name: Robert Frigerio
Title: Director

**SELLERS' REPRESENTATIVE:**

**Alexey Andreevich Vinogradov**

By: /s/ Aexey Andreevich Vinogradov
Name: Alexey Andreevich Vinogradov
Title:

[SIGNATURE PAGE TO SHARE PURCHASE AGREEMENT]

**EXHIBIT A**

**ASSIGNMENT AGREEMENT**

This Assignment Agreement (the "Agreement") is dated as of March 1, 2019 (the "Effective Date") by and between:

(i) Hesperix SA, a corporation registered under the laws of Switzerland, company no. CHE-434.229.465, located at via Luganetto 4, 6962, Viganello, Switzerland ("Hesperix" or "Assignee"), on one hand, and

(ii) (1) Alexey Vyacheslavovich Stepanov, an individual residing at Ostrovityananova street, bld. 45/2, app. 44, Moscow, 117342, Russian Federation ("Stepanov"),

(2) Alexander Gabibovich Gabibov, an individual residing at Yauzsky Boulevard 14, App.10, Moscow 109028, Russian Federation ("Gabibov"),

(3) Ivan Vitalievich Smirnov, an individual residing at 2/1 Kutuzovskiy prt, App 222 121248, Moscow, Russian Federation ("Smirnov");

(4) Dmitry Dmitrievich Genkin, an individual residing at Konstantinovsky Avenue 26, App 2, St. Petersburg 197110 Russian Federation ("Genkin"),

(5) Richard A. Lerner, an individual, residing at 7750 Roseland Drive, La Jolla, CA 92037, USA ("Lerner"),

(6) Alexey Anatolievich Belogurov, an individual residing at Ryblevskoe shosse, bld. 9, app. 53, Moscow 121108, Russian Federation ("Belogurov"),

(7) Alexey Vinogradov, an individual residing at 4, Stroiteley Str., Block 4, App. 54, Moscow, Russian Federation ("Vinogradov");

(8) Shemyakin-Ovchinnikov Institute of Bioorganic Chemistry, Russian Academy of Sciences, an educational institution, located at Miklukho-Maklaya 16/10, 117997, Moscow, V-437, Russian Federation (the "Institute"),

(9) PJSC «Pharmsynthez», a public joint stock company located at 134, Liter l, Kuzmolovsky urban-type settlement, Capitolovo station, Vsevolozhsky district, 188663, Leningrad region, Russian Federation ("Pharmsynthez") (Stepanov, Gabibov, Genkin, Lerner, Belogurov, the Institute, and Pharmsynthez, collectively "Assignors"), on the other hand.

**RECITALS**

Whereas, Hesperix is a pharmaceutical company engaged in the research, development, manufacturing, and commercialization of pharmaceutical and biological products;

Whereas, the Assignors are named inventors, applicants, or owners of one or more of the Patents (as defined below);

Whereas, Gabibov, Stepanov, Smirnov, Belogurov, Genkin, and Vinogradov, as of the Effective Date, are shareholders of Hesperix;

Whereas, prior hereto, each of Stepanov, Gabibov and Belogurov granted to the Institute an irrevocable assignment of the Patents each owned, and in turn, the Institute hereby grants to the Assignee an assignment of such Patents as provided herein;

Whereas, prior hereto, Genkin granted to Pharmsynthez an irrevocable assignment of the Patents he owned, and in turn, Pharmsynthez hereby grants to the Assignee an assignment to such Patents as provided herein;

Whereas, prior hereto, Lerner, as an employee of The Scripps Research Institute, a California public benefit corporation located at 10550 North Torrey Pines Road, La Jolla, CA 92037, USA ("Scripps"), granted to Scripps an irrevocable assignment of the Patents he owned;

Whereas, the Assignors, directly or indirectly, desire to assign to Hesperix all of their respective rights, title, and interests in the Patents and Know-How as provided herein; and

Whereas, Hesperix desires to acquire the Assignors' respective rights, title, and interests in the Patents as provided herein;

Now, Therefore, in consideration of the foregoing premises and the mutual covenants contained herein, the Parties (as defined below), intending to be legally bound, agree as follows:

**ARTICLE 1**
**DEFINITIONS**

The following terms shall have the following meanings as used in this Agreement:

1.1 "Actions" means all charges, complaints, actions, suits, proceedings, hearings, investigations, claims, demands, judgments, orders, decrees, stipulations or injunctions.

1.2 "Affiliate" means any Person (as defined below) or combination thereof that, directly or indirectly, owns or controls a Party (as defined below) hereto, is owned or controlled by such Party or is under common ownership or control with such Party, the terms "control" and "controlled" in this definition (including, with correlative meaning, the terms "controlled by" or "under the common control with") meaning ownership (including ownership by trusts with substantially the same beneficial interests, or by contract or otherwise) of at least fifty percent (50%) of the voting or equity rights of such Person or combination thereof or the power to direct the management of such Person or combination thereof. For the avoidance of doubt, neither of the Parties shall be deemed to be an Affiliate of the other solely as a result of their entering into this Agreement.

1.3 "Business Day" means any day other than (i) Saturday or Sunday or (ii) any other day on which banks in New York, New York are permitted or required to be closed.

1.4 "Calendar Day" means any day.

1.5 "Calendar Quarter" means the three (3) month periods ending on March 31, June 30, September 30, and December 31 in each Calendar Year (as defined below).

1.6 "Calendar Year" means the twelve (12) month period beginning January 1 and ending December 31 of any year.

1.7 "Commercial Sale" means any arm's length sale by Hesperix or by any licensee of any of Hesperix's right, title or interest in the Patents (as defined below) to a Third Party (as defined below). Sales for test marketing, clinical study purposes, or compassionate, named patient, or similar use shall not constitute a Commercial Sale.

1.8 "Confidential Information" shall mean, with respect to any Party hereto, all confidential or proprietary information, whether written, electronic, or oral, which is disclosed by a Party (the "Disclosing Party") to another Party (the "Receiving Party"). Notwithstanding the foregoing, Confidential Information of a Party shall not include information: (a) which was publicly known prior to initial disclosure of such information by the Disclosing Party to the Receiving Party, (b) that has become publicly known, in print, other tangible form, or electronic form, without any act or omission of the Receiving Party, (c) received by the Receiving Party without restriction at any time from a Third Party (as defined below), other than the Disclosing Party, rightfully having possession of and the right to disclose such information, (d) shown to have been otherwise known by the Receiving Party prior to disclosure of such information by the Disclosing Party to the Receiving Party as proven by prior written records in existence prior to such initial disclosure, or (e) shown to have been independently developed by employees or agents of the Receiving Party without access to or use of such information of the Disclosing Party as proven by the receiving party's written records.

1.9 "Control" means (except as otherwise used in the context of the definition of Affiliates), with respect to any intellectual property right or other intangible property in which a Party (as defined below) or one of its Affiliates has, in whole or in part, any right, title, interest, license or sublicense, the ability to grant direct or indirect access, license, or sublicense to without violating the terms of any agreement or other arrangement in force as of the Effective Date with any Third Party (as defined below).

1.10 "Governmental Authority" means any court, tribunal, arbitrator, agency, legislative body, commission, official or other instrumentality of (a) any government of any country, (b) a federal, state, province, county, city or other political subdivision thereof or (c) any supranational body, including the European Agency for the Evaluation of Medicinal Products.

1.11 "Herein", "hereof", and "hereunder" and words of like import refer to this Agreement as a whole and not to any particular provision of this Agreement.

1.12 "Include", "includes", or "including" shall be deemed to be followed by the words "without limitation", whether or not they are in fact followed by those words or words of like import.

1.13 "Know-How" means the names of the vendors that, as of the Effective Date, are contemplated by the Assignors to carry out the development of the inventions claimed in the Patents.

1.14 "Knowledge" means, with respect to a natural person, to the recollection, as of the Effective Date, of that natural person, and with respect to a non-natural person, to the recollection, as of the Effective Date, of that natural person executing this Agreement on behalf of such non-natural person.

1.15 "Law" means all laws, statutes, rules, codes, regulations, orders, judgments, or ordinances of any Governmental Authority.

1.16 "Net Sales" means, with respect to a Product, the amount invoiced by Hesperix, its Affiliates, or any of their respective licensees for Commercial Sales of such Product less:

(i) transportation charges, warehousing costs and expenses, freight and insurance;

(ii) taxes (other than taxes based on income), tariffs, regulatory fees, user fees, customs duty, excise, or other duty, manufacture, use, and any other governmental charges, all to the extent imposed upon the sale, transportation or delivery of such Product and paid by the seller;

(iii) Third Party (as defined below) distributor fees;

(iv) trade discounts, quantity discounts, cash discounts, prompt payment discounts, rebates, free goods (including 2-for-1 and the like), or chargebacks actually granted, given, allowed, or incurred in the ordinary course of business in connection with the sale of such Product, including any credits, volume rebates, charge-back and prime vendor rebates, fees, reimbursements or similar payments granted or given to wholesalers and other distributors, buying groups, health care insurance carriers, pharmacy benefit management companies, health maintenance organizations, or other institutions or health care organizations, physicians, or patients;

(v) adjustments, allowances or credits to customers, including on account of price adjustments, governmental requirements, billing errors, rejection, damage, recalls, or return of such Product;

(vi) payments or rebates paid in connection with sales of Products to any Governmental Authority or regulatory authority in respect of any state or federal Medicare, Medicaid, or similar programs; and

(vii) any item substantially similar in character or substance to the foregoing.

For the purposes of determining Net Sales, in the event a Product is sold in a finished combination package containing such Product packaged together in combination with one or more other products, devices, equipment or components (a "Combination Product"), Net Sales for such Combination Product will be calculated by multiplying actual Net Sales of such Combination Product by the fraction A/(A+B) where A is the selling price of the Product if sold separately in finished form and B is the selling price of any other products, equipment or components in the Combination Product if sold separately in finished form provided that the selling price of any Combination Product shall not be less than A+B. In the event that a product containing Product or one or more of such products, equipment or components in the Combination Product are not sold separately, then the parties shall negotiate in good faith a formula for calculating Net Sales for such Combination Product that reflects the respective contributions of the product containing Product and such other products, equipment or components to the overall value of such Combination Product. Assignee covenants that it will not intentionally manipulate any part of the fraction A/ (A+B) to avoid or reduce royalty payments or obligations that would otherwise be due for sales of Product in combination form or otherwise.

Notwithstanding the foregoing, the disposition of a Product or the use of the Product in clinical studies, compassionate, named patient, test marketing, any non-registrational studies, or any other instance where the Product is supplied without charge shall not result in any Net Sales. Any Products donated by Hesperix, its licensee, or its assignee to non-profit institutions or government agencies for a non-commercial purpose shall not result in any Net Sales. Similarly, any free Products (including two for one and the like) which are supplied to a Third Party (as defined below) in conjunction with the offer for sale or sale of any Product will not result in any Net Sales of such free goods. Additionally, amounts received by Hesperix, its licensee(s), its assignee(s) or any respective Affiliates of any of the foregoing for the sale of Products among any of the foregoing for resale shall not be included in the computation of Net Sales hereunder. The use of a Product by or on behalf of Hesperix, its licensee(s), or any of Affiliates of any of the foregoing for research and Development purposes shall not result in any Net Sales.

1.17 “Party” means any of Hesperix, Stepanov, Gabibov, Smirnov, Genkin, Lerner, Belogurov, Vinogradov, the Institute, or Pharmsynthez.

1.18 “Parties” means all of Hesperix, Stepanov, Gabibov, Smirnov, Genkin, Lerner, Belogurov, Vinogradov, the Institute, and Pharmsynthez.

1.19 “Patents” means (i) the patent applications listed in Exhibit 1.17; (ii) any valid and enforceable patents, re-examinations, reissues, renewals, extensions, supplementary protection certificates and term restorations, any confirmation patent or registration patent or patent of addition based on any such patent application, (iii) all continuation, continuation-in-part, divisional, provisional, and substitute applications and inventors’ certificates of any of the foregoing; (iv) all foreign counterparts of any of the foregoing; and (v) all priority applications of any of the foregoing.

1.20 “Person” means any natural person, corporation, firm, business trust, joint venture, association, organization, company, partnership, other entity or combination, government, or any agency, or subdivisions of any of the foregoing.

1.21 “Product” means any active pharmaceutical, chemical or biological ingredient, component thereof, formulation thereof, dosage form, or use or manufacture of any of the foregoing disclosed in a Patent or encompassed by the claims of a Patent. For the avoidance of doubt, any Product that includes more than one such active pharmaceutical, chemical or biological ingredient, component thereof, formulation thereof, or dosage form thereof will be considered a single Product.

1.22 “Third Party” means any Person other than any of the Parties.

1.23 “Valid Claim” means a claim of an issued and unexpired patent or a claim of a pending patent application within the Patents which has not been held unpatentable, invalid or unenforceable by a court or other government agency of competent jurisdiction and has not been admitted to be invalid or unenforceable through reissue, reexamination, disclaimer or otherwise; provided, however, that if the holding of such court or agency is later reversed by a court or agency with overriding authority, the claim shall be reinstated as a Valid Claim with respect to Net Sales made after the date of such reversal. Notwithstanding the foregoing provisions of this Section 1.23, if a claim of a pending patent application within the Patents has not issued as a claim of an issued patent within the Patents, within nine (9) years after the filing date from which such claim takes priority, such pending claim shall not be a Valid Claim for purposes of this Agreement.

1.24 “Writing”, “written”, and comparable terms refer to printing, typing and other means of reproducing words (including electronic media) in a visible form.

1.25 Additional Definitions. Each of the following definitions is set forth in the Sections indicated below:

| Definition | Section |
|---|---|
| Affected Party | Section 6.2 |
| Agreement | Preamble |
| Bankruptcy Event | Section 6.2 |
| Belogurov | Preamble |
| Combination Product | Section 1.16 |
| Confirmatory Assignment | Section 2.1(b) |
| Control (wrt Affiliate) | Section 1.2 |
| Disclosing Party | Section 1.8 |
| Effective Date | Preamble |
| Gabibov | Preamble |
| Genkin | Preamble |
| Hesperix | Preamble |
| Institute | Preamble |
| IP License Agreement | Recitals |
| Lerner | Preamble |
| Pharmsynthez | Preamble |
| Receiving Party | Section 1.8 |
| Required Third Party License | Section 3.6 |
| Scripps | Recitals |
| Scripps Rights | Section 2.1(b) |
| Smirnov | Preamble |
| Stepanov | Preamble |
| Vinogradov | Preamble |
| Withholding Taxes | Section 3.7 |

1.26 Agreement References. References to any agreement or contract are to that agreement or contract as amended, modified or supplemented in writing from time to time in accordance with the terms hereof and thereof.

1.27 Ambiguities. Ambiguities, if any, in this Agreement shall not be construed against any Party, irrespective of which Party may be deemed to have authored the ambiguous provision.

1.28 Capitalization. Any capitalized terms used in any Schedule or Exhibit but not otherwise defined therein shall have the meaning as defined in this Agreement.

1.29 Date References. References from or through any date mean, unless otherwise specified, from and including or through and including, respectively.

1.30 Gender. Unless the context of this Agreement otherwise requires, words of one gender include the other gender.

1.31 Headings. Headings and captions of the Articles and Sections hereof are for convenience only and are not to be used in the interpretation of this Agreement.

1.32 Joint and Several Obligations. Unless specified otherwise in this Agreement, the obligations of all Parties hereto are several.

1.33 No Strict Construction. This Agreement has been prepared jointly and shall not be strictly construed against either Party.

1.34 Number of Days. Whenever this Agreement refers to a number of days, unless otherwise specified, such number shall refer to Calendar Days.

1.35 Person References. References to any Person include the successors and permitted assigns of that Person.

1.36 References to Parts of this Agreement. References to Articles and Sections are to Articles and Sections of this Agreement unless otherwise specified.

1.37 Exhibits. All Exhibits annexed hereto or referred to herein are hereby incorporated in and made a part of this Agreement as if set forth in full herein.

1.38 Singular/Plural. Any singular term in this Agreement shall be deemed to include the plural, and any plural term the singular.

1.39 United States Dollars. References in this Agreement to "Dollars" or "$" shall mean the legal tender of the United States of America.

**ARTICLE 2 – ASSIGNMENT**

2.1 Assignments; Certain Representations.

(a) Prior to the Effective Date, each of Stepanov, Gabibov and Belogurov will have granted to the Institute an irrevocable assignment of the Patents each owned, and Genkin will have granted to Pharmsynthez an irrevocable assignment of the Patents he owned.

(b) Subject to the terms of this Agreement and in order to fulfill the Parties' obligations under this Agreement, Assignors, collectively own all right, title, and interest, throughout the world in all inventions in the Patents and Know-How, free and clear of all liens or other encumbrances of any nature whatsoever other than any right title and interest that Scripps has in the Patents and Know-How (the "Scripps Rights"), and Hesperix desires to purchase all of Assignors' collective rights, title, interests throughout the world in the same, free and clear of all liens or other encumbrances of any nature whatsoever; for the consideration paid by Hesperix, the receipt and sufficiency of which are hereby acknowledged, Assignors, directly or indirectly as provided above, each hereby irrevocably sell, assign, transfer, and convey unto Hesperix all of their individual right, title, and interest throughout the world in and to said Patents and Know-How (including the right to sue for past infringement thereof) including in and to any patent application whether conventional, design, divisional, continuation, continuation-in-part, and continued prosecution applications, requests for continued examination, substitutions, patents of addition, reissues, renewals, or reexams thereof, and in and to all inventions thereon, preparatory to obtaining Letters Patent of the United States and patents throughout the world therefore; and Assignors each hereby authorize the United States Commissioner of Patents and Trademarks to issue any and all Letters Patent of the United States and shall request all patent authorities throughout the world to issue any and all patents anywhere in the world included in or resulting from said Patents, free and clear of all liens or other encumbrances of any nature whatsoever, to Hesperix, for its interest and for the sole use and benefit of Hesperix and its assigns and legal representatives; *provided, however,* that the Parties acknowledge and agree that their respective rights, title, interests,and obligations pursuant to this assignment and Agreement are subject to the rights of the United States Government, existing and as amended, which may arise or result from Scripps and Scripps' assignors receipt of research support from the United States Government. Each Assignor will execute a Confirmatory Assignment substantially in the form of Exhibit 2.1 attached hereto for recordation purposes.

2.2 No Other Technology Rights. It is understood and agreed that this Agreement does not grant any Party any license, covenant, or other right in the intellectual property of any other Party other than as expressly specified in this Agreement. As of the Effective Date, the Assignee or its designee or successor intends to develop Products using the Patents, and each Assignor has and will have no interest in such Products, except as set forth in or contemplated by this Agreement or as an owner of Assignee or Xenetic Biosciences Inc. following the closing of its acquisition of Assignee. No other compensation or amount is owed any other party in connection with making, conceiving or developing the Patents, except as otherwise provided in this Agreement or in any agreement between or among the Parties or Xenetic Biosciences Inc. concerning ownership of Assignee or Xenetic Biosciences Inc.

2.3 Further Acts. Each Assignor hereby agrees and covenants to Hesperix that he/she/it will undertake all legal acts at any time necessary and at no further cost or expense to Hesperix other than those obligations under Article 3 of this Agreement (i) to vest all right, title, and interest in the Patents and Know-How in Hesperix or Hesperix's designee, (ii) to enable Hesperix or Hesperix's designee to prosecute the patents and to issue patents from the Patents, (iii) to enable Hesperix or Hesperix's designee to enforce the Patents against any infringers or to defend against any challenges to the validity or enforceability of the Patents, and (iv) to do all other acts as may be reasonable or necessary to satisfy the intent of the parties hereto.

2.4 Cooperation. The Assignors shall cooperate with Hesperix and its counsel in connection with prosecuting and maintaining the Patents, for example, by providing all pertinent information and data with respect thereto, assisting in reviewing and responding to any actions issued by any patent office, and executing applications, specifications, declarations, oaths, assignments and all similar instruments which Hesperix shall deem necessary. Assignors shall use commercially reasonable efforts at no cost to such Assignors to coordinate and procure that personnel who have knowledge of the Patents and the know-how are available for telephone discussions, and meetings with Hesperix, and facilitate to its commercially reasonable efforts meetings with the Assignors and with patent counsel, as and when reasonably required by Hesperix. The Assignors further agree that their obligation to execute or cause to be executed any such instrument or papers shall continue after the expiration of this Agreement. If Hesperix is unable for any reason to secure the Assignors' signature to apply for or to pursue any application for any United States or foreign patents assigned hereunder to Assignor, then each Inventor hereby irrevocably designates and appoints Hesperix and its duly authorized officers and agents as such Assignor's agent and attorney-in-fact, to act for and in his/her name, place and stead to execute and file any such lawful applications and to do all other lawfully permitted acts to further the prosecution and issuance of letters patent thereon with the same legal force and effect as if executed by such Inventor.

**ARTICLE 3 – PAYMENTS AND PAYMENT TERMS**

3.1 Running Royalties. In consideration for the assignments by the Institute and Pharmsynthez of the Patents and their respective representations, warranties, and covenants made pursuant to this Agreement, and subject to the provisions herein, Hesperix shall, during the Term, pay each of the Institute and Pharmsynthez a running royalty of * percent (*%) (*i.e.,* a total of * percent (*%) divided evenly between the Institute and Pharmsynthez) of Net Sales of Products in each country in which, in absence of this Agreement, the manufacture, use, offer for sale, sale, or importation of the Product would infringe a Valid Claim of an issued patent within the Patents. This running royalty rate will be reduced by * (*) to *percent (*%) to each of the Institute and Pharmsynthez (*i.e.,* a total of * percent (*%) divided evenly between the Institute and Pharmsynthez) in each country in which the manufacture, use, offer for sale, sale, or importation of the Product would infringe a Valid Claim of a pending application within the Patents if such claim were a claim of an issued patent at the time of the sale of such Product but would not infringe a Valid Claim of an issued patent within the Patents. The running royalty rate will be reduced to * percent (*%) to each of the Institute and Pharmsynthez (i.e., a total of * percent (*%) divided evenly between the Institute and Pharmsynthez) for any Royalty Term under Section 3.2 which neither of the foregoing royalty rate is applicable. If Hesperix assigns the Patents to a Third Party, Hesperix will make all of the obligations of Sections 3.1–3.10 become obligations of such Third Party assignee, and upon such assignment of the Patents to such Third Party, Hesperix shall be relieved of these obligations.

Each of the Institute, and Pharmsynthez will be paid only one (1) running royalty each for each unit of Product no matter how many times such unit is sold or how many Patents, absent this Agreement, would be infringed by the manufacture, use, offer for sale, sale, or importation of such Product. All running royalties are non-refundable.

* Portions of this Exhibit have been omitted and filed separately with the Securities and Exchange Commission pursuant to a request for confidential treatment.

3.2 Royalty Term. Running royalties due under Section 3.1 will commence on the Effective Date through, on Product-by-Product and country-by-country bases, the later of (i) the expiration of the last-to-expire Patent, a Valid Claim of which would, absent this Agreement, be infringed by the manufacture, use, offer for sale, sale, or import of a Product or (ii) ten (10) years from the date of first Commercial Sale.

3.3 Royalty Payments and Reports. Running royalties under Section 3.1 shall be due forty-five (45) Calendar Days after the end of each Calendar Quarter. Each payment of running royalties under Article 3 will be accompanied by a report setting forth, on Product-by-Product and country-by-country bases, the amount of gross sales of each Product, a calculation of corresponding Net Sales and the information used to make such calculation, the currency conversion rate used (if applicable), the United States Dollar-equivalent of such Net Sales, and a calculation of the royalty payment due on such Net Sales. Such report will be considered Confidential Information of Hesperix subject to the obligations of Article 4.

3.4 Interest on Late Payments. Any payments or portions thereof due hereunder which are not paid when such payments are due under this Agreement will bear interest at the lower of (a) the U.S. Prime Rate in effect on the due date plus one (1) percentage point or (b) the maximum rate permitted by applicable Law, calculated on the number of Calendar Days such payment is delinquent; provided, that any payments or portions thereof which are disputed in good faith by the Assignee shall not incur any interest thereon unless finally resolved as provided for herein in the applicable Assignor's favor.

3.5 Currency. Royalty payments under this Agreement shall be payable in U.S. dollars and shall be paid by bank wire transfer in immediately available funds to such bank account as designated in writing by the payee. Whenever conversion from any foreign currency shall be required, such conversion shall be at the rate of exchange thereafter published in the Wall Street Journal for the Business Day closest to the end of the applicable accounting period.

3.6 Royalty Reduction. In the event Hesperix is required to obtain a license from a third party in order to avoid infringing such third party's patent(s) in the development, manufacture, use, or sale of any Product (a "Required Third Party License"). Hesperix may deduct one half of any running royalties due under Required Third Party Licenses from any royalties due under this Agreement; *provided, however*, that the royalty due under this Agreement will not be reduced in total by more than one-half.

3.7 Withholding Taxes. The Institute and Pharmsynthez will respectively be responsible for any and all of their respective income or other similar taxes owed by them and required by applicable Law to be withheld or deducted from any payments made by or on behalf of Hesperix to each of them ("Withholding Taxes"), and Hesperix may deduct from any amounts that Hesperix is required to pay hereunder an amount equal to such Withholding Taxes; provided, however, that Hesperix is required by a Governmental Authority to pay such amounts on the Institute's, or Pharmsynthez's behalf. The Institute and Pharmsynthez will provide Hesperix with any information available to the Institute or Pharmsynthez that is necessary to determine the Withholding Taxes (including any potential reduction based on an applicable income tax treaty along with necessary certification of residency for treaty benefits to apply). Such Withholding Taxes will be paid to the proper taxing authority for the Institute's or Pharmsynthez's account, as appropriate, and evidence of such payment that is satisfactory to the Institute or Pharmsynthez as appropriate, will be sent to the Institute or Pharmsynthez as appropriate, within thirty (30) Calendar Days of such payment.

3.8 Cooperation of the Parties. Hesperix, the Institute and Pharmsynthez will do all lawful acts and things and sign all lawful deeds and documents as any may reasonably request from the other(s) to enable Hesperix, the Institute, and Pharmsynthez to take advantage of any applicable legal provision or any double taxation treaties with the object of paying the sums due to the Institute, and Pharmsynthez hereunder without withholding or deducting any Withholding Taxes.

3.9 Record Retention. Hesperix will maintain complete and accurate books, records, and accounts used for the determination of expenses, deductions, credits, or other relevant factors in connection with the calculation of Net Sales, in sufficient detail to confirm the accuracy of any payments required under this Agreement, which books, records, and accounts will be retained by Hesperix until three (3) years after the end of the period to which such books, records, and accounts pertain. Hesperix agrees to allow relevant tax authorities to inspect the records contemplated under this Section 3.9 and otherwise to cooperate in responding to inquiries from tax authorities.

3.10 Audit. The Institute and Pharmsynthez will collectively have the right to have an independent certified public accounting firm have access during normal business hours, and upon reasonable prior written notice, to such of the records of Hesperix as such firm deems reasonably necessary to verify the accuracy of the calculation of Net Sales by Hesperix under this Agreement for any Calendar Quarter ending not more than three (3) years prior to the date of such request; *provided however*, that the Institute, and Pharmsynthez will not have the right to conduct more than one such audit in any twelve (12) month period and that the Institute and Pharmsynthez shall not be permitted to audit the same period of time more than once. The Institute and Pharmsynthez will bear all costs of such audit, unless the audit reveals a discrepancy in the Institute's or Pharmsynthez's, favor of more than twenty percent (20%), in which case Hesperix will bear the cost of the audit (not to exceed 50% of the amount of any underpayment). The Institute and Pharmsynthez will treat all information subject to review under this Article 3 in accordance with the provisions of Article 4 and will cause its accounting firm to enter into a reasonably acceptable confidentiality agreement with the Institute and Pharmsynthez obligating such firm to maintain all such financial information in confidence pursuant to such confidentiality agreement. The independent certified public accounting firm shall report to the Institute, Pharmsynthez, and Hesperix only the conclusions of its audit, that is whether Hesperix has accurately calculated Net Sales or the extent of the inaccuracy, unless any of the Institute, Pharmsynthez, or Hesperix, with reasonable cause, contests the accuracy of the accounting firm's calculations. In the event the independent accounting firm finds discrepancies in Hesperix's calculations of Net Sales, the independent accounting firm shall additionally promptly inform the Institute, Pharmsynthez, and Hesperix of its conclusions and the bases therefore.

3.11 Payment of Additional Amounts or Refunds. If, based on the results of any audit, additional payments are owed to the Institute, or Pharmsynthez, under this Agreement, then Hesperix will make such additional payments promptly after the accounting firm's written report is delivered to Hesperix, the Institute, and Pharmsynthez. If, based on the results of any audit, refunds are owed to Hesperix under this Agreement, then the Institute and Pharmsynthez as appropriate, will make such refunds promptly after the accounting firm's written report is delivered to Hesperix, the Institute, and Pharmsynthez. However, if any of the Institute, Pharmsynthez, or Hesperix, with reasonable cause, contests the accuracy of the accounting firm's calculations, such over or under payment may be withheld pending resolution of the disputed amount.

3.12 Allocation of Shares in Hesperix. Hesperix, Gabibov, Stepanov, Smirnov, Belogurov, Genkin, Vinogradov, and Lerner, agree that upon execution of this Agreement by all Parties, ownership of one hundred percent (100%) of the outstanding shares of Hesperix in all classes will be reallocated (whether by issuance of additional shares or otherwise) as follows and that Hesperix, Gabibov, Stepanov, Smirnov, Belogurov, Genkin, Vinogradov, Lerner, shall undertake all actions and will execute all documents necessary to complete this reallocation :

| **Party** | **Allocation upon Assignment Execution by All Parties, Rounded to two Decimal Places** |
|---|---|
| Gabibov | Twelve and thirty-one hundredths percent (12.31%) |
| Stepanov | Four and sixty-two hundredths percent (4.62%) |
| Smirnov | Three and eight hundredths percent (3.08%) |
| Belogurov | Three and eight hundredths percent (3.08%) |
| Genkin | Twenty-three and eight hundredths percent (23.08%) |
| Lerner | Seven and sixty-nine hundredths Percent (7.69%) |
| Vinogradov | Forty-six and fifteen hundredths percent (46.15%) |

**ARTICLE 4 - CONFIDENTIALITY**

4.1. Nondisclosure Obligations. For a period from the Effective Date to three (3) years after the earlier of the expiration of the Royalty Term (or termination of this Agreement by Hesperix, if Hesperix is the Disclosing Party), the Receiving Party shall maintain as confidential and shall not make any public disclosure of Confidential Information of the Disclosing Party, without the advance written permission of the Disclosing Party, which permission may be withheld by the Disclosing Party at the Disclosing Party's sole discretion; *provided, however*, that to the extent it is reasonably necessary or appropriate to fulfill its obligations or to exercise its rights under this Agreement the Receiving Party may disclose Confidential Information of the Disclosing Party to its Affiliates, its and their respective officers, directors, employees, sublicensees, consultants, outside contractors, clinical investigators, and other Third Parties, on a need-to-know basis and on the condition that such Persons agree to use the Confidential Information only for purposes specifically authorized by this Agreement and to keep the Confidential Information confidential for the same time periods and to the same extent as the Receiving Party is required to keep the Confidential Information confidential hereunder; and (ii) the Receiving Party may disclose Confidential Information to Governmental Authorities to the extent that such disclosure is reasonably necessary to obtain authorizations to conduct clinical trials or to develop or commercially market products, or as otherwise may be required by Law or pursuant to legal or regulatory process; and (iii) the Receiving Party may disclose Confidential Information to its attorneys, accountants, lenders, insurers, and advisors who are bound by a professional duty of confidentiality (so long as the Receiving Party remains responsible for any such breaches by such professionals).

4.2 Nondisclosure of the Agreement. Except as permitted by the other Sections of Article 4 or as otherwise required by Law, the Parties each agree not to disclose any terms or conditions of this Agreement to any Third Party without the prior written consent of the other Party, such consent not to be unreasonable conditioned, delayed, or withheld; *provided* that each Party shall be entitled to disclose the terms of this Agreement without such consent to (a) existing and potential investors or other financing sources on the condition that such Persons agree in writing to keep such terms confidential for the same time periods and to the same extent as such Party is required to keep such terms confidential, (b) to its attorneys, accountants and advisors who are bound by a professional duty of confidentiality (so long as the Receiving Party remains responsible for any such breaches by such professionals or other third parties), and (c) any entity that is publically traded that may acquire all or substantially all of the assets or equity interests of Hesperix, which may further disclose the terms of this Agreement or otherwise as may be required by the rules and regulations of the exchange in which it is listed.

4.3 Press Releases. No public announcement or press release containing the terms of this Agreement, except as otherwise required by Law shall be made or issued, directly or indirectly, by any Party without first obtaining the prior written approval of the other Parties. The Parties agree that any Party preparing any such press release shall provide the other Parties with a draft thereof reasonably in advance of disclosure so as to permit the other Parties to review and comment on such press release prior to any dissemination of such release.

4.4 Injunctive Relief. The Parties hereby acknowledge that a breach of their respective obligations in this Article 4 may cause irreparable harm and that the remedy or remedies at law for any such breach may be inadequate. The Parties hereby agree that, in the event of any such breach, in addition to all other available remedies hereunder, the non-breaching Party shall have the right to obtain equitable relief to enforce the provisions of this Article 4.

**ARTICLE 5 - REPRESENTATIONS AND WARRANTIES**

5.1 Hesperix's Representations and Warranties. Hesperix represents and warrants to the other Parties that:

(a) Hesperix is a corporation duly organized, validly existing, and in good standing under the laws of Switzerland,;

(b) Hesperix has the legal right, authority, and corporate power to enter into this Agreement;

(c) Hesperix has taken all necessary corporate action to authorize the execution, delivery, and performance of this Agreement;

(d) upon the execution and delivery of this Agreement, this Agreement shall constitute a valid and binding obligation of Hesperix, enforceable against Hesperix in accordance with its terms, except to the extent enforceability is limited by bankruptcy, insolvency or similar laws affecting creditors' rights and remedies or equitable principles;

(e) the performance of Hesperix's obligations under this Agreement will not conflict with its organizational documents, as amended, and will not result in a breach of any material agreements or contracts to which it is a party;

(f) Hesperix has not and will not, during the Term, enter into any material agreements or contracts that would be inconsistent with its obligations under this Agreement; and

(g) this Agreement is fully binding and enforceable in accordance with its terms.

5.2 Stepanov's Representations and Warranties. Stepanov represents and warrants to the other Parties that:

(a) Stepanov is an individual;

(b) to his Knowledge, Stepanov is not an inventor, nor does he own any interest in any patents or patent application other than his ownership interest in the Patents that would be infringed by the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the in the Patents as of the Effective Date;

(c) to his Knowledge, the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date, will not infringe any patent or any other rights of any Third Party (other than the Scripps Rights) or contribute to the infringement of other rights of any Third Party (other than the Scripps Rights) in the United States or elsewhere, and no claim, action or suit alleging any such infringement or contribution to infringement is pending (other than with respect to the Scripps Rights) or, to his Knowledge, threatened (other than with respect to the Scripps Rights) in writing against Stepanov or his Affiliates.

(d) his assignment to the Institute of his right, title, and interest in and to the Patents is valid and binding;

(e) upon the execution and delivery of this Agreement, this Agreement shall constitute a valid and binding obligation of Stepanov, enforceable against Stepanov in accordance with its terms, except to the extent enforceability is limited by bankruptcy, insolvency or similar laws affecting creditors' rights and remedies or equitable principles;

(f) the performance of Stepanov's obligations under this Agreement will not result in a breach of any material agreements or contracts to which he is a party;

(g) Stepanov has not and will not, during the Term, enter into any material agreements or contracts that would be inconsistent with his obligations under this Agreement; and

(h) this Agreement is fully binding and enforceable in accordance with its terms.

5.3 Gabibov's Representations and Warranties. Gabibov represents and warrants to the other Parties that:

(a) Gabibov is an individual;

(b) to his Knowledge, Gabibov is not an inventor, nor does he own any interest in any patents or patent applications other than his ownership interest in the Patents that would be infringed by the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date;

(c) to his Knowledge, the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date, will not infringe any patent or any other rights of any Third Party (other than the Scripps Rights) or contribute to the infringement of other rights of any Third Party (other than the Scripps Rights) in the United States or elsewhere, and no claim, action or suit alleging any such infringement or contribution to infringement is pending (other than with respect to the Scripps Rights) or to his Knowledge threatened (other than with respect to the Scripps Rights) in writing against Gabibov or his Affiliates;

(d) his assignment to the Institute of his right, title, and interest in and to the Patents is valid and binding;

(e) upon the execution and delivery of this Agreement, this Agreement shall constitute a valid and binding obligation of Gabibov, enforceable against Gabibov in accordance with its terms, except to the extent enforceability is limited by bankruptcy, insolvency or similar laws affecting creditors' rights and remedies or equitable principles;

(f) the performance of Gabibov's obligations under this Agreement will not result in a breach of any material agreements or contracts to which he is a party;

(g) Gabibov has not and will not, during the Term, enter into any material agreements or contracts that would be inconsistent with his obligations under this Agreement; and

(h) this Agreement is fully binding and enforceable in accordance with its terms.

5.4 Smirnov's Representations and Warranties. Smirnov represents and warrants to the other Parties that:

(a) Smirnov is an individual;

(b) to his Knowledge, Smirnov is not an inventor, nor does he own any interest in any patents or patent applications other than his ownership interest in the Patents that would be infringed by the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date;

(c) to his Knowledge, the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date, will not infringe any patent or any other rights of any Third Party (other than the Scripps Rights) or contribute to the infringement of other rights of any Third Party (other than the Scripps Rights) in the United States or elsewhere, and no claim, action or suit alleging any such infringement or contribution to infringement is pending (other than with respect to the Scripps Rights) or threatened (other than with respect to the Scripps Rights) in writing against Smirnov or his Affiliates;

(d) upon the execution and delivery of this Agreement, this Agreement shall constitute a valid and binding obligation of Smirnov, enforceable against Smirnov in accordance with its terms, except to the extent enforceability is limited by bankruptcy, insolvency or similar laws affecting creditors' rights and remedies or equitable principles;

(e) the performance of Smirnov's obligations under this Agreement will not result in a breach of any material agreements or contracts to which he is a party;

(f) Smirnov has not and will not, during the Term, enter into any material agreements or contracts that would be inconsistent with his obligations under this Agreement; and

(g) this Agreement is fully binding and enforceable in accordance with its terms.

5.5 Genkin's Representations and Warranties. Genkin represents and warrants to the other Parties that:

(a) Genkin is an individual;

(b) to his Knowledge, Genkin is not an inventor, nor does he own any interest in any patents or patent applications other than his ownership interest in the Patents that would be infringed by the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date;

(c) to his Knowledge, the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date, will not infringe any patent or any other rights of any Third Party (other than the Scripps Rights) or contribute to the infringement of other rights of any Third Party (other than the Scripps Rights) in the United States or elsewhere, and no claim, action or suit alleging any such infringement or contribution to infringement is pending (other than with respect to the Scripps Rights) or threatened (other than with respect to the Scripps Rights) in writing against Genkin or his Affiliates;

(d) his assignment to Pharmsynthez of his right, title, and interest in and to the Patents is valid and binding;

(e) upon the execution and delivery of this Agreement, this Agreement shall constitute a valid and binding obligation of Genkin, enforceable against Genkin in accordance with its terms, except to the extent enforceability is limited by bankruptcy, insolvency or similar laws affecting creditors' rights and remedies or equitable principles;

(f) the performance of Genkin's obligations under this Agreement will not result in a breach of any material agreements or contracts to which he is a party;

(g) Genkin has not and will not, during the Term, enter into any material agreements or contracts that would be inconsistent with his obligations under this Agreement; and

(h) this Agreement is fully binding and enforceable in accordance with its terms.

5.6 Lerner's Representations and Warranties. Lerner represents and warrants to the other Parties that:

(a) Lerner is an individual;

(b) to his Knowledge, Lerner is not an inventor, nor does he own any interest in any patents or patent applications other than his ownership interest in the Patents that would be infringed by the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents;

(c) to his Knowledge, the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date, will not infringe any patent or any other rights of any Third Party (other than with respect to the Scripps Rights) or contribute to the infringement of other rights of any Third Party (other than with respect to the Scripps Rights) in the United States or elsewhere, and no claim, action or suit alleging any such infringement or contribution to infringement is pending (other than with respect to the Scripps Rights) or threatened (other than with respect to the Scripps Rights) in writing against Lerner or his Affiliates;

(d) his assignment to Scripps of his right, title, and interest in and to the Patents is valid and binding;

(e) upon the execution and delivery of this Agreement, this Agreement shall constitute a valid and binding obligation of Lerner, enforceable against Lerner in accordance with its terms, except to the extent enforceability is limited by bankruptcy, insolvency or similar laws affecting creditors' rights and remedies or equitable principles;

(f) the performance of Lerner's obligations under this Agreement will not result in a breach of any material agreements or contracts to which he is a party;

(g) Lerner has not and will not, during the Term, enter into any material agreements or contracts that would be inconsistent with his obligations under this Agreement; and

(h) this Agreement is fully binding and enforceable in accordance with its terms.

5.7 Belogurov's Representations and Warranties. Belogurov represents and warrants to the other Parties that:

(a) Belogurov is an individual;

(b) to his Knowledge, Belogurov is not an inventor, nor does he own any interest in any patents or patent applications other than his ownership interest in the Patents that would be infringed by the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date;

(c) to his Knowledge, the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date, will not infringe any patent or any other rights of any Third Party (other than the Scripps Rights) or contribute to the infringement of other rights of any Third Party (other than the Scripps Rights) in the United States or elsewhere, and no claim, action or suit alleging any such infringement or contribution to infringement is pending (other than with respect to the Scripps Rights) or threatened (other than with respect to the Scripps Rights) in writing against Belogurov or his Affiliates;

(c) upon the execution and delivery of this Agreement, this Agreement shall constitute a valid and binding obligation of Belogurov, enforceable against Belogurov in accordance with its terms, except to the extent enforceability is limited by bankruptcy, insolvency or similar laws affecting creditors' rights and remedies or equitable principles;

(d) his assignment to the Institute of his right, title, and interest in and to the Patents is valid and binding;

(e) the performance of Belogurov's obligations under this Agreement will not result in a breach of any material agreements or contracts to which he is a party;

(f) Belogurov has not and will not, during the Term, enter into any material agreements or contracts that would be inconsistent with his obligations under this Agreement; and

(g) this Agreement is fully binding and enforceable in accordance with its terms.

5.8 Vinogradov's Representations and Warranties. Vinogradov represents and warrants to the other Parties that:

(a) Vinogradov is an individual;

(b) to his Knowledge, Vinogradov is not an inventor, nor does he own any interest in any patents or patent applications other than his ownership interest in the Patents that would be infringed by the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date as of the Effective Date;

(c) to his Knowledge, the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date, will not infringe any patent or any other rights of any Third Party (other than the Scripps Rights) or contribute to the infringement of other rights of any Third Party (other than the Scripps Rights) in the United States or elsewhere, and no claim, action or suit alleging any such infringement or contribution to infringement is pending (other than with respect to the Scripps Rights) or threatened (other than with respect to the Scripps Rights) in writing against Vinogradov or his Affiliates;

(d) upon the execution and delivery of this Agreement, this Agreement shall constitute a valid and binding obligation of Vinogradov, enforceable against Vinogradov in accordance with its terms, except to the extent enforceability is limited by bankruptcy, insolvency or similar laws affecting creditors' rights and remedies or equitable principles;

(e) the performance of Vinogradov's obligations under this Agreement will not result in a breach of any material agreements or contracts to which he is a party;

(f) Vinogradov has not and will not, during the Term, enter into any material agreements or contracts that would be inconsistent with his obligations under this Agreement; and

(g) this Agreement is fully binding and enforceable in accordance with its terms.

5.9 The Institute's Representations and Warranties. The Institute represents and warrants to the other Parties that:

(a) the Institute is an educational corporation duly organized, validly existing, and in good standing under the laws of the Russian federation;

(b) to its Knowledge, the Institute does not own any patents or patent applications other than its ownership interest in the Patents that would be infringed by the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date;

(c) to its Knowledge, the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date, will not infringe any patent or any other rights of any Third Party (other than the Scripps Rights) or contribute to the infringement of other rights of any Third Party (other than the Scripps Rights) in the United States or elsewhere, and no claim, action or suit alleging any such infringement or contribution to infringement is pending (other than with respect to the Scripps Rights) or threatened (other than with respect to the Scripps Rights) in writing against the Institute or its Affiliates;

(d) to its Knowledge, the Institute is unaware of any inventions that were invented or may be invented by members of its faculty, or other employees, other than the Assignors, that would be infringed by the making, having made, using, or selling of products claimed in the Patents, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date;

(e) the Institute has the legal right, authority, and corporate power to enter into this Agreement;

(f) the Institute has taken all necessary corporate action to authorize the execution, delivery, and performance of this Agreement;

(g) upon the execution and delivery of this Agreement, this Agreement shall constitute a valid and binding obligation of the Institute, enforceable against the Institute in accordance with its terms, except to the extent enforceability is limited by bankruptcy, insolvency or similar laws affecting creditors' rights and remedies or equitable principles;

(h) the performance of the Institute's obligations under this Agreement will not conflict with its organizational documents, as amended, and will not result in a breach of any material agreements or contracts to which it is a party;

(i) the Institute has not and will not, during the Term, enter into any material agreements or contracts that would be inconsistent with its obligations under this Agreement and

(j) this Agreement is fully binding and enforceable in accordance with its terms.

5.10 Pharmsynthez's Representations and Warranties. Pharmsynthez represents and warrants to the other Parties that:

(a) Pharmsynthez is a public joint stock company duly organized, validly existing, and in good standing under the laws of the Russian Federation;

(b) to its Knowledge, Pharmsynthez does not own any patents or patent applications other than its ownership interest in the Patents that would be infringed by the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date;

(c) to its Knowledge, the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date, will not infringe any patent or any other rights of any Third Party (other than the Scripps Rights) or contribute to the infringement of other rights of any Third Party (other than the Scripps Rights) in the United States or elsewhere, and no claim, action or suit alleging any such infringement or contribution to infringement is pending (other than with respect to the Scripps Rights) or threatened (other than with respect to the Scripps Rights) in writing against Pharmsynthez or its Affiliates;

(d) to its Knowledge, Pharmsynthez is unaware of any inventions that were invented or may be invented by its employees, other than the Assignors, that would be infringed by the making, having made, using, or selling of products claimed in the Patents, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date;

(e) Pharmsynthez has the legal right, authority, and corporate power to enter into this Agreement;

(f) Pharmsynthez has taken all necessary corporate action to authorize the execution, delivery, and performance of this Agreement;

(g) upon the execution and delivery of this Agreement, this Agreement shall constitute a valid and binding obligation of Pharmsynthez, enforceable against Pharmsynthez in accordance with its terms, except to the extent enforceability is limited by bankruptcy, insolvency or similar laws affecting creditors' rights and remedies or equitable principles;

(h) the performance of Pharmsynthez's obligations under this Agreement will not conflict with its organizational documents, as amended, and will not result in a breach of any material agreements or contracts to which it is a party;

(i) Pharmsynthez has not and will not, during the Term, enter into any material agreements or contracts that would be inconsistent with its obligations under this Agreement; and

(j) this Agreement is fully binding and enforceable in accordance with its terms.

5.11 WARRANTY DISCLAIMER. EXCEPT AS EXPRESSLY SET FORTH IN THIS AGREEMENT, NO PARTY MAKES ANY REPRESENTATIONS OR EXTENDS ANY WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING ANY EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO PATENTS AND TECHNOLOGY OR ANY MATERIALS OR INFORMATION PROVIDED TO ANY OTHER PARTY UNDER THIS AGREEMENT, OR WITH RESPECT TO ANY PRODUCTS OR SERVICES OF ANY PARTY OR THEIR RESPECTIVE AFFILIATES. FURTHERMORE, UNLESS EXPRESSLY STATED IN THIS AGREEMENT, NOTHING IN THIS AGREEMENT SHALL BE CONSTRUED AS A WARRANTY, EXPRESS OR IMPLIED, THAT USE BY ANY PARTY OF PATENTS OR ANY MATERIALS OR INFORMATION PROVIDED TO ANY PARTY UNDER THIS AGREEMENT, DO NOT INFRINGE ANY PATENT RIGHTS OR OTHER INTELLECTUAL PROPERTY RIGHTS OF ANY THIRD PARTY.

5.12 EXCLUSION OF DAMAGES; LIMITATIONS OF LIABILITY. EXCEPT FOR LIABILITY FOR BREACH OF CONFIDENTIALITY, NO PARTY SHALL BE LIABLE TO ANY OTHER PARTY HERETO FOR SPECIAL, INDIRECT, INCIDENTAL, OR PUNITIVE DAMAGES, OR CONSEQUENTIAL DAMAGES (INCLUDING DAMAGES RESULTING FROM LOSS OF USE, LOSS OF PROFITS, OR INTERRUPTION OR LOSS OF BUSINESS OR OTHER SIMILIAR ECONOMIC LOSS) ARISING OUT OF THIS AGREEMENT OR WITH RESPECT TO A PARTY'S PERFORMANCE OR NON-PERFORMANCE HEREUNDER.

The foregoing exclusion of damages:

(i) applies even if a Party had or should have had actual or constructive knowledge of the possibility of such damages,

(ii) is a fundamental element of the basis of the bargain among the Parties, and this Agreement would not be entered into without such limitations and exclusions, and

(iii) shall apply whether an Action is based on breach of contract, breach of warranty, tort (including negligence), product liability, strict liability or otherwise, and notwithstanding any failure of essential purpose of any limited remedy herein.

The foregoing exclusion of damages is intended to apply even if there is a total and fundamental breach of this Agreement. The essential purpose of the exclusion of damages clause is to limit the Parties' respective liabilities to each other hereunder.

5.13 Essential Basis. The Parties acknowledge and agree that the disclaimers, exclusions, and limitations of liability set forth in this Article 5 form an essential basis of this Agreement, and that, absent any of such disclaimers, exclusions or limitations of liability, the terms of this Agreement, including the economic terms, would be substantially different.

5.14 Liability. Other than as expressly provided in this Agreement, each Party shall bear all risk, responsibility, and liability for all of its acts or omissions in performing its obligations under this Agreement.

5.15 Compliance with Law. Each Party shall comply, and shall require its Affiliates to comply, with all applicable relative to its obligations hereunder.

5.16 Broker's Fees. Each Party has disclosed to the other whether it has incurred or agreed to pay any broker's commission or finder's fee relating to or in connection with the transactions contemplated by this Agreement.

**ARTICLE 6 - TERMINATION**

6.1 Termination without Cause. Hesperix will be able to terminate this Agreement with any or all Parties without cause immediately upon written notice to the appropriate Party(ies). No other Party shall be able to terminate this Agreement without cause.

6.2 Termination for Financial Reasons. To the extent permitted by Law, upon the filing or institution of bankruptcy, reorganization, liquidation or receivership proceedings, or upon an assignment of a substantial portion of the assets for the benefit of creditors (a "Bankruptcy Event") by any Party, Hesperix may terminate this Agreement; *provided, however*, that, in the case of any involuntary bankruptcy proceeding, such right to terminate will only become effective if the subject Party consents to the involuntary bankruptcy or such proceeding is not dismissed within ninety (90) days after the filing thereof. Hesperix will retain and may fully exercise all of its rights and elections under the U.S. Bankruptcy Code and foreign equivalents, including that upon commencement of a bankruptcy proceeding by or against such Party undergoing a bankruptcy proceeding (the "Affected Party") under the U.S. Bankruptcy Code or foreign equivalents. This Section 6.2 is without prejudice to any rights Hesperix may have arising under the U.S. Bankruptcy Code, foreign equivalents or other Law.

**ARTICLE 7 – OTHER PROVISIONS**

7.1 Assignment. Hesperix will have the right, without the consent of any other Parties, to assign this Agreement, or any part of its rights hereunder, and to delegate its obligations or any part thereof hereunder, to (i) any Affiliate, (ii) any successor in interest by reason of any merger, acquisition, partnership, or license agreement, or (iii) any other Third Party, whereupon the assignee will succeed to such rights, and will assume such obligations, of Hesperix under this Agreement as fully and to the same extent as if the assignee, instead of Hesperix, were the original party to this Agreement with respect to such rights and obligations. Other than as provided for in the preceding sentence, this Agreement may not be assigned, in whole or in part, by any Party without prior written consent of Hesperix, such consent to be at Hesperix's sole discretion. Any assignment in contravention of the provisions of this Section 7.1 shall be null and void. This Section 7.1 will not apply to any assignment of the Patents by Hesperix.

7.2 Notices. Any notice or other communication pursuant to this Agreement shall be sufficiently made or given (i) on the date of transmission if sent to such Party by facsimile or e-mail, with confirmation of transmission, with paper copy being sent by certified first class mail, postage prepaid, or by next day express delivery service, addressed to it at its address below (or such address as it shall designate by written notice given to the other Party) or (ii) on the date of mailing by certified first class mail, postage prepaid, or by next day express delivery service, addressed to it at its address below (or such address as it shall designate by written notice given to the other Party) if no transmission to such Party by facsimile or e-mail, with confirmation of transmission, is made.

If to Hesperix: via Luganetto 4,
6962 Viganello
Switzerland
Attn:

with a copy to: Troutman Sanders LLP
875 Third Avenue
New York, NY 10022
USA
Attn: Irina Vainberg, Ph.D., J.D.

| | |
|---|---|
| If to Stepanov: | Ostrovityananova street<br>bld. 45/2<br>app. 44<br>Moscow 117342<br>Russian Federation |
| If to Gabibov: | Yauzsky Boulevard 14<br>App.10<br>Moscow 109028<br>Russian Federation |
| If to Smirnov: | 2/1 Kutuzovskiy prt,<br>App 222<br>121248, Moscow,<br>Russian Federation |
| If to Vinogradov: | 4, Stroiteley Str., Block 4,<br>App. 54,<br>Moscow,<br>Russian Federation |
| If to Genkin: | Konstantinovsky Avenue 26<br>App 2<br>St. Petersburg 197110<br>Russian Federation |
| with a copy to: | Troutman Sanders LLP<br>875 Third Avenue<br>New York, NY 10022<br>USA<br>Attn: Irina Vainberg, Ph.D., J.D. |
| If to Lerner: | 7750 Roseland Drive<br>La Jolla, CA 92037<br>USA |
| If to Belogurov: | Ryblevskoe shosse<br>bld. 9<br>app. 53<br>Moscow 121108<br>Russian Federation |
| If to the Institute: | GSP-7<br>Ulitsa Miklukho-Maklaya, 16/10<br>Moscow 117997, V-437<br>Russian Federation |
| If to Pharmsynthez: | 34, Liter l, Kuzmolovsky urban-type settlement<br>Capitolovo station<br>Vsevolozhsky district<br>188663, Leningrad region<br>Russian Federation |

7.3 Force Majeure. No Party shall be held liable or responsible to any other Party nor be deemed to have defaulted under or breached this Agreement for failure or delay in fulfilling or performing any term of this Agreement when such failure or delay is caused by or results from causes beyond the reasonable control of the affected Party, including without limitation, fire, floods, embargoes, war, acts of war (whether war is declared or not), insurrections, riots, civil commotions, strikes, lockouts or other labor disturbances, acts of God or acts, omissions or delays in acting by any Governmental Authority; *provided, however*, that the Party so affected shall use reasonable efforts to avoid or remove such causes of non-performance, and shall continue performance hereunder with reasonable dispatch wherever or whenever such causes are removed. Each Party shall provide the other Parties with prompt written notice of any delay or failure to perform that occurs by reason of force majeure. The Parties shall mutually seek a resolution of the delay or the failure to perform in good faith.

7.4 Waivers and Modifications. The failure of any Party to insist on the performance of any obligation hereunder shall not be deemed to be a waiver of such obligation. Waiver of any breach of any provision hereof shall not be deemed to be a waiver of any other breach of such provision or any other provision. No waiver, modification, release, or amendment of any obligation under or provision of this Agreement shall be valid or effective unless in writing and signed by both Parties hereto.

7.5 Relationship of the Parties. It is expressly agreed that the relationship among the Parties shall not constitute a partnership, joint venture, or agency. The Parties are independent contractors. No Party shall have the authority to make any statements, representations, or commitments of any kind, or to take any action, which shall be binding on any other Party, without the prior written consent of such other Party to do so.

7.6 Counterparts. This Agreement may be executed in counterparts with the same effect as if all Parties had signed the same document. All such counterparts shall be deemed an original, shall be construed together, and shall constitute one and the same instrument. Counterparts may be delivered via facsimile, electronic mail (including pdf) or other transmission method and any counterpart so delivered shall be deemed to have been duly and validly delivered and be valid and effective for all purposes.

7.7 Severability. In performing this Agreement, the Parties shall comply with all applicable Laws. Wherever there is any conflict between any provision of this Agreement and any Law, the Law shall prevail, but in such event the affected provision of this Agreement shall be limited or eliminated only to the extent necessary, and the remainder of this Agreement shall remain in full force and effect. In the event the terms of this Agreement are materially altered as a result of the foregoing, the Parties shall renegotiate in good faith the terms of this Agreement to resolve any inequities.

7.8 Entire Agreement. This Agreement and the Exhibits hereto constitute the entire agreement between the Parties with respect to the subject matter hereof, and supersedes any and all oral, electronic, or written communications or understandings relating to the subject matter hereof.

7.9 Further Actions. Each Party agrees to execute, acknowledge, and deliver such further instruments, and to do all such other acts, as may be necessary or appropriate in order to carry out the purposes and intent of this Agreement.

7.10 Expenses. Except as otherwise provided herein, all costs and expenses incurred in connection with this Agreement shall be paid by the Party incurring such cost or expense.

7.10 Third Party Beneficiaries. Notwithstanding any provision herein to the contrary, no provision of this Agreement is intended to confer any rights, benefits, remedies, obligations or liabilities hereunder upon any person other than the Parties, their Affiliates where expressly stated, other indemnities where expressly stated, and their respective successors and assigns.

7.11 Governing Law. The validity, construction, and interpretation of this Agreement and any determination of the performance which this Agreement requires will be governed by and construed in accordance with the Laws of the State of New York applicable to contracts made and performed wholly within the State of New York.

7.12 Jurisdiction. Each Party hereby irrevocably and unconditionally submits, for itself and its property, to the non-exclusive jurisdiction of any New York or Federal court sitting in New York County, New York and any appellate court from any thereof; in any Action arising out of or relating to this Agreement, or for recognition or enforcement of any judgment, and each of the Parties hereby irrevocably and unconditionally agrees that all claims in respect of any such Action may be heard and determined in such New York State court, or, to the extent permitted by law, in such Federal court. Each of the Parties agrees that a final judgment in any such Action shall be conclusive and may be enforced in other jurisdictions by suit on the judgment or in any other manner provided by law. Each of the Parties hereby irrevocably waives, to the fullest extent it may legally and effectively do so, the defense of an inconvenient forum to the maintenance of such Action in any such court, and agrees not to plead the same, and agrees that nothing herein will limit the right to sue in any other jurisdiction if a New York State or Federal court of competent jurisdiction sitting in New York County, New York rules or orders that it will not exercise jurisdiction over any such Action.

7.13 Venue. Each of the Parties hereby irrevocably and unconditionally waives, to the fullest extent it may legally and effectively do so, any objection which it may now or hereafter have to the laying of Action arising out of or relating to this Agreement in any court referred to in this Section 7.13.

7.14 Immunity Waiver. To the extent that a Party has or hereafter may acquire any immunity from jurisdiction of any court or from any legal process (whether through service of notice, attachment prior to judgment, attachment in aid of execution or execution, on the ground of sovereignty or otherwise) with respect to itself or its property, it hereby irrevocably waives, to the fullest extent it may legally and effectively do so, such immunity in respect of its obligations under this Agreement.

7.15 Survival. Termination or expiration of this Agreement for any reason shall not affect the accrued rights of the Parties arising in any way out of this Agreement and shall not release any Party from any liability which, at the time of such termination or expiration, has already accrued, as applicable, or which is attributable to a period prior to such termination or expiration, nor preclude any Party, as applicable, from pursuing any rights and remedies it may have hereunder or at law or in equity which accrued or are based upon any event or series of events occurring prior to such termination or expiration. Additionally, Articles 1, 3, 4, 5, and 7 and Section 2.3 shall survive the termination or expiration of this Agreement.

IN WITNESS WHEREOF, the parties have caused their duly authorized officers to execute and deliver this Agreement as of the Effective Date.

HESPERIX SA

By: /s/ Robert Frigerio
Name: Robert Frigerio
Title: Director

ALEXEY VYACHESLAVOVICH STEPANOV

/s/ Alexey Vyacheslavovish Stepanov
An Individual

ALEXANDER GABIBOVICH GABIBOV

/s/ Alexander Gabibovish Gabibov
An Individual

IVAN VITALIEVICH SMIRNOV

/s/ Ivan Vatalievich Smirnov
An Individual

DMITRY DMITRIEVICH GENKIN

/s/ Dmitry Dmitrievch Genkin
An Individual

RICHARD A. LERNER

/s/ Richard A.Lerner
An Individual

ALEXEY ANATOLIEVICH BELOGUROV

/s/ Alexey Anatolievish Belogurov
An Individual

ALEXEY VINOGRADOV

/s/ Alexey Vinogradov
An Individual

SHEMYAKIN-OVCHINNIKOV INSTITUTE OF BIOORGANIC CHEMISTRY, RUSSIAN ACADEMY OF SCIENCES

By: /s/ Alexander Gabibov
Name: Alexander Gabibov
Title: Director

PJSC «PHARMSYNTHEZ»

By: /s/ Peter Fruglyakov
Name: Peter Fruglyakov
Title: CEO

**Exhibit 1.17**

| | | | |
|---|---|---|---|
| **RU2017134483**<br>**filed Oct. 4, 2017**<br>**C1256.70030RU00** | **RU2018112009**<br>**filed Apr. 4, 2018**<br>**C1256.70031RU00** | **RU2018134321**<br>**filed Oct. 1, 2018**<br>**C1256.70033RU00** | **PCT/RU2018/000653**<br>**filed Oct. 4, 2018**<br>**C1256.70030WO00** |

**Exhibit 2.1**

**ASSIGNMENT**

WHEREAS,

(ii) (1) Alexey Vyacheslavovich Stepanov, an individual residing at Ostrovityananova street, bld. 45/2, app. 44, Moscow, 117342, Russian Federation ("Stepanov"),

(2) Alexander Gabibovich Gabibov, an individual residing at Yauzsky Boulevard 14, App.10, Moscow 109028, Russian Federation ("Gabibov"),

(3) Dmitry Dmitrievich Genkin, an individual residing at Konstantinovsky Avenue 26, App 2, St. Petersburg 197110 Russian Federation ("Genkin"),

(4) Richard A. Lerner, an individual, residing at 7750 Roseland Drive, La Jolla, CA 92037, USA ("Lerner"),

(5) Alexey Anatolievich Belogurov, an individual residing at Ryblevskoe shosse, bld. 9, app. 53, Moscow 121108, Russian Federation ("Belogurov"),

(6) Shemyakin-Ovchinnikov Institute of Bioorganic Chemistry, Russian Academy of Sciences, an educational institution, located at Miklukho-Maklaya 16/10, 117997, Moscow, V-437, Russian Federation (the "Institute"), and

(7) PJSC «Pharmsynthez», a public joint stock company located at 134, Liter l, Kuzmolovsky urban-type settlement, Capitolovo station, Vsevolozhsky district, 188663, Leningrad region, Russia ("Pharmsynthez") (Stepanov, Gabibov, Genkin, Lerner, Belogurov, the Institute, and Pharmsynthez, collectively "Assignors")

collectively own or have owned all right, title, and interest in certain new and useful inventions entitled "ARTICLES AND METHODS DIRECTED TO PERSONALIZED THERAPY OF CANCER"

for which the following patent applications were filed:

| | | | |
|---|---|---|---|
| **RU2017134483**<br>**filed Oct. 4, 2017**<br>**C1256.70030RU00** | **RU2018112009**<br>**filed Apr. 4, 2018**<br>**C1256.70031RU00** | **RU2018134321**<br>**filed Oct. 1, 2018**<br>**C1256.70033RU00** | **PCT/RU2018/000653**<br>**filed Oct. 4, 2018**<br>**C1256.70030WO00** |

(collectively, the "Patents").

WHEREAS, Hesperix SA, a corporation registered under the laws of Switzerland, company no. CHE-434.229.465, located at via Luganetto 4, 6962, Viganello, Switzerland ("Hesperix" or "Assignee") is desirous of acquiring Assignors' entire right, title and interest therein, including the right to claim priority thereof, free and clear of all liens or other encumbrances of any nature whatsoever;

NOW THEREFORE, for the consideration paid by Hesperix, the receipt and sufficiency of which are hereby acknowledged, Assignors each irrevocably sell, assign, transfer, and convey unto Hesperix all of their individual right, title, and interest, if any, throughout the world in and to said Patents (including the right to sue for past infringement thereof) including in and to any patent application whether conventional, design, divisional, continuation, continuation-in-part, and continued prosecution applications, requests for continued examination, substitutions, patents of addition, reissues, renewals, or reexams thereof, and in and to all inventions thereon, preparatory to obtaining Letters Patent of the United States and patents throughout the world therefore, free and clear of all liens or other encumbrances of any nature whatsoever; and Assignors each authorize the United States Commissioner of Patents and Trademarks to issue any and all Letters Patent of the United States and request all patent authorities throughout the world to issue any and all patents anywhere in the world included in or resulting from said Patents, to Hesperix, for its interest and for the sole use and benefit of Hesperix and its assigns and legal representatives.

Each Assignor agrees that his assignment hereunder is effective from the date of his execution of this Assignment.

IN TESTIMONY WHEREOF, each Assignor sets hereunto his hand and seal on the corresponding dates below.

ALEXEY VYACHESLAVOVICH STEPANOV

_____ Date: _____

An individual

Witness 1 signature _____

Witness 1 name (Print) _____

Witness 1 address _____

_____

_____

Witness2 signature _____

Witness2 name (Print) _____

Witness2 address _____

_____

_____

ALEXANDER GABIBOVICH GABIBOV

_____ Date: _____

An individual

Witness 1 signature _____

Witness 1 name (Print) _____

Witness 1 address _____

_____

_____

Witness2 signature _____

Witness2 name (Print) _____

Witness2 address _____

_____

_____

DMITRY DMITRIEVICH GENKIN

_____ Date: _____

An individual

Witness 1 signature _____

Witness 1 name (Print) _____

Witness 1 address _____

_____

_____

Witness2 signature _____

Witness2 name (Print) _____

Witness2 address _____

_____

_____

RICHARD A. LERNER

_____ Date: _____
An Individual

STATE OF:

: SS

COUNTY OF:_____

On this _____ day of _____, 2019, before me personally appeared **Richard A. Lerner,** to me known to be the person whose name is subscribed in the foregoing instrument, and who acknowledged that he executed said instrument as his free and voluntary act and for the purposes therein expressed.

_____

Notary Public

My Commission Expires:

_____

ALEXEY ANATOLIEVICH BELOGUROV

_____ Date: _____
An individual

Witness 1 signature _____

Witness 1 name (Print) _____

Witness 1 address _____

_____

_____

Witness2 signature _____

Witness2 name (Print) _____

Witness2 address _____

_____

_____

SHEMYAKIN-OVCHINNIKOV INSTITUTE OF BIOORGANIC CHEMISTRY, RUSSIAN ACADEMY OF SCIENCES

By: _____ Date: _____
Name:
Title:

Witness 1 signature _____

Witness 1 name (Print) _____

Witness 1 address _____

_____

_____

Witness 2 signature _____

Witness 2 name (Print) _____

Witness 2 address _____

_____

_____

PJSC «PHARMSYNTHEZ»

By: _____ Date: _____
Name:
Title:

Witness 1 signature _____

Witness 1 name (Print) _____

Witness 1 address _____

_____

_____

Witness 2 signature _____

Witness 2 name (Print) _____

Witness 2 address _____

_____

_____

**EXHIBIT B**

_____, 2019

Xenetic Biosciences, Inc.
40 Speen Street, Suite 102
Framingham, MA 01701
Attn: Jeffrey F. Eisenberg, Chief Executive Officer

Ladies and Gentlemen:

The undersigned signatory of this lock-up agreement ("**Lock-Up Agreement**") understands that the Sellers and the Sellers' Representative (as defined in the Share Purchase Agreement, which is defined below) entered into a Share Purchase Agreement dated as of March 1, 2019 (the "**Share Purchase Agreement**") with Xenetic Biosciences, Inc., (the "**Buyer**") providing for the acquisition by Buyer of 4,875,000 shares of common stock of Hesperix SA in exchange for the Transaction Shares (as defined in the Share Purchase Agreement).

As an inducement to Buyer to enter into the Share Purchase Agreement and the transactions contemplated thereby, the undersigned hereby agrees that the undersigned will not, during the period commencing on the date hereof and ending one hundred eighty (180) days after the date hereof (the "**Lock-Up Period**"), (1) offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, lend, or otherwise transfer or dispose of, directly or indirectly, any shares of capital stock of Buyer or any securities convertible into or exercisable or exchangeable for shares of capital stock of Buyer, whether now owned or hereafter acquired by the undersigned or with respect to which the undersigned has or hereafter acquires the power of disposition (collectively, the "**Lock-Up Securities**"); (2) enter into any swap or other arrangement that transfers to another, in whole or in part, any of the economic consequences of ownership of Lock-Up Securities, whether any such transaction is to be settled by delivery of shares of Lock-Up Securities, in cash or otherwise; (3) make any demand for or exercise any right with respect to the registration of any Lock-Up Securities; or (4) publicly disclose the intention to make any offer, sale, pledge or disposition, or to enter into any transaction, swap, hedge or other arrangement relating to any Lock-Up Securities. Notwithstanding the foregoing, and subject to the conditions below, the undersigned may transfer Lock-Up Securities as a *bona fide* gift, by will or intestacy, or to a family member or trust for the benefit of a family member (for purposes of this Lock-Up Agreement, "family member" means any relationship by blood, marriage or adoption, not more remote than first cousin) or as a *bona fide* gift to a charity or educational institution;*provided* that in the case of any such transfer pursuant to the foregoing, (i) any such transfer shall not involve a disposition for value, (ii) each transferee shall sign and deliver to Buyer a lock-up agreement substantially in the form of this Lock-Up Agreement, and (iii) no filing under Section 16(a) of the Exchange Act shall be required or shall be voluntarily made, except for a Form 5. The undersigned also agrees and consents to the entry of stop transfer instructions with Buyer's transfer agent and registrar against the transfer of the undersigned's Lock-Up Securities, except in compliance with this Lock-Up Agreement.

The undersigned understands that this Lock-Up Agreement is irrevocable and shall be binding upon the undersigned's heirs, legal representatives, successors, and assigns.

Very truly yours,

_____

**[SELLER NAME]**

**EXHIBIT C**

**STOCKHOLDER'S AGREEMENT**

This **STOCKHOLDER'S AGREEMENT**, dated as of [●], is entered into by and between Xenetic Biosciences, Inc., a Nevada corporation (the "Company"), and the undersigned stockholder of the Company (the "Stockholder").

**WHEREAS,** the parties hereto desire to provide for certain rights and obligations of the Stockholder on and after the date hereof.

**WHEREAS,** the Company has executed that certain Share Purchase Agreement, dated as of the date hereof (as the same may be amended, modified, supplemented, refinanced or replaced from time to time, the "Share Purchase Agreement"), by and among the Company, Hesperix SA, a Swiss corporation ("Hesperix"), and certain other parties thereto.

**NOW THEREFORE,** in consideration of the mutual covenants and agreements contained in this Agreement, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

**ARTICLE I**

**DEFINITIONS**

Capitalized terms not otherwise defined shall have the meanings specified in the Share Purchase Agreement.

**ARTICLE II**

**VOTING AGREEMENT**

The Stockholder covenants and agrees to vote or cause to be voted, or consent or cause to be consented, all voting securities of the Company beneficially owned (as such term is defined under the Rule 13d-3 under the Securities Exchange Act of 1934, as amended), by such Stockholder, directly or indirectly from time to time and at all times, in favor of the slate of nominees recommended by the board of directors of the Company for election as directors during the term of this Agreement, whether such matter is brought before any meeting of the stockholders of the Company however called, proposed to be taken by written consent of the stockholders of the Company or otherwise

**ARTICLE III**

**MISCELLANEOUS**

**3.1. Termination.**

This Agreement shall terminate and be of no further force and effect upon the earlier of (i) the date on which the Stockholder no longer beneficially owns equity stock of the Company and (ii) the written agreement of the Stockholder and the Company to terminate this Agreement.

**3.2. Successors and Assigns; Beneficiaries.**

Except as otherwise provided herein, all of the terms and provisions of this Agreement shall be binding upon, shall inure to the benefit of, and shall be enforceable by the respective transferees, successors, and assignees of the parties hereto and any of their respective transferees, successors, or assignees. This Agreement may be assigned only with the express prior written consent of the other party hereto, *provided*, such assignee executes a joinder agreeing to be bound by the terms of this Agreement in the same capacity as the assigning party. Any attempted assignment, without such consent, will be void ab initio.

**3.3. Amendment and Modification; Waiver of Compliance.**

(a) This Agreement may be amended only by a written instrument duly executed by the Company and the Stockholder, to amend this Agreement.

(b) Except as otherwise provided in this Agreement, any failure of any of the parties to comply with any obligation, covenant, agreement or condition herein may be waived by the party entitled to the benefits thereof only by a written instrument signed by the party granting such waiver, but such waiver or failure to insist upon strict compliance with such obligation, covenant, agreement or condition shall not operate as a waiver of, or estoppel with respect to, any subsequent or other failure.

**3.4. Notices.**

Any notice, request, claim, demand, document and other communication hereunder to any party shall be effective upon receipt (or refusal of receipt) and shall be in writing and delivered personally or sent by facsimile, or first class mail, or by Federal Express, United Parcel Service or other similar courier or other similar means of communication (i) to the Stockholder, to its address set forth on the signature page hereto, or (ii) to the Company, to:

Xenetic Biosciences, Inc.
40 Speen Street, Suite 102
Framingham, MA 01701
Attn: Special Committee
Jeffrey F. Eisenberg, Chief Executive Officer

with a copy to:

Akerman LLP
350 East Las Olas Blvd.
Suite 1600
Fort Lauderdale, Florida 33301
Facsimile: (954) 463-2224
Email: Teddy.Klinghoffer@Akerman.com
Andrea.Fisher@Akerman.com
Attn: Teddy Klinghoffer, Esq.
Andrea Fisher Evans, Esq.

or, in each case, to such other address as such party may designate in writing to the other parties by written notice given in the manner specified herein.

**3.5. Specific Performance.**

Each party hereto acknowledges and agrees that in the event of any breach of this Agreement by any of them, the other parties hereto would be irreparably harmed and could not be made whole by monetary damages. Each party accordingly agrees to waive the defense in any action for specific performance that a remedy at law would be adequate and agrees that the parties, in addition to any other remedy to which they may be entitled at law or in equity, shall be entitled to specific performance of this Agreement without the posting of bond.

**3.6. Entire Agreement.**

The provisions of this Agreement and the other writings referred to herein or delivered pursuant hereto which form a part hereof contain the entire agreement among the parties hereto with respect to the subject matter hereof and supersede all prior oral and written agreements and memoranda and undertakings among the parties hereto with regard to such subject matter.

**3.7. Severability.**

If any provision of this Agreement, or the application of such provision to any Person or circumstance or in any jurisdiction, shall be held to be invalid or unenforceable to any extent, (i) the remainder of this Agreement shall not be affected thereby, and each other provision hereof shall be valid and enforceable to the fullest extent permitted by law, (ii) as to such Person or circumstance or in such jurisdiction such provision shall be reformed to be valid and enforceable to the fullest extent permitted by law and (iii) the application of such provision to other Persons or circumstances or in other jurisdictions shall not be affected thereby.

**3.8. Governing Law.**

This Agreement shall be governed by and construed in accordance with the laws of the State of Nevada without regard to conflicts of law principles thereof.

**3.9. Waiver of Jury Trial.**

EACH PARTY ACKNOWLEDGES AND AGREES THAT ANY CONTROVERSY WHICH MAY ARISE UNDER THIS AGREEMENT IS LIKELY TO INVOLVE COMPLICATED AND DIFFICULT ISSUES, AND THEREFORE EACH SUCH PARTY HEREBY IRREVOCABLY AND UNCONDITIONALLY WAIVES ANY RIGHT SUCH PARTY MAY HAVE TO A TRIAL BY JURY IN RESPECT OF ANY LITIGATION DIRECTLY OR INDIRECTLY ARISING OUT OF OR RELATING TO THIS AGREEMENT OR THE TRANSACTIONS CONTEMPLATED HEREBY, OR IN ANY WAY CONNECTED WITH OR RELATED OR INCIDENTAL TO THE DEALINGS OF THE PARTIES OR ANY OF THEM IN RESPECT OF THIS AGREEMENT. EACH PARTY CERTIFIES AND ACKNOWLEDGES THAT (i) NO REPRESENTATIVE, AGENT OR ATTORNEY OF ANY OTHER PARTY HAS REPRESENTED, EXPRESSLY OR OTHERWISE, THAT SUCH OTHER PARTY WOULD NOT, IN THE EVENT OF LITIGATION, SEEK TO ENFORCE THE FOREGOING WAIVER, (ii) EACH SUCH PARTY UNDERSTANDS AND HAS CONSIDERED THE IMPLICATIONS OF THIS WAIVER, (iii) EACH SUCH PARTY MAKES THIS WAIVER VOLUNTARILY, AND (iv) EACH SUCH PARTY HAS BEEN INDUCED TO ENTER INTO THIS AGREEMENT BY, AMONG OTHER THINGS, THE WAIVERS AND CERTIFICATIONS IN THIS SECTION. EACH PARTY AGREES THAT THE OTHER MAY FILE A COPY OF THIS AGREEMENT WITH ANY COURT AS WRITTEN EVIDENCE OF THE CONSENT OF THE PARTIES TO THE WAIVER OF THEIR RIGHT TO TRIAL BY JURY.

**3.10. Counterparts.**

This Agreement may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

**3.11. Further Assurances.**

At any time or from time to time after the date hereof, the parties hereto agree to cooperate with each other, and at the request of any other party, to execute and deliver any further instruments or documents and to take all such further action as any other party may reasonably request in order to evidence or effectuate the provisions of this Agreement and to otherwise carry out the intent of the parties hereunder.

* * * * *

IN WITNESS WHEREOF, each of the undersigned has signed this Agreement as of the date first above written.

**COMPANY:**

Xenetic Biosciences, Inc.

By: _____
Name:
Title:

**STOCKHOLDER:**

By: _____
Name:
Number of Shares Beneficially Owned:_____
Address:_____
_____

[Signature Page to Stockholder's Agreement]

**APPENDIX B**

**ASSIGNMENT AGREEMENT**

This Assignment Agreement (the "Agreement") is dated as of March 1, 2019 (the "Effective Date") by and between:

(i) Hesperix SA, a corporation registered under the laws of Switzerland, company no. CHE-434.229.465, located at via Luganetto 4, 6962, Viganello, Switzerland ("Hesperix" or "Assignee"), on one hand, and

(ii) (1) Alexey Vyacheslavovich Stepanov, an individual residing at Ostrovityananova street, bld. 45/2, app. 44, Moscow, 117342, Russian Federation ("Stepanov"),

(2) Alexander Gabibovich Gabibov, an individual residing at Yauzsky Boulevard 14, App.10, Moscow 109028, Russian Federation ("Gabibov"),

(3) Ivan Vitalievich Smirnov, an individual residing at 2/1 Kutuzovskiy prt, App 222 121248, Moscow, Russian Federation ("Smirnov");

(4) Dmitry Dmitrievich Genkin, an individual residing at Konstantinovsky Avenue 26, App 2, St. Petersburg 197110 Russian Federation ("Genkin"),

(5) Richard A. Lerner, an individual, residing at 7750 Roseland Drive, La Jolla, CA 92037, USA ("Lerner"),

(6) Alexey Anatolievich Belogurov, an individual residing at Ryblevskoe shosse, bld. 9, app. 53, Moscow 121108, Russian Federation ("Belogurov"),

(7) Alexey Vinogradov, an individual residing at 4, Stroiteley Str., Block 4, App. 54, Moscow, Russian Federation ("Vinogradov");

(8) Shemyakin-Ovchinnikov Institute of Bioorganic Chemistry, Russian Academy of Sciences, an educational institution, located at Miklukho-Maklaya 16/10, 117997, Moscow, V-437, Russian Federation (the "Institute"),

(9) PJSC «Pharmsynthez», a public joint stock company located at 134, Liter l, Kuzmolovsky urban-type settlement, Capitolovo station, Vsevolozhsky district, 188663, Leningrad region, Russian Federation ("Pharmsynthez") (Stepanov, Gabibov, Genkin, Lerner, Belogurov, the Institute, and Pharmsynthez, collectively "Assignors"), on the other hand.

**RECITALS**

Whereas, Hesperix is a pharmaceutical company engaged in the research, development, manufacturing, and commercialization of pharmaceutical and biological products;

Whereas, the Assignors are named inventors, applicants, or owners of one or more of the Patents (as defined below);

Whereas, Gabibov, Stepanov, Smirnov, Belogurov, Genkin, and Vinogradov, as of the Effective Date, are shareholders of Hesperix;

Whereas, prior hereto, each of Stepanov, Gabibov and Belogurov granted to the Institute an irrevocable assignment of the Patents each owned, and in turn, the Institute hereby grants to the Assignee an assignment of such Patents as provided herein;

Whereas, prior hereto, Genkin granted to Pharmsynthez an irrevocable assignment of the Patents he owned, and in turn, Pharmsynthez hereby grants to the Assignee an assignment to such Patents as provided herein;

Whereas, prior hereto, Lerner, as an employee of The Scripps Research Institute, a California public benefit corporation located at 10550 North Torrey Pines Road, La Jolla, CA 92037, USA ("Scripps"), granted to Scripps an irrevocable assignment of the Patents he owned;

Whereas, the Assignors, directly or indirectly, desire to assign to Hesperix all of their respective rights, title, and interests in the Patents and Know-How as provided herein; and

Whereas, Hesperix desires to acquire the Assignors' respective rights, title, and interests in the Patents as provided herein;

Now, Therefore, in consideration of the foregoing premises and the mutual covenants contained herein, the Parties (as defined below), intending to be legally bound, agree as follows:

## ARTICLE 1
## DEFINITIONS

The following terms shall have the following meanings as used in this Agreement:

1.1 "Actions" means all charges, complaints, actions, suits, proceedings, hearings, investigations, claims, demands, judgments, orders, decrees, stipulations or injunctions.

1.2 "Affiliate" means any Person (as defined below) or combination thereof that, directly or indirectly, owns or controls a Party (as defined below) hereto, is owned or controlled by such Party or is under common ownership or control with such Party, the terms "control" and "controlled" in this definition (including, with correlative meaning, the terms "controlled by" or "under the common control with") meaning ownership (including ownership by trusts with substantially the same beneficial interests, or by contract or otherwise) of at least fifty percent (50%) of the voting or equity rights of such Person or combination thereof or the power to direct the management of such Person or combination thereof. For the avoidance of doubt, neither of the Parties shall be deemed to be an Affiliate of the other solely as a result of their entering into this Agreement.

1.3 "Business Day" means any day other than (i) Saturday or Sunday or (ii) any other day on which banks in New York, New York are permitted or required to be closed.

1.4 "Calendar Day" means any day.

1.5 "Calendar Quarter" means the three (3) month periods ending on March 31, June 30, September 30, and December 31 in each Calendar Year (as defined below).

1.6 "Calendar Year" means the twelve (12) month period beginning January 1 and ending December 31 of any year.

1.7 "Commercial Sale" means any arm's length sale by Hesperix or by any licensee of any of Hesperix's right, title or interest in the Patents (as defined below) to a Third Party (as defined below). Sales for test marketing, clinical study purposes, or compassionate, named patient, or similar use shall not constitute a Commercial Sale.

1.8 "Confidential Information" shall mean, with respect to any Party hereto, all confidential or proprietary information, whether written, electronic, or oral, which is disclosed by a Party (the "Disclosing Party") to another Party (the "Receiving Party"). Notwithstanding the foregoing, Confidential Information of a Party shall not include information: (a) which was publicly known prior to initial disclosure of such information by the Disclosing Party to the Receiving Party, (b) that has become publicly known, in print, other tangible form, or electronic form, without any act or omission of the Receiving Party, (c) received by the Receiving Party without restriction at any time from a Third Party (as defined below), other than the Disclosing Party, rightfully having possession of and the right to disclose such information, (d) shown to have been otherwise known by the Receiving Party prior to disclosure of such information by the Disclosing Party to the Receiving Party as proven by prior written records in existence prior to such initial disclosure, or (e) shown to have been independently developed by employees or agents of the Receiving Party without access to or use of such information of the Disclosing Party as proven by the receiving party's written records.

1.9 "Control" means (except as otherwise used in the context of the definition of Affiliates), with respect to any intellectual property right or other intangible property in which a Party (as defined below) or one of its Affiliates has, in whole or in part, any right, title, interest, license or sublicense, the ability to grant direct or indirect access, license, or sublicense to without violating the terms of any agreement or other arrangement in force as of the Effective Date with any Third Party (as defined below).

1.10 "Governmental Authority" means any court, tribunal, arbitrator, agency, legislative body, commission, official or other instrumentality of (a) any government of any country, (b) a federal, state, province, county, city or other political subdivision thereof or (c) any supranational body, including the European Agency for the Evaluation of Medicinal Products.

1.11 "Herein", "hereof", and "hereunder" and words of like import refer to this Agreement as a whole and not to any particular provision of this Agreement.

1.12 "Include", "includes", or "including" shall be deemed to be followed by the words "without limitation", whether or not they are in fact followed by those words or words of like import.

1.13 "Know-How" means the names of the vendors that, as of the Effective Date, are contemplated by the Assignors to carry out the development of the inventions claimed in the Patents.

1.14 "Knowledge" means, with respect to a natural person, to the recollection, as of the Effective Date, of that natural person, and with respect to a non-natural person, to the recollection, as of the Effective Date, of that natural person executing this Agreement on behalf of such non-natural person.

1.15 "Law" means all laws, statutes, rules, codes, regulations, orders, judgments, or ordinances of any Governmental Authority.

1.16 "Net Sales" means, with respect to a Product, the amount invoiced by Hesperix, its Affiliates, or any of their respective licensees for Commercial Sales of such Product less:

(i) transportation charges, warehousing costs and expenses, freight and insurance;

(ii) taxes (other than taxes based on income), tariffs, regulatory fees, user fees, customs duty, excise, or other duty, manufacture, use, and any other governmental charges, all to the extent imposed upon the sale, transportation or delivery of such Product and paid by the seller;

(iii) Third Party (as defined below) distributor fees;

(iv) trade discounts, quantity discounts, cash discounts, prompt payment discounts, rebates, free goods (including 2-for-1 and the like), or chargebacks actually granted, given, allowed, or incurred in the ordinary course of business in connection with the sale of such Product, including any credits, volume rebates, charge-back and prime vendor rebates, fees, reimbursements or similar payments granted or given to wholesalers and other distributors, buying groups, health care insurance carriers, pharmacy benefit management companies, health maintenance organizations, or other institutions or health care organizations, physicians, or patients;

(v) adjustments, allowances or credits to customers, including on account of price adjustments, governmental requirements, billing errors, rejection, damage, recalls, or return of such Product;

(vi) payments or rebates paid in connection with sales of Products to any Governmental Authority or regulatory authority in respect of any state or federal Medicare, Medicaid, or similar programs; and

(vii) any item substantially similar in character or substance to the foregoing.

For the purposes of determining Net Sales, in the event a Product is sold in a finished combination package containing such Product packaged together in combination with one or more other products, devices, equipment or components (a "Combination Product"), Net Sales for such Combination Product will be calculated by multiplying actual Net Sales of such Combination Product by the fraction A/(A+B) where A is the selling price of the Product if sold separately in finished form and B is the selling price of any other products, equipment or components in the Combination Product if sold separately in finished form provided that the selling price of any Combination Product shall not be less than A+B. In the event that a product containing Product or one or more of such products, equipment or components in the Combination Product are not sold separately, then the parties shall negotiate in good faith a formula for calculating Net Sales for such Combination Product that reflects the respective contributions of the product containing Product and such other products, equipment or components to the overall value of such Combination Product. Assignee covenants that it will not intentionally manipulate any part of the fraction A/ (A+B) to avoid or reduce royalty payments or obligations that would otherwise be due for sales of Product in combination form or otherwise.

Notwithstanding the foregoing, the disposition of a Product or the use of the Product in clinical studies, compassionate, named patient, test marketing, any non-registrational studies, or any other instance where the Product is supplied without charge shall not result in any Net Sales. Any Products donated by Hesperix, its licensee, or its assignee to non-profit institutions or government agencies for a non-commercial purpose shall not result in any Net Sales. Similarly, any free Products (including two for one and the like) which are supplied to a Third Party (as defined below) in conjunction with the offer for sale or sale of any Product will not result in any Net Sales of such free goods. Additionally, amounts received by Hesperix, its licensee(s), its assignee(s) or any respective Affiliates of any of the foregoing for the sale of Products among any of the foregoing for resale shall not be included in the computation of Net Sales hereunder. The use of a Product by or on behalf of Hesperix, its licensee(s), or any of Affiliates of any of the foregoing for research and Development purposes shall not result in any Net Sales.

1.17 “Party” means any of Hesperix, Stepanov, Gabibov, Smirnov, Genkin, Lerner, Belogurov, Vinogradov, the Institute, or Pharmsynthez.

1.18 “Parties” means all of Hesperix, Stepanov, Gabibov, Smirnov, Genkin, Lerner, Belogurov, Vinogradov, the Institute, and Pharmsynthez.

1.19 “Patents” means (i) the patent applications listed in Exhibit 1.17; (ii) any valid and enforceable patents, re-examinations, reissues, renewals, extensions, supplementary protection certificates and term restorations, any confirmation patent or registration patent or patent of addition based on any such patent application, (iii) all continuation, continuation-in-part, divisional, provisional, and substitute applications and inventors’ certificates of any of the foregoing; (iv) all foreign counterparts of any of the foregoing; and (v) all priority applications of any of the foregoing.

1.20 “Person” means any natural person, corporation, firm, business trust, joint venture, association, organization, company, partnership, other entity or combination, government, or any agency, or subdivisions of any of the foregoing.

1.21 “Product” means any active pharmaceutical, chemical or biological ingredient, component thereof, formulation thereof, dosage form, or use or manufacture of any of the foregoing disclosed in a Patent or encompassed by the claims of a Patent. For the avoidance of doubt, any Product that includes more than one such active pharmaceutical, chemical or biological ingredient, component thereof, formulation thereof, or dosage form thereof will be considered a single Product.

1.22 “Third Party” means any Person other than any of the Parties.

1.23 “Valid Claim” means a claim of an issued and unexpired patent or a claim of a pending patent application within the Patents which has not been held unpatentable, invalid or unenforceable by a court or other government agency of competent jurisdiction and has not been admitted to be invalid or unenforceable through reissue, reexamination, disclaimer or otherwise; provided, however, that if the holding of such court or agency is later reversed by a court or agency with overriding authority, the claim shall be reinstated as a Valid Claim with respect to Net Sales made after the date of such reversal. Notwithstanding the foregoing provisions of this Section 1.23, if a claim of a pending patent application within the Patents has not issued as a claim of an issued patent within the Patents, within nine (9) years after the filing date from which such claim takes priority, such pending claim shall not be a Valid Claim for purposes of this Agreement.

1.24 “Writing”, “written”, and comparable terms refer to printing, typing and other means of reproducing words (including electronic media) in a visible form.

1.25 Additional Definitions. Each of the following definitions is set forth in the Sections indicated below:

| Definition | Section |
|---|---|
| Affected Party | Section 6.2 |
| Agreement | Preamble |
| Bankruptcy Event | Section 6.2 |
| Belogurov | Preamble |
| Combination Product | Section 1.16 |
| Confirmatory Assignment | Section 2.1(b) |
| Control (wrt Affiliate) | Section 1.2 |
| Disclosing Party | Section 1.8 |
| Effective Date | Preamble |
| Gabibov | Preamble |
| Genkin | Preamble |
| Hesperix | Preamble |
| Institute | Preamble |
| IP License Agreement | Recitals |
| Lerner | Preamble |
| Pharmsynthez | Preamble |
| Receiving Party | Section 1.8 |
| Required Third Party License | Section 3.6 |
| Scripps | Recitals |
| Scripps Rights | Section 2.1(b) |
| Smirnov | Preamble |
| Stepanov | Preamble |
| Vinogradov | Preamble |
| Withholding Taxes | Section 3.7 |

1.26 Agreement References. References to any agreement or contract are to that agreement or contract as amended, modified or supplemented in writing from time to time in accordance with the terms hereof and thereof.

1.27 Ambiguities. Ambiguities, if any, in this Agreement shall not be construed against any Party, irrespective of which Party may be deemed to have authored the ambiguous provision.

1.28 Capitalization. Any capitalized terms used in any Schedule or Exhibit but not otherwise defined therein shall have the meaning as defined in this Agreement.

1.29 Date References. References from or through any date mean, unless otherwise specified, from and including or through and including, respectively.

1.30 Gender. Unless the context of this Agreement otherwise requires, words of one gender include the other gender.

1.31 Headings. Headings and captions of the Articles and Sections hereof are for convenience only and are not to be used in the interpretation of this Agreement.

1.32 Joint and Several Obligations. Unless specified otherwise in this Agreement, the obligations of all Parties hereto are several.

1.33 No Strict Construction. This Agreement has been prepared jointly and shall not be strictly construed against either Party.

1.34 Number of Days. Whenever this Agreement refers to a number of days, unless otherwise specified, such number shall refer to Calendar Days.

1.35 Person References. References to any Person include the successors and permitted assigns of that Person.

1.36 References to Parts of this Agreement. References to Articles and Sections are to Articles and Sections of this Agreement unless otherwise specified.

1.37 Exhibits. All Exhibits annexed hereto or referred to herein are hereby incorporated in and made a part of this Agreement as if set forth in full herein.

1.38 Singular/Plural. Any singular term in this Agreement shall be deemed to include the plural, and any plural term the singular.

1.39 United States Dollars. References in this Agreement to "Dollars" or "$" shall mean the legal tender of the United States of America.

**ARTICLE 2 – ASSIGNMENT**

2.1 Assignments; Certain Representations.

(a) Prior to the Effective Date, each of Stepanov, Gabibov and Belogurov will have granted to the Institute an irrevocable assignment of the Patents each owned, and Genkin will have granted to Pharmsynthez an irrevocable assignment of the Patents he owned.

(b) Subject to the terms of this Agreement and in order to fulfill the Parties' obligations under this Agreement, Assignors, collectively own all right, title, and interest, throughout the world in all inventions in the Patents and Know-How, free and clear of all liens or other encumbrances of any nature whatsoever other than any right title and interest that Scripps has in the Patents and Know-How (the "Scripps Rights"), and Hesperix desires to purchase all of Assignors' collective rights, title, interests throughout the world in the same, free and clear of all liens or other encumbrances of any nature whatsoever; for the consideration paid by Hesperix, the receipt and sufficiency of which are hereby acknowledged, Assignors, directly or indirectly as provided above, each hereby irrevocably sell, assign, transfer, and convey unto Hesperix all of their individual right, title, and interest throughout the world in and to said Patents and Know-How (including the right to sue for past infringement thereof) including in and to any patent application whether conventional, design, divisional, continuation, continuation-in-part, and continued prosecution applications, requests for continued examination, substitutions, patents of addition, reissues, renewals, or reexams thereof, and in and to all inventions thereon, preparatory to obtaining Letters Patent of the United States and patents throughout the world therefore; and Assignors each hereby authorize the United States Commissioner of Patents and Trademarks to issue any and all Letters Patent of the United States and shall request all patent authorities throughout the world to issue any and all patents anywhere in the world included in or resulting from said Patents, free and clear of all liens or other encumbrances of any nature whatsoever, to Hesperix, for its interest and for the sole use and benefit of Hesperix and its assigns and legal representatives; *provided, however,* that the Parties acknowledge and agree that their respective rights, title, interests,and obligations pursuant to this assignment and Agreement are subject to the rights of the United States Government, existing and as amended, which may arise or result from Scripps and Scripps' assignors receipt of research support from the United States Government. Each Assignor will execute a Confirmatory Assignment substantially in the form of Exhibit 2.1 attached hereto for recordation purposes.

2.2 No Other Technology Rights. It is understood and agreed that this Agreement does not grant any Party any license, covenant, or other right in the intellectual property of any other Party other than as expressly specified in this Agreement. As of the Effective Date, the Assignee or its designee or successor intends to develop Products using the Patents, and each Assignor has and will have no interest in such Products, except as set forth in or contemplated by this Agreement or as an owner of Assignee or Xenetic Biosciences Inc. following the closing of its acquisition of Assignee. No other compensation or amount is owed any other party in connection with making, conceiving or developing the Patents, except as otherwise provided in this Agreement or in any agreement between or among the Parties or Xenetic Biosciences Inc. concerning ownership of Assignee or Xenetic Biosciences Inc.

2.3 Further Acts. Each Assignor hereby agrees and covenants to Hesperix that he/she/it will undertake all legal acts at any time necessary and at no further cost or expense to Hesperix other than those obligations under Article 3 of this Agreement (i) to vest all right, title, and interest in the Patents and Know-How in Hesperix or Hesperix's designee, (ii) to enable Hesperix or Hesperix's designee to prosecute the patents and to issue patents from the Patents, (iii) to enable Hesperix or Hesperix's designee to enforce the Patents against any infringers or to defend against any challenges to the validity or enforceability of the Patents, and (iv) to do all other acts as may be reasonable or necessary to satisfy the intent of the parties hereto.

2.4 Cooperation. The Assignors shall cooperate with Hesperix and its counsel in connection with prosecuting and maintaining the Patents, for example, by providing all pertinent information and data with respect thereto, assisting in reviewing and responding to any actions issued by any patent office, and executing applications, specifications, declarations, oaths, assignments and all similar instruments which Hesperix shall deem necessary. Assignors shall use commercially reasonable efforts at no cost to such Assignors to coordinate and procure that personnel who have knowledge of the Patents and the know-how are available for telephone discussions, and meetings with Hesperix, and facilitate to its commercially reasonable efforts meetings with the Assignors and with patent counsel, as and when reasonably required by Hesperix. The Assignors further agree that their obligation to execute or cause to be executed any such instrument or papers shall continue after the expiration of this Agreement. If Hesperix is unable for any reason to secure the Assignors' signature to apply for or to pursue any application for any United States or foreign patents assigned hereunder to Assignor, then each Inventor hereby irrevocably designates and appoints Hesperix and its duly authorized officers and agents as such Assignor's agent and attorney-in-fact, to act for and in his/her name, place and stead to execute and file any such lawful applications and to do all other lawfully permitted acts to further the prosecution and issuance of letters patent thereon with the same legal force and effect as if executed by such Inventor.

**ARTICLE 3 – PAYMENTS AND PAYMENT TERMS**

3.1 Running Royalties. In consideration for the assignments by the Institute and Pharmsynthez of the Patents and their respective representations, warranties, and covenants made pursuant to this Agreement, and subject to the provisions herein, Hesperix shall, during the Term, pay each of the Institute and Pharmsynthez a running royalty of * percent (*%) (*i.e.,* a total of * percent (*%) divided evenly between the Institute and Pharmsynthez) of Net Sales of Products in each country in which, in absence of this Agreement, the manufacture, use, offer for sale, sale, or importation of the Product would infringe a Valid Claim of an issued patent within the Patents. This running royalty rate will be reduced by * (*) to *percent (*%) to each of the Institute and Pharmsynthez (*i.e.,* a total of * percent (*%) divided evenly between the Institute and Pharmsynthez) in each country in which the manufacture, use, offer for sale, sale, or importation of the Product would infringe a Valid Claim of a pending application within the Patents if such claim were a claim of an issued patent at the time of the sale of such Product but would not infringe a Valid Claim of an issued patent within the Patents. The running royalty rate will be reduced to * percent (*%) to each of the Institute and Pharmsynthez (i.e., a total of * percent (*%) divided evenly between the Institute and Pharmsynthez) for any Royalty Term under Section 3.2 which neither of the foregoing royalty rate is applicable. If Hesperix assigns the Patents to a Third Party, Hesperix will make all of the obligations of Sections 3.1–3.10 become obligations of such Third Party assignee, and upon such assignment of the Patents to such Third Party, Hesperix shall be relieved of these obligations.

Each of the Institute, and Pharmsynthez will be paid only one (1) running royalty each for each unit of Product no matter how many times such unit is sold or how many Patents, absent this Agreement, would be infringed by the manufacture, use, offer for sale, sale, or importation of such Product. All running royalties are non-refundable.

* Portions of this Exhibit have been omitted and filed separately with the Securities and Exchange Commission pursuant to a request for confidential treatment.

3.2 Royalty Term. Running royalties due under Section 3.1 will commence on the Effective Date through, on Product-by-Product and country-by-country bases, the later of (i) the expiration of the last-to-expire Patent, a Valid Claim of which would, absent this Agreement, be infringed by the manufacture, use, offer for sale, sale, or import of a Product or (ii) ten (10) years from the date of first Commercial Sale.

3.3 Royalty Payments and Reports. Running royalties under Section 3.1 shall be due forty-five (45) Calendar Days after the end of each Calendar Quarter. Each payment of running royalties under Article 3 will be accompanied by a report setting forth, on Product-by-Product and country-by-country bases, the amount of gross sales of each Product, a calculation of corresponding Net Sales and the information used to make such calculation, the currency conversion rate used (if applicable), the United States Dollar-equivalent of such Net Sales, and a calculation of the royalty payment due on such Net Sales. Such report will be considered Confidential Information of Hesperix subject to the obligations of Article 4.

3.4 Interest on Late Payments. Any payments or portions thereof due hereunder which are not paid when such payments are due under this Agreement will bear interest at the lower of (a) the U.S. Prime Rate in effect on the due date plus one (1) percentage point or (b) the maximum rate permitted by applicable Law, calculated on the number of Calendar Days such payment is delinquent; provided, that any payments or portions thereof which are disputed in good faith by the Assignee shall not incur any interest thereon unless finally resolved as provided for herein in the applicable Assignor's favor.

3.5 Currency. Royalty payments under this Agreement shall be payable in U.S. dollars and shall be paid by bank wire transfer in immediately available funds to such bank account as designated in writing by the payee. Whenever conversion from any foreign currency shall be required, such conversion shall be at the rate of exchange thereafter published in the Wall Street Journal for the Business Day closest to the end of the applicable accounting period.

3.6 Royalty Reduction. In the event Hesperix is required to obtain a license from a third party in order to avoid infringing such third party's patent(s) in the development, manufacture, use, or sale of any Product (a "Required Third Party License"). Hesperix may deduct one half of any running royalties due under Required Third Party Licenses from any royalties due under this Agreement; *provided, however*, that the royalty due under this Agreement will not be reduced in total by more than one-half.

3.7 Withholding Taxes. The Institute and Pharmsynthez will respectively be responsible for any and all of their respective income or other similar taxes owed by them and required by applicable Law to be withheld or deducted from any payments made by or on behalf of Hesperix to each of them ("Withholding Taxes"), and Hesperix may deduct from any amounts that Hesperix is required to pay hereunder an amount equal to such Withholding Taxes; provided, however, that Hesperix is required by a Governmental Authority to pay such amounts on the Institute's, or Pharmsynthez's behalf. The Institute and Pharmsynthez will provide Hesperix with any information available to the Institute or Pharmsynthez that is necessary to determine the Withholding Taxes (including any potential reduction based on an applicable income tax treaty along with necessary certification of residency for treaty benefits to apply). Such Withholding Taxes will be paid to the proper taxing authority for the Institute's or Pharmsynthez's account, as appropriate, and evidence of such payment that is satisfactory to the Institute or Pharmsynthez as appropriate, will be sent to the Institute or Pharmsynthez as appropriate, within thirty (30) Calendar Days of such payment.

3.8 Cooperation of the Parties. Hesperix, the Institute and Pharmsynthez will do all lawful acts and things and sign all lawful deeds and documents as any may reasonably request from the other(s) to enable Hesperix, the Institute, and Pharmsynthez to take advantage of any applicable legal provision or any double taxation treaties with the object of paying the sums due to the Institute, and Pharmsynthez hereunder without withholding or deducting any Withholding Taxes.

3.9 Record Retention. Hesperix will maintain complete and accurate books, records, and accounts used for the determination of expenses, deductions, credits, or other relevant factors in connection with the calculation of Net Sales, in sufficient detail to confirm the accuracy of any payments required under this Agreement, which books, records, and accounts will be retained by Hesperix until three (3) years after the end of the period to which such books, records, and accounts pertain. Hesperix agrees to allow relevant tax authorities to inspect the records contemplated under this Section 3.9 and otherwise to cooperate in responding to inquiries from tax authorities.

3.10 Audit. The Institute and Pharmsynthez will collectively have the right to have an independent certified public accounting firm have access during normal business hours, and upon reasonable prior written notice, to such of the records of Hesperix as such firm deems reasonably necessary to verify the accuracy of the calculation of Net Sales by Hesperix under this Agreement for any Calendar Quarter ending not more than three (3) years prior to the date of such request; *provided however*, that the Institute, and Pharmsynthez will not have the right to conduct more than one such audit in any twelve (12) month period and that the Institute and Pharmsynthez shall not be permitted to audit the same period of time more than once. The Institute and Pharmsynthez will bear all costs of such audit, unless the audit reveals a discrepancy in the Institute's or Pharmsynthez's, favor of more than twenty percent (20%), in which case Hesperix will bear the cost of the audit (not to exceed 50% of the amount of any underpayment). The Institute and Pharmsynthez will treat all information subject to review under this Article 3 in accordance with the provisions of Article 4 and will cause its accounting firm to enter into a reasonably acceptable confidentiality agreement with the Institute and Pharmsynthez obligating such firm to maintain all such financial information in confidence pursuant to such confidentiality agreement. The independent certified public accounting firm shall report to the Institute, Pharmsynthez, and Hesperix only the conclusions of its audit, that is whether Hesperix has accurately calculated Net Sales or the extent of the inaccuracy, unless any of the Institute, Pharmsynthez, or Hesperix, with reasonable cause, contests the accuracy of the accounting firm's calculations. In the event the independent accounting firm finds discrepancies in Hesperix's calculations of Net Sales, the independent accounting firm shall additionally promptly inform the Institute, Pharmsynthez, and Hesperix of its conclusions and the bases therefore.

3.11 Payment of Additional Amounts or Refunds. If, based on the results of any audit, additional payments are owed to the Institute, or Pharmsynthez, under this Agreement, then Hesperix will make such additional payments promptly after the accounting firm's written report is delivered to Hesperix, the Institute, and Pharmsynthez. If, based on the results of any audit, refunds are owed to Hesperix under this Agreement, then the Institute and Pharmsynthez as appropriate, will make such refunds promptly after the accounting firm's written report is delivered to Hesperix, the Institute, and Pharmsynthez. However, if any of the Institute, Pharmsynthez, or Hesperix, with reasonable cause, contests the accuracy of the accounting firm's calculations, such over or under payment may be withheld pending resolution of the disputed amount.

3.12 Allocation of Shares in Hesperix. Hesperix, Gabibov, Stepanov, Smirnov, Belogurov, Genkin, Vinogradov, and Lerner, agree that upon execution of this Agreement by all Parties, ownership of one hundred percent (100%) of the outstanding shares of Hesperix in all classes will be reallocated (whether by issuance of additional shares or otherwise) as follows and that Hesperix, Gabibov, Stepanov, Smirnov, Belogurov, Genkin, Vinogradov, Lerner, shall undertake all actions and will execute all documents necessary to complete this reallocation :

| **Party** | **Allocation upon Assignment Execution by All Parties, Rounded to two Decimal Places** |
|---|---|
| Gabibov | Twelve and thirty-one hundredths percent (12.31%) |
| Stepanov | Four and sixty-two hundredths percent (4.62%) |
| Smirnov | Three and eight hundredths percent (3.08%) |
| Belogurov | Three and eight hundredths percent (3.08%) |
| Genkin | Twenty-three and eight hundredths percent (23.08%) |
| Lerner | Seven and sixty-nine hundredths Percent (7.69%) |
| Vinogradov | Forty-six and fifteen hundredths percent (46.15%) |

## ARTICLE 4 - CONFIDENTIALITY

4.1. Nondisclosure Obligations. For a period from the Effective Date to three (3) years after the earlier of the expiration of the Royalty Term (or termination of this Agreement by Hesperix, if Hesperix is the Disclosing Party), the Receiving Party shall maintain as confidential and shall not make any public disclosure of Confidential Information of the Disclosing Party, without the advance written permission of the Disclosing Party, which permission may be withheld by the Disclosing Party at the Disclosing Party's sole discretion; *provided, however*, that to the extent it is reasonably necessary or appropriate to fulfill its obligations or to exercise its rights under this Agreement the Receiving Party may disclose Confidential Information of the Disclosing Party to its Affiliates, its and their respective officers, directors, employees, sublicensees, consultants, outside contractors, clinical investigators, and other Third Parties, on a need-to-know basis and on the condition that such Persons agree to use the Confidential Information only for purposes specifically authorized by this Agreement and to keep the Confidential Information confidential for the same time periods and to the same extent as the Receiving Party is required to keep the Confidential Information confidential hereunder; and (ii) the Receiving Party may disclose Confidential Information to Governmental Authorities to the extent that such disclosure is reasonably necessary to obtain authorizations to conduct clinical trials or to develop or commercially market products, or as otherwise may be required by Law or pursuant to legal or regulatory process; and (iii) the Receiving Party may disclose Confidential Information to its attorneys, accountants, lenders, insurers, and advisors who are bound by a professional duty of confidentiality (so long as the Receiving Party remains responsible for any such breaches by such professionals).

4.2 Nondisclosure of the Agreement. Except as permitted by the other Sections of Article 4 or as otherwise required by Law, the Parties each agree not to disclose any terms or conditions of this Agreement to any Third Party without the prior written consent of the other Party, such consent not to be unreasonable conditioned, delayed, or withheld; *provided* that each Party shall be entitled to disclose the terms of this Agreement without such consent to (a) existing and potential investors or other financing sources on the condition that such Persons agree in writing to keep such terms confidential for the same time periods and to the same extent as such Party is required to keep such terms confidential, (b) to its attorneys, accountants and advisors who are bound by a professional duty of confidentiality (so long as the Receiving Party remains responsible for any such breaches by such professionals or other third parties), and (c) any entity that is publically traded that may acquire all or substantially all of the assets or equity interests of Hesperix, which may further disclose the terms of this Agreement or otherwise as may be required by the rules and regulations of the exchange in which it is listed.

4.3 Press Releases. No public announcement or press release containing the terms of this Agreement, except as otherwise required by Law shall be made or issued, directly or indirectly, by any Party without first obtaining the prior written approval of the other Parties. The Parties agree that any Party preparing any such press release shall provide the other Parties with a draft thereof reasonably in advance of disclosure so as to permit the other Parties to review and comment on such press release prior to any dissemination of such release.

4.4 Injunctive Relief. The Parties hereby acknowledge that a breach of their respective obligations in this Article 4 may cause irreparable harm and that the remedy or remedies at law for any such breach may be inadequate. The Parties hereby agree that, in the event of any such breach, in addition to all other available remedies hereunder, the non-breaching Party shall have the right to obtain equitable relief to enforce the provisions of this Article 4.

## ARTICLE 5 - REPRESENTATIONS AND WARRANTIES

5.1 Hesperix's Representations and Warranties. Hesperix represents and warrants to the other Parties that:

(a) Hesperix is a corporation duly organized, validly existing, and in good standing under the laws of Switzerland,;

(b) Hesperix has the legal right, authority, and corporate power to enter into this Agreement;

(c) Hesperix has taken all necessary corporate action to authorize the execution, delivery, and performance of this Agreement;

(d) upon the execution and delivery of this Agreement, this Agreement shall constitute a valid and binding obligation of Hesperix, enforceable against Hesperix in accordance with its terms, except to the extent enforceability is limited by bankruptcy, insolvency or similar laws affecting creditors' rights and remedies or equitable principles;

(e) the performance of Hesperix's obligations under this Agreement will not conflict with its organizational documents, as amended, and will not result in a breach of any material agreements or contracts to which it is a party;

(f) Hesperix has not and will not, during the Term, enter into any material agreements or contracts that would be inconsistent with its obligations under this Agreement; and

(g) this Agreement is fully binding and enforceable in accordance with its terms.

5.2 Stepanov's Representations and Warranties. Stepanov represents and warrants to the other Parties that:

(a) Stepanov is an individual;

(b) to his Knowledge, Stepanov is not an inventor, nor does he own any interest in any patents or patent application other than his ownership interest in the Patents that would be infringed by the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the in the Patents as of the Effective Date;

(c) to his Knowledge, the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date, will not infringe any patent or any other rights of any Third Party (other than the Scripps Rights) or contribute to the infringement of other rights of any Third Party (other than the Scripps Rights) in the United States or elsewhere, and no claim, action or suit alleging any such infringement or contribution to infringement is pending (other than with respect to the Scripps Rights) or, to his Knowledge, threatened (other than with respect to the Scripps Rights) in writing against Stepanov or his Affiliates.

(d) his assignment to the Institute of his right, title, and interest in and to the Patents is valid and binding;

(e) upon the execution and delivery of this Agreement, this Agreement shall constitute a valid and binding obligation of Stepanov, enforceable against Stepanov in accordance with its terms, except to the extent enforceability is limited by bankruptcy, insolvency or similar laws affecting creditors' rights and remedies or equitable principles;

(f) the performance of Stepanov's obligations under this Agreement will not result in a breach of any material agreements or contracts to which he is a party;

(g) Stepanov has not and will not, during the Term, enter into any material agreements or contracts that would be inconsistent with his obligations under this Agreement; and

(h) this Agreement is fully binding and enforceable in accordance with its terms.

5.3 Gabibov's Representations and Warranties. Gabibov represents and warrants to the other Parties that:

(a) Gabibov is an individual;

(b) to his Knowledge, Gabibov is not an inventor, nor does he own any interest in any patents or patent applications other than his ownership interest in the Patents that would be infringed by the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date;

(c) to his Knowledge, the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date, will not infringe any patent or any other rights of any Third Party (other than the Scripps Rights) or contribute to the infringement of other rights of any Third Party (other than the Scripps Rights) in the United States or elsewhere, and no claim, action or suit alleging any such infringement or contribution to infringement is pending (other than with respect to the Scripps Rights) or to his Knowledge threatened (other than with respect to the Scripps Rights) in writing against Gabibov or his Affiliates;

(d) his assignment to the Institute of his right, title, and interest in and to the Patents is valid and binding;

(e) upon the execution and delivery of this Agreement, this Agreement shall constitute a valid and binding obligation of Gabibov, enforceable against Gabibov in accordance with its terms, except to the extent enforceability is limited by bankruptcy, insolvency or similar laws affecting creditors' rights and remedies or equitable principles;

(f) the performance of Gabibov's obligations under this Agreement will not result in a breach of any material agreements or contracts to which he is a party;

(g) Gabibov has not and will not, during the Term, enter into any material agreements or contracts that would be inconsistent with his obligations under this Agreement; and

(h) this Agreement is fully binding and enforceable in accordance with its terms.

5.4 Smirnov's Representations and Warranties. Smirnov represents and warrants to the other Parties that:

(a) Smirnov is an individual;

(b) to his Knowledge, Smirnov is not an inventor, nor does he own any interest in any patents or patent applications other than his ownership interest in the Patents that would be infringed by the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date;

(c) to his Knowledge, the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date, will not infringe any patent or any other rights of any Third Party (other than the Scripps Rights) or contribute to the infringement of other rights of any Third Party (other than the Scripps Rights) in the United States or elsewhere, and no claim, action or suit alleging any such infringement or contribution to infringement is pending (other than with respect to the Scripps Rights) or threatened (other than with respect to the Scripps Rights) in writing against Smirnov or his Affiliates;

(d) upon the execution and delivery of this Agreement, this Agreement shall constitute a valid and binding obligation of Smirnov, enforceable against Smirnov in accordance with its terms, except to the extent enforceability is limited by bankruptcy, insolvency or similar laws affecting creditors' rights and remedies or equitable principles;

(e) the performance of Smirnov's obligations under this Agreement will not result in a breach of any material agreements or contracts to which he is a party;

(f) Smirnov has not and will not, during the Term, enter into any material agreements or contracts that would be inconsistent with his obligations under this Agreement; and

(g) this Agreement is fully binding and enforceable in accordance with its terms.

5.5 Genkin's Representations and Warranties. Genkin represents and warrants to the other Parties that:

(a) Genkin is an individual;

(b) to his Knowledge, Genkin is not an inventor, nor does he own any interest in any patents or patent applications other than his ownership interest in the Patents that would be infringed by the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date;

(c) to his Knowledge, the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date, will not infringe any patent or any other rights of any Third Party (other than the Scripps Rights) or contribute to the infringement of other rights of any Third Party (other than the Scripps Rights) in the United States or elsewhere, and no claim, action or suit alleging any such infringement or contribution to infringement is pending (other than with respect to the Scripps Rights) or threatened (other than with respect to the Scripps Rights) in writing against Genkin or his Affiliates;

(d) his assignment to Pharmsynthez of his right, title, and interest in and to the Patents is valid and binding;

(e) upon the execution and delivery of this Agreement, this Agreement shall constitute a valid and binding obligation of Genkin, enforceable against Genkin in accordance with its terms, except to the extent enforceability is limited by bankruptcy, insolvency or similar laws affecting creditors' rights and remedies or equitable principles;

(f) the performance of Genkin's obligations under this Agreement will not result in a breach of any material agreements or contracts to which he is a party;

(g) Genkin has not and will not, during the Term, enter into any material agreements or contracts that would be inconsistent with his obligations under this Agreement; and

(h) this Agreement is fully binding and enforceable in accordance with its terms.

5.6 Lerner's Representations and Warranties. Lerner represents and warrants to the other Parties that:

(a) Lerner is an individual;

(b) to his Knowledge, Lerner is not an inventor, nor does he own any interest in any patents or patent applications other than his ownership interest in the Patents that would be infringed by the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents;

(c) to his Knowledge, the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date, will not infringe any patent or any other rights of any Third Party (other than with respect to the Scripps Rights) or contribute to the infringement of other rights of any Third Party (other than with respect to the Scripps Rights) in the United States or elsewhere, and no claim, action or suit alleging any such infringement or contribution to infringement is pending (other than with respect to the Scripps Rights) or threatened (other than with respect to the Scripps Rights) in writing against Lerner or his Affiliates;

(d) his assignment to Scripps of his right, title, and interest in and to the Patents is valid and binding;

(e) upon the execution and delivery of this Agreement, this Agreement shall constitute a valid and binding obligation of Lerner, enforceable against Lerner in accordance with its terms, except to the extent enforceability is limited by bankruptcy, insolvency or similar laws affecting creditors' rights and remedies or equitable principles;

(f) the performance of Lerner's obligations under this Agreement will not result in a breach of any material agreements or contracts to which he is a party;

(g) Lerner has not and will not, during the Term, enter into any material agreements or contracts that would be inconsistent with his obligations under this Agreement; and

(h) this Agreement is fully binding and enforceable in accordance with its terms.

5.7 Belogurov's Representations and Warranties. Belogurov represents and warrants to the other Parties that:

(a) Belogurov is an individual;

(b) to his Knowledge, Belogurov is not an inventor, nor does he own any interest in any patents or patent applications other than his ownership interest in the Patents that would be infringed by the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date;

(c) to his Knowledge, the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date, will not infringe any patent or any other rights of any Third Party (other than the Scripps Rights) or contribute to the infringement of other rights of any Third Party (other than the Scripps Rights) in the United States or elsewhere, and no claim, action or suit alleging any such infringement or contribution to infringement is pending (other than with respect to the Scripps Rights) or threatened (other than with respect to the Scripps Rights) in writing against Belogurov or his Affiliates;

(c) upon the execution and delivery of this Agreement, this Agreement shall constitute a valid and binding obligation of Belogurov, enforceable against Belogurov in accordance with its terms, except to the extent enforceability is limited by bankruptcy, insolvency or similar laws affecting creditors' rights and remedies or equitable principles;

(d) his assignment to the Institute of his right, title, and interest in and to the Patents is valid and binding;

(e) the performance of Belogurov's obligations under this Agreement will not result in a breach of any material agreements or contracts to which he is a party;

(f) Belogurov has not and will not, during the Term, enter into any material agreements or contracts that would be inconsistent with his obligations under this Agreement; and

(g) this Agreement is fully binding and enforceable in accordance with its terms.

5.8 Vinogradov's Representations and Warranties. Vinogradov represents and warrants to the other Parties that:

(a) Vinogradov is an individual;

(b) to his Knowledge, Vinogradov is not an inventor, nor does he own any interest in any patents or patent applications other than his ownership interest in the Patents that would be infringed by the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date as of the Effective Date;

(c) to his Knowledge, the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date, will not infringe any patent or any other rights of any Third Party (other than the Scripps Rights) or contribute to the infringement of other rights of any Third Party (other than the Scripps Rights) in the United States or elsewhere, and no claim, action or suit alleging any such infringement or contribution to infringement is pending (other than with respect to the Scripps Rights) or threatened (other than with respect to the Scripps Rights) in writing against Vinogradov or his Affiliates;

(d) upon the execution and delivery of this Agreement, this Agreement shall constitute a valid and binding obligation of Vinogradov, enforceable against Vinogradov in accordance with its terms, except to the extent enforceability is limited by bankruptcy, insolvency or similar laws affecting creditors' rights and remedies or equitable principles;

(e) the performance of Vinogradov's obligations under this Agreement will not result in a breach of any material agreements or contracts to which he is a party;

(f) Vinogradov has not and will not, during the Term, enter into any material agreements or contracts that would be inconsistent with his obligations under this Agreement; and

(g) this Agreement is fully binding and enforceable in accordance with its terms.

5.9 The Institute's Representations and Warranties. The Institute represents and warrants to the other Parties that:

(a) the Institute is an educational corporation duly organized, validly existing, and in good standing under the laws of the Russian federation;

(b) to its Knowledge, the Institute does not own any patents or patent applications other than its ownership interest in the Patents that would be infringed by the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date;

(c) to its Knowledge, the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date, will not infringe any patent or any other rights of any Third Party (other than the Scripps Rights) or contribute to the infringement of other rights of any Third Party (other than the Scripps Rights) in the United States or elsewhere, and no claim, action or suit alleging any such infringement or contribution to infringement is pending (other than with respect to the Scripps Rights) or threatened (other than with respect to the Scripps Rights) in writing against the Institute or its Affiliates;

(d) to its Knowledge, the Institute is unaware of any inventions that were invented or may be invented by members of its faculty, or other employees, other than the Assignors, that would be infringed by the making, having made, using, or selling of products claimed in the Patents, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date;

(e) the Institute has the legal right, authority, and corporate power to enter into this Agreement;

(f) the Institute has taken all necessary corporate action to authorize the execution, delivery, and performance of this Agreement;

(g) upon the execution and delivery of this Agreement, this Agreement shall constitute a valid and binding obligation of the Institute, enforceable against the Institute in accordance with its terms, except to the extent enforceability is limited by bankruptcy, insolvency or similar laws affecting creditors' rights and remedies or equitable principles;

(h) the performance of the Institute's obligations under this Agreement will not conflict with its organizational documents, as amended, and will not result in a breach of any material agreements or contracts to which it is a party;

(i) the Institute has not and will not, during the Term, enter into any material agreements or contracts that would be inconsistent with its obligations under this Agreement and

(j) this Agreement is fully binding and enforceable in accordance with its terms.

5.10 Pharmsynthez's Representations and Warranties. Pharmsynthez represents and warrants to the other Parties that:

(a) Pharmsynthez is a public joint stock company duly organized, validly existing, and in good standing under the laws of the Russian Federation;

(b) to its Knowledge, Pharmsynthez does not own any patents or patent applications other than its ownership interest in the Patents that would be infringed by the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date;

(c) to its Knowledge, the making, having made, using, or selling of products claimed in the Patents as of the Effective Date, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date, will not infringe any patent or any other rights of any Third Party (other than the Scripps Rights) or contribute to the infringement of other rights of any Third Party (other than the Scripps Rights) in the United States or elsewhere, and no claim, action or suit alleging any such infringement or contribution to infringement is pending (other than with respect to the Scripps Rights) or threatened (other than with respect to the Scripps Rights) in writing against Pharmsynthez or its Affiliates;

(d) to its Knowledge, Pharmsynthez is unaware of any inventions that were invented or may be invented by its employees, other than the Assignors, that would be infringed by the making, having made, using, or selling of products claimed in the Patents, or the otherwise practicing of any technology or inventions claimed in the Patents as of the Effective Date;

(e) Pharmsynthez has the legal right, authority, and corporate power to enter into this Agreement;

(f) Pharmsynthez has taken all necessary corporate action to authorize the execution, delivery, and performance of this Agreement;

(g) upon the execution and delivery of this Agreement, this Agreement shall constitute a valid and binding obligation of Pharmsynthez, enforceable against Pharmsynthez in accordance with its terms, except to the extent enforceability is limited by bankruptcy, insolvency or similar laws affecting creditors' rights and remedies or equitable principles;

(h) the performance of Pharmsynthez's obligations under this Agreement will not conflict with its organizational documents, as amended, and will not result in a breach of any material agreements or contracts to which it is a party;

(i) Pharmsynthez has not and will not, during the Term, enter into any material agreements or contracts that would be inconsistent with its obligations under this Agreement; and

(j) this Agreement is fully binding and enforceable in accordance with its terms.

5.11 WARRANTY DISCLAIMER. EXCEPT AS EXPRESSLY SET FORTH IN THIS AGREEMENT, NO PARTY MAKES ANY REPRESENTATIONS OR EXTENDS ANY WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING ANY EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO PATENTS AND TECHNOLOGY OR ANY MATERIALS OR INFORMATION PROVIDED TO ANY OTHER PARTY UNDER THIS AGREEMENT, OR WITH RESPECT TO ANY PRODUCTS OR SERVICES OF ANY PARTY OR THEIR RESPECTIVE AFFILIATES. FURTHERMORE, UNLESS EXPRESSLY STATED IN THIS AGREEMENT, NOTHING IN THIS AGREEMENT SHALL BE CONSTRUED AS A WARRANTY, EXPRESS OR IMPLIED, THAT USE BY ANY PARTY OF PATENTS OR ANY MATERIALS OR INFORMATION PROVIDED TO ANY PARTY UNDER THIS AGREEMENT, DO NOT INFRINGE ANY PATENT RIGHTS OR OTHER INTELLECTUAL PROPERTY RIGHTS OF ANY THIRD PARTY.

5.12 EXCLUSION OF DAMAGES; LIMITATIONS OF LIABILITY. EXCEPT FOR LIABILITY FOR BREACH OF CONFIDENTIALITY, NO PARTY SHALL BE LIABLE TO ANY OTHER PARTY HERETO FOR SPECIAL, INDIRECT, INCIDENTAL, OR PUNITIVE DAMAGES, OR CONSEQUENTIAL DAMAGES (INCLUDING DAMAGES RESULTING FROM LOSS OF USE, LOSS OF PROFITS, OR INTERRUPTION OR LOSS OF BUSINESS OR OTHER SIMILIAR ECONOMIC LOSS) ARISING OUT OF THIS AGREEMENT OR WITH RESPECT TO A PARTY'S PERFORMANCE OR NON-PERFORMANCE HEREUNDER.

The foregoing exclusion of damages:

(i) applies even if a Party had or should have had actual or constructive knowledge of the possibility of such damages,

(ii) is a fundamental element of the basis of the bargain among the Parties, and this Agreement would not be entered into without such limitations and exclusions, and

(iii) shall apply whether an Action is based on breach of contract, breach of warranty, tort (including negligence), product liability, strict liability or otherwise, and notwithstanding any failure of essential purpose of any limited remedy herein.

The foregoing exclusion of damages is intended to apply even if there is a total and fundamental breach of this Agreement. The essential purpose of the exclusion of damages clause is to limit the Parties' respective liabilities to each other hereunder.

5.13 Essential Basis. The Parties acknowledge and agree that the disclaimers, exclusions, and limitations of liability set forth in this Article 5 form an essential basis of this Agreement, and that, absent any of such disclaimers, exclusions or limitations of liability, the terms of this Agreement, including the economic terms, would be substantially different.

5.14 Liability. Other than as expressly provided in this Agreement, each Party shall bear all risk, responsibility, and liability for all of its acts or omissions in performing its obligations under this Agreement.

5.15 Compliance with Law. Each Party shall comply, and shall require its Affiliates to comply, with all applicable relative to its obligations hereunder.

5.16 Broker's Fees. Each Party has disclosed to the other whether it has incurred or agreed to pay any broker's commission or finder's fee relating to or in connection with the transactions contemplated by this Agreement.

**ARTICLE 6 - TERMINATION**

6.1 Termination without Cause. Hesperix will be able to terminate this Agreement with any or all Parties without cause immediately upon written notice to the appropriate Party(ies). No other Party shall be able to terminate this Agreement without cause.

6.2 Termination for Financial Reasons. To the extent permitted by Law, upon the filing or institution of bankruptcy, reorganization, liquidation or receivership proceedings, or upon an assignment of a substantial portion of the assets for the benefit of creditors (a "Bankruptcy Event") by any Party, Hesperix may terminate this Agreement; *provided, however*, that, in the case of any involuntary bankruptcy proceeding, such right to terminate will only become effective if the subject Party consents to the involuntary bankruptcy or such proceeding is not dismissed within ninety (90) days after the filing thereof. Hesperix will retain and may fully exercise all of its rights and elections under the U.S. Bankruptcy Code and foreign equivalents, including that upon commencement of a bankruptcy proceeding by or against such Party undergoing a bankruptcy proceeding (the "Affected Party") under the U.S. Bankruptcy Code or foreign equivalents. This Section 6.2 is without prejudice to any rights Hesperix may have arising under the U.S. Bankruptcy Code, foreign equivalents or other Law.

**ARTICLE 7 – OTHER PROVISIONS**

7.1 Assignment. Hesperix will have the right, without the consent of any other Parties, to assign this Agreement, or any part of its rights hereunder, and to delegate its obligations or any part thereof hereunder, to (i) any Affiliate, (ii) any successor in interest by reason of any merger, acquisition, partnership, or license agreement, or (iii) any other Third Party, whereupon the assignee will succeed to such rights, and will assume such obligations, of Hesperix under this Agreement as fully and to the same extent as if the assignee, instead of Hesperix, were the original party to this Agreement with respect to such rights and obligations. Other than as provided for in the preceding sentence, this Agreement may not be assigned, in whole or in part, by any Party without prior written consent of Hesperix, such consent to be at Hesperix's sole discretion. Any assignment in contravention of the provisions of this Section 7.1 shall be null and void. This Section 7.1 will not apply to any assignment of the Patents by Hesperix.

7.2 Notices. Any notice or other communication pursuant to this Agreement shall be sufficiently made or given (i) on the date of transmission if sent to such Party by facsimile or e-mail, with confirmation of transmission, with paper copy being sent by certified first class mail, postage prepaid, or by next day express delivery service, addressed to it at its address below (or such address as it shall designate by written notice given to the other Party) or (ii) on the date of mailing by certified first class mail, postage prepaid, or by next day express delivery service, addressed to it at its address below (or such address as it shall designate by written notice given to the other Party) if no transmission to such Party by facsimile or e-mail, with confirmation of transmission, is made.

If to Hesperix: via Luganetto 4,
6962 Viganello
Switzerland
Attn:

with a copy to: Troutman Sanders LLP
875 Third Avenue
New York, NY 10022
USA
Attn: Irina Vainberg, Ph.D., J.D.

| | |
|---|---|
| If to Stepanov: | Ostrovityananova street<br>bld. 45/2<br>app. 44<br>Moscow 117342<br>Russian Federation |
| If to Gabibov: | Yauzsky Boulevard 14<br>App.10<br>Moscow 109028<br>Russian Federation |
| If to Smirnov: | 2/1 Kutuzovskiy prt,<br>App 222<br>121248, Moscow,<br>Russian Federation |
| If to Vinogradov: | 4, Stroiteley Str., Block 4,<br>App. 54,<br>Moscow,<br>Russian Federation |
| If to Genkin: | Konstantinovsky Avenue 26<br>App 2<br>St. Petersburg 197110<br>Russian Federation |
| with a copy to: | Troutman Sanders LLP<br>875 Third Avenue<br>New York, NY 10022<br>USA<br>Attn: Irina Vainberg, Ph.D., J.D. |
| If to Lerner: | 7750 Roseland Drive<br>La Jolla, CA 92037<br>USA |
| If to Belogurov: | Ryblevskoe shosse<br>bld. 9<br>app. 53<br>Moscow 121108<br>Russian Federation |
| If to the Institute: | GSP-7<br>Ulitsa Miklukho-Maklaya, 16/10<br>Moscow 117997, V-437<br>Russian Federation |
| If to Pharmsynthez: | 34, Liter l, Kuzmolovsky urban-type settlement<br>Capitolovo station<br>Vsevolozhsky district<br>188663, Leningrad region<br>Russian Federation |

7.3 Force Majeure. No Party shall be held liable or responsible to any other Party nor be deemed to have defaulted under or breached this Agreement for failure or delay in fulfilling or performing any term of this Agreement when such failure or delay is caused by or results from causes beyond the reasonable control of the affected Party, including without limitation, fire, floods, embargoes, war, acts of war (whether war is declared or not), insurrections, riots, civil commotions, strikes, lockouts or other labor disturbances, acts of God or acts, omissions or delays in acting by any Governmental Authority; *provided, however*, that the Party so affected shall use reasonable efforts to avoid or remove such causes of non-performance, and shall continue performance hereunder with reasonable dispatch wherever or whenever such causes are removed. Each Party shall provide the other Parties with prompt written notice of any delay or failure to perform that occurs by reason of force majeure. The Parties shall mutually seek a resolution of the delay or the failure to perform in good faith.

7.4 Waivers and Modifications. The failure of any Party to insist on the performance of any obligation hereunder shall not be deemed to be a waiver of such obligation. Waiver of any breach of any provision hereof shall not be deemed to be a waiver of any other breach of such provision or any other provision. No waiver, modification, release, or amendment of any obligation under or provision of this Agreement shall be valid or effective unless in writing and signed by both Parties hereto.

7.5 Relationship of the Parties. It is expressly agreed that the relationship among the Parties shall not constitute a partnership, joint venture, or agency. The Parties are independent contractors. No Party shall have the authority to make any statements, representations, or commitments of any kind, or to take any action, which shall be binding on any other Party, without the prior written consent of such other Party to do so.

7.6 Counterparts. This Agreement may be executed in counterparts with the same effect as if all Parties had signed the same document. All such counterparts shall be deemed an original, shall be construed together, and shall constitute one and the same instrument. Counterparts may be delivered via facsimile, electronic mail (including pdf) or other transmission method and any counterpart so delivered shall be deemed to have been duly and validly delivered and be valid and effective for all purposes.

7.7 Severability. In performing this Agreement, the Parties shall comply with all applicable Laws. Wherever there is any conflict between any provision of this Agreement and any Law, the Law shall prevail, but in such event the affected provision of this Agreement shall be limited or eliminated only to the extent necessary, and the remainder of this Agreement shall remain in full force and effect. In the event the terms of this Agreement are materially altered as a result of the foregoing, the Parties shall renegotiate in good faith the terms of this Agreement to resolve any inequities.

7.8 Entire Agreement. This Agreement and the Exhibits hereto constitute the entire agreement between the Parties with respect to the subject matter hereof, and supersedes any and all oral, electronic, or written communications or understandings relating to the subject matter hereof.

7.9 Further Actions. Each Party agrees to execute, acknowledge, and deliver such further instruments, and to do all such other acts, as may be necessary or appropriate in order to carry out the purposes and intent of this Agreement.

7.10 Expenses. Except as otherwise provided herein, all costs and expenses incurred in connection with this Agreement shall be paid by the Party incurring such cost or expense.

7.10 Third Party Beneficiaries. Notwithstanding any provision herein to the contrary, no provision of this Agreement is intended to confer any rights, benefits, remedies, obligations or liabilities hereunder upon any person other than the Parties, their Affiliates where expressly stated, other indemnities where expressly stated, and their respective successors and assigns.

7.11 Governing Law. The validity, construction, and interpretation of this Agreement and any determination of the performance which this Agreement requires will be governed by and construed in accordance with the Laws of the State of New York applicable to contracts made and performed wholly within the State of New York.

7.12 Jurisdiction. Each Party hereby irrevocably and unconditionally submits, for itself and its property, to the non-exclusive jurisdiction of any New York or Federal court sitting in New York County, New York and any appellate court from any thereof; in any Action arising out of or relating to this Agreement, or for recognition or enforcement of any judgment, and each of the Parties hereby irrevocably and unconditionally agrees that all claims in respect of any such Action may be heard and determined in such New York State court, or, to the extent permitted by law, in such Federal court. Each of the Parties agrees that a final judgment in any such Action shall be conclusive and may be enforced in other jurisdictions by suit on the judgment or in any other manner provided by law. Each of the Parties hereby irrevocably waives, to the fullest extent it may legally and effectively do so, the defense of an inconvenient forum to the maintenance of such Action in any such court, and agrees not to plead the same, and agrees that nothing herein will limit the right to sue in any other jurisdiction if a New York State or Federal court of competent jurisdiction sitting in New York County, New York rules or orders that it will not exercise jurisdiction over any such Action.

7.13 Venue. Each of the Parties hereby irrevocably and unconditionally waives, to the fullest extent it may legally and effectively do so, any objection which it may now or hereafter have to the laying of Action arising out of or relating to this Agreement in any court referred to in this Section 7.13.

7.14 Immunity Waiver. To the extent that a Party has or hereafter may acquire any immunity from jurisdiction of any court or from any legal process (whether through service of notice, attachment prior to judgment, attachment in aid of execution or execution, on the ground of sovereignty or otherwise) with respect to itself or its property, it hereby irrevocably waives, to the fullest extent it may legally and effectively do so, such immunity in respect of its obligations under this Agreement.

7.15 Survival. Termination or expiration of this Agreement for any reason shall not affect the accrued rights of the Parties arising in any way out of this Agreement and shall not release any Party from any liability which, at the time of such termination or expiration, has already accrued, as applicable, or which is attributable to a period prior to such termination or expiration, nor preclude any Party, as applicable, from pursuing any rights and remedies it may have hereunder or at law or in equity which accrued or are based upon any event or series of events occurring prior to such termination or expiration. Additionally, Articles 1, 3, 4, 5, and 7 and Section 2.3 shall survive the termination or expiration of this Agreement.

IN WITNESS WHEREOF, the parties have caused their duly authorized officers to execute and deliver this Agreement as of the Effective Date.

HESPERIX SA

By: /s/ Robert Frigerio
Name: Robert Frigerio
Title: Director

ALEXEY VYACHESLAVOVICH STEPANOV

/s/ Alexey Vyacheslavovish Stepanov
An Individual

ALEXANDER GABIBOVICH GABIBOV

/s/ Alexander Gabibovish Gabibov
An Individual

IVAN VITALIEVICH SMIRNOV

/s/ Ivan Vatalievich Smirnov
An Individual

DMITRY DMITRIEVICH GENKIN

/s/ Dmitry Dmitrievch Genkin
An Individual

RICHARD A. LERNER

/s/ Richard A.Lerner
An Individual

ALEXEY ANATOLIEVICH BELOGUROV

/s/ Alexey Anatolievish Belogurov
An Individual

ALEXEY VINOGRADOV

/s/ Alexey Vinogradov
An Individual

SHEMYAKIN-OVCHINNIKOV INSTITUTE OF BIOORGANIC CHEMISTRY, RUSSIAN ACADEMY OF SCIENCES

By: /s/ Alexander Gabibov
Name: Alexander Gabibov
Title: Director

PJSC «PHARMSYNTHEZ»

By: /s/ Peter Fruglyakov
Name: Peter Fruglyakov
Title: CEO

**Exhibit 1.17**

| | | | |
|---|---|---|---|
| **RU2017134483**<br>**filed Oct. 4, 2017**<br>**C1256.70030RU00** | **RU2018112009**<br>**filed Apr. 4, 2018**<br>**C1256.70031RU00** | **RU2018134321**<br>**filed Oct. 1, 2018**<br>**C1256.70033RU00** | **PCT/RU2018/000653**<br>**filed Oct. 4, 2018**<br>**C1256.70030WO00** |

**Exhibit 2.1**

**ASSIGNMENT**

WHEREAS,

(ii) (1) Alexey Vyacheslavovich Stepanov, an individual residing at Ostrovityananova street, bld. 45/2, app. 44, Moscow, 117342, Russian Federation ("Stepanov"),

(2) Alexander Gabibovich Gabibov, an individual residing at Yauzsky Boulevard 14, App.10, Moscow 109028, Russian Federation ("Gabibov"),

(3) Dmitry Dmitrievich Genkin, an individual residing at Konstantinovsky Avenue 26, App 2, St. Petersburg 197110 Russian Federation ("Genkin"),

(4) Richard A. Lerner, an individual, residing at 7750 Roseland Drive, La Jolla, CA 92037, USA ("Lerner"),

(5) Alexey Anatolievich Belogurov, an individual residing at Ryblevskoe shosse, bld. 9, app. 53, Moscow 121108, Russian Federation ("Belogurov"),

(6) Shemyakin-Ovchinnikov Institute of Bioorganic Chemistry, Russian Academy of Sciences, an educational institution, located at Miklukho-Maklaya 16/10, 117997, Moscow, V-437, Russian Federation (the "Institute"), and

(7) PJSC «Pharmsynthez», a public joint stock company located at 134, Liter l, Kuzmolovsky urban-type settlement, Capitolovo station, Vsevolozhsky district, 188663, Leningrad region, Russia ("Pharmsynthez") (Stepanov, Gabibov, Genkin, Lerner, Belogurov, the Institute, and Pharmsynthez, collectively "Assignors")

collectively own or have owned all right, title, and interest in certain new and useful inventions entitled "ARTICLES AND METHODS DIRECTED TO PERSONALIZED THERAPY OF CANCER"

for which the following patent applications were filed:

| | | | |
|---|---|---|---|
| **RU2017134483**<br>**filed Oct. 4, 2017**<br>**C1256.70030RU00** | **RU2018112009**<br>**filed Apr. 4, 2018**<br>**C1256.70031RU00** | **RU2018134321**<br>**filed Oct. 1, 2018**<br>**C1256.70033RU00** | **PCT/RU2018/000653**<br>**filed Oct. 4, 2018**<br>**C1256.70030WO00** |

(collectively, the "Patents").

WHEREAS, Hesperix SA, a corporation registered under the laws of Switzerland, company no. CHE-434.229.465, located at via Luganetto 4, 6962, Viganello, Switzerland ("Hesperix" or "Assignee") is desirous of acquiring Assignors' entire right, title and interest therein, including the right to claim priority thereof, free and clear of all liens or other encumbrances of any nature whatsoever;

NOW THEREFORE, for the consideration paid by Hesperix, the receipt and sufficiency of which are hereby acknowledged, Assignors each irrevocably sell, assign, transfer, and convey unto Hesperix all of their individual right, title, and interest, if any, throughout the world in and to said Patents (including the right to sue for past infringement thereof) including in and to any patent application whether conventional, design, divisional, continuation, continuation-in-part, and continued prosecution applications, requests for continued examination, substitutions, patents of addition, reissues, renewals, or reexams thereof, and in and to all inventions thereon, preparatory to obtaining Letters Patent of the United States and patents throughout the world therefore, free and clear of all liens or other encumbrances of any nature whatsoever; and Assignors each authorize the United States Commissioner of Patents and Trademarks to issue any and all Letters Patent of the United States and request all patent authorities throughout the world to issue any and all patents anywhere in the world included in or resulting from said Patents, to Hesperix, for its interest and for the sole use and benefit of Hesperix and its assigns and legal representatives.

Each Assignor agrees that his assignment hereunder is effective from the date of his execution of this Assignment.

IN TESTIMONY WHEREOF, each Assignor sets hereunto his hand and seal on the corresponding dates below.

ALEXEY VYACHESLAVOVICH STEPANOV

_____ Date: _____

An individual

Witness 1 signature _____

Witness 1 name (Print) _____

Witness 1 address _____

_____

_____

Witness2 signature _____

Witness2 name (Print) _____

Witness2 address _____

_____

_____

ALEXANDER GABIBOVICH GABIBOV

_____ Date: _____
An individual

Witness 1 signature _____

Witness 1 name (Print) _____

Witness 1 address _____

_____

_____

Witness2 signature _____

Witness2 name (Print) _____

Witness2 address _____

_____

_____

DMITRY DMITRIEVICH GENKIN

_____ Date: _____
An individual

Witness 1 signature _____

Witness 1 name (Print) _____

Witness 1 address _____

_____

_____

Witness2 signature _____

Witness2 name (Print) _____

Witness2 address _____

_____

_____

RICHARD A. LERNER

_____ Date: _____
An Individual

STATE OF:

: SS

COUNTY OF:_____

On this _____ day of _____, 2019, before me personally appeared **Richard A. Lerner,** to me known to be the person whose name is subscribed in the foregoing instrument, and who acknowledged that he executed said instrument as his free and voluntary act and for the purposes therein expressed.

_____

Notary Public

My Commission Expires:

_____

ALEXEY ANATOLIEVICH BELOGUROV

_____ Date: _____
An individual

Witness 1 signature _____

Witness 1 name (Print) _____

Witness 1 address _____

_____

_____

Witness2 signature _____

Witness2 name (Print) _____

Witness2 address _____

_____

_____

SHEMYAKIN-OVCHINNIKOV INSTITUTE OF BIOORGANIC CHEMISTRY, RUSSIAN ACADEMY OF SCIENCES

By: _____ Date: _____
Name:
Title:

Witness 1 signature _____

Witness 1 name (Print) _____

Witness 1 address _____

_____

_____

Witness 2 signature _____

Witness 2 name (Print) _____

Witness 2 address _____

_____

_____

PJSC «PHARMSYNTHEZ»

By: _____ Date: _____
Name:
Title:

Witness 1 signature _____

Witness 1 name (Print) _____

Witness 1 address _____

_____

_____

Witness 2 signature _____

Witness 2 name (Print) _____

Witness 2 address _____

_____

_____

**EXHIBIT B**

_____, 2019

Xenetic Biosciences, Inc.
40 Speen Street, Suite 102
Framingham, MA 01701
Attn: Jeffrey F. Eisenberg, Chief Executive Officer

Ladies and Gentlemen:

The undersigned signatory of this lock-up agreement ("**Lock-Up Agreement**") understands that the Sellers and the Sellers' Representative (as defined in the Share Purchase Agreement, which is defined below) entered into a Share Purchase Agreement dated as of March 1, 2019 (the "**Share Purchase Agreement**") with Xenetic Biosciences, Inc., (the "**Buyer**") providing for the acquisition by Buyer of 4,875,000 shares of common stock of Hesperix SA in exchange for the Transaction Shares (as defined in the Share Purchase Agreement).

As an inducement to Buyer to enter into the Share Purchase Agreement and the transactions contemplated thereby, the undersigned hereby agrees that the undersigned will not, during the period commencing on the date hereof and ending one hundred eighty (180) days after the date hereof (the "**Lock-Up Period**"), (1) offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, lend, or otherwise transfer or dispose of, directly or indirectly, any shares of capital stock of Buyer or any securities convertible into or exercisable or exchangeable for shares of capital stock of Buyer, whether now owned or hereafter acquired by the undersigned or with respect to which the undersigned has or hereafter acquires the power of disposition (collectively, the "**Lock-Up Securities**"); (2) enter into any swap or other arrangement that transfers to another, in whole or in part, any of the economic consequences of ownership of Lock-Up Securities, whether any such transaction is to be settled by delivery of shares of Lock-Up Securities, in cash or otherwise; (3) make any demand for or exercise any right with respect to the registration of any Lock-Up Securities; or (4) publicly disclose the intention to make any offer, sale, pledge or disposition, or to enter into any transaction, swap, hedge or other arrangement relating to any Lock-Up Securities. Notwithstanding the foregoing, and subject to the conditions below, the undersigned may transfer Lock-Up Securities as a *bona fide* gift, by will or intestacy, or to a family member or trust for the benefit of a family member (for purposes of this Lock-Up Agreement, "family member" means any relationship by blood, marriage or adoption, not more remote than first cousin) or as a *bona fide* gift to a charity or educational institution; *provided* that in the case of any such transfer pursuant to the foregoing, (i) any such transfer shall not involve a disposition for value, (ii) each transferee shall sign and deliver to Buyer a lock-up agreement substantially in the form of this Lock-Up Agreement, and (iii) no filing under Section 16(a) of the Exchange Act shall be required or shall be voluntarily made, except for a Form 5. The undersigned also agrees and consents to the entry of stop transfer instructions with Buyer's transfer agent and registrar against the transfer of the undersigned's Lock-Up Securities, except in compliance with this Lock-Up Agreement.

The undersigned understands that this Lock-Up Agreement is irrevocable and shall be binding upon the undersigned's heirs, legal representatives, successors, and assigns.

Very truly yours,

_____

**[SELLER NAME]**

**EXHIBIT C**

**STOCKHOLDER'S AGREEMENT**

This **STOCKHOLDER'S AGREEMENT**, dated as of [●], is entered into by and between Xenetic Biosciences, Inc., a Nevada corporation (the "Company"), and the undersigned stockholder of the Company (the "Stockholder").

**WHEREAS,** the parties hereto desire to provide for certain rights and obligations of the Stockholder on and after the date hereof.

**WHEREAS,** the Company has executed that certain Share Purchase Agreement, dated as of the date hereof (as the same may be amended, modified, supplemented, refinanced or replaced from time to time, the "Share Purchase Agreement"), by and among the Company, Hesperix SA, a Swiss corporation ("Hesperix"), and certain other parties thereto.

**NOW THEREFORE,** in consideration of the mutual covenants and agreements contained in this Agreement, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

**ARTICLE I**

**DEFINITIONS**

Capitalized terms not otherwise defined shall have the meanings specified in the Share Purchase Agreement.

**ARTICLE II**

**VOTING AGREEMENT**

The Stockholder covenants and agrees to vote or cause to be voted, or consent or cause to be consented, all voting securities of the Company beneficially owned (as such term is defined under the Rule 13d-3 under the Securities Exchange Act of 1934, as amended), by such Stockholder, directly or indirectly from time to time and at all times, in favor of the slate of nominees recommended by the board of directors of the Company for election as directors during the term of this Agreement, whether such matter is brought before any meeting of the stockholders of the Company however called, proposed to be taken by written consent of the stockholders of the Company or otherwise

**ARTICLE III**

**MISCELLANEOUS**

**3.1. Termination.**

This Agreement shall terminate and be of no further force and effect upon the earlier of (i) the date on which the Stockholder no longer beneficially owns equity stock of the Company and (ii) the written agreement of the Stockholder and the Company to terminate this Agreement.

**3.2. Successors and Assigns; Beneficiaries.**

Except as otherwise provided herein, all of the terms and provisions of this Agreement shall be binding upon, shall inure to the benefit of, and shall be enforceable by the respective transferees, successors, and assignees of the parties hereto and any of their respective transferees, successors, or assignees. This Agreement may be assigned only with the express prior written consent of the other party hereto, *provided*, such assignee executes a joinder agreeing to be bound by the terms of this Agreement in the same capacity as the assigning party. Any attempted assignment, without such consent, will be void ab initio.

**3.3. Amendment and Modification; Waiver of Compliance.**

(a) This Agreement may be amended only by a written instrument duly executed by the Company and the Stockholder, to amend this Agreement.

(b) Except as otherwise provided in this Agreement, any failure of any of the parties to comply with any obligation, covenant, agreement or condition herein may be waived by the party entitled to the benefits thereof only by a written instrument signed by the party granting such waiver, but such waiver or failure to insist upon strict compliance with such obligation, covenant, agreement or condition shall not operate as a waiver of, or estoppel with respect to, any subsequent or other failure.

**3.4. Notices.**

Any notice, request, claim, demand, document and other communication hereunder to any party shall be effective upon receipt (or refusal of receipt) and shall be in writing and delivered personally or sent by facsimile, or first class mail, or by Federal Express, United Parcel Service or other similar courier or other similar means of communication (i) to the Stockholder, to its address set forth on the signature page hereto, or (ii) to the Company, to:

Xenetic Biosciences, Inc.
40 Speen Street, Suite 102
Framingham, MA 01701
Attn: Special Committee
Jeffrey F. Eisenberg, Chief Executive Officer

with a copy to:

Akerman LLP
350 East Las Olas Blvd.
Suite 1600
Fort Lauderdale, Florida 33301
Facsimile: (954) 463-2224
Email: Teddy.Klinghoffer@Akerman.com
Andrea.Fisher@Akerman.com
Attn: Teddy Klinghoffer, Esq.
Andrea Fisher Evans, Esq.

or, in each case, to such other address as such party may designate in writing to the other parties by written notice given in the manner specified herein.

**3.5. Specific Performance.**

Each party hereto acknowledges and agrees that in the event of any breach of this Agreement by any of them, the other parties hereto would be irreparably harmed and could not be made whole by monetary damages. Each party accordingly agrees to waive the defense in any action for specific performance that a remedy at law would be adequate and agrees that the parties, in addition to any other remedy to which they may be entitled at law or in equity, shall be entitled to specific performance of this Agreement without the posting of bond.

**3.6. Entire Agreement.**

The provisions of this Agreement and the other writings referred to herein or delivered pursuant hereto which form a part hereof contain the entire agreement among the parties hereto with respect to the subject matter hereof and supersede all prior oral and written agreements and memoranda and undertakings among the parties hereto with regard to such subject matter.

**3.7. Severability.**

If any provision of this Agreement, or the application of such provision to any Person or circumstance or in any jurisdiction, shall be held to be invalid or unenforceable to any extent, (i) the remainder of this Agreement shall not be affected thereby, and each other provision hereof shall be valid and enforceable to the fullest extent permitted by law, (ii) as to such Person or circumstance or in such jurisdiction such provision shall be reformed to be valid and enforceable to the fullest extent permitted by law and (iii) the application of such provision to other Persons or circumstances or in other jurisdictions shall not be affected thereby.

**3.8. Governing Law.**

This Agreement shall be governed by and construed in accordance with the laws of the State of Nevada without regard to conflicts of law principles thereof.

**3.9. Waiver of Jury Trial.**

EACH PARTY ACKNOWLEDGES AND AGREES THAT ANY CONTROVERSY WHICH MAY ARISE UNDER THIS AGREEMENT IS LIKELY TO INVOLVE COMPLICATED AND DIFFICULT ISSUES, AND THEREFORE EACH SUCH PARTY HEREBY IRREVOCABLY AND UNCONDITIONALLY WAIVES ANY RIGHT SUCH PARTY MAY HAVE TO A TRIAL BY JURY IN RESPECT OF ANY LITIGATION DIRECTLY OR INDIRECTLY ARISING OUT OF OR RELATING TO THIS AGREEMENT OR THE TRANSACTIONS CONTEMPLATED HEREBY, OR IN ANY WAY CONNECTED WITH OR RELATED OR INCIDENTAL TO THE DEALINGS OF THE PARTIES OR ANY OF THEM IN RESPECT OF THIS AGREEMENT. EACH PARTY CERTIFIES AND ACKNOWLEDGES THAT (i) NO REPRESENTATIVE, AGENT OR ATTORNEY OF ANY OTHER PARTY HAS REPRESENTED, EXPRESSLY OR OTHERWISE, THAT SUCH OTHER PARTY WOULD NOT, IN THE EVENT OF LITIGATION, SEEK TO ENFORCE THE FOREGOING WAIVER, (ii) EACH SUCH PARTY UNDERSTANDS AND HAS CONSIDERED THE IMPLICATIONS OF THIS WAIVER, (iii) EACH SUCH PARTY MAKES THIS WAIVER VOLUNTARILY, AND (iv) EACH SUCH PARTY HAS BEEN INDUCED TO ENTER INTO THIS AGREEMENT BY, AMONG OTHER THINGS, THE WAIVERS AND CERTIFICATIONS IN THIS SECTION. EACH PARTY AGREES THAT THE OTHER MAY FILE A COPY OF THIS AGREEMENT WITH ANY COURT AS WRITTEN EVIDENCE OF THE CONSENT OF THE PARTIES TO THE WAIVER OF THEIR RIGHT TO TRIAL BY JURY.

**3.10. Counterparts.**

This Agreement may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

**3.11. Further Assurances.**

At any time or from time to time after the date hereof, the parties hereto agree to cooperate with each other, and at the request of any other party, to execute and deliver any further instruments or documents and to take all such further action as any other party may reasonably request in order to evidence or effectuate the provisions of this Agreement and to otherwise carry out the intent of the parties hereunder.

* * * * *

IN WITNESS WHEREOF, each of the undersigned has signed this Agreement as of the date first above written.

**COMPANY:**

Xenetic Biosciences, Inc.

By: _____
Name:
Title:

**STOCKHOLDER:**

By: _____
Name:
Number of Shares Beneficially Owned:_____
Address:_____
_____

[Signature Page to Stockholder's Agreement]

**APPENDIX C**

**ASSIGNMENT AGREEMENT**

between

**XENETIC BIOSCIENCES, INC.,**

and

**OPKO PHARMACEUTICALS, LLC**

dated as of

March 1, 2019

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**ASSIGNMENT AGREEMENT**

This ASSIGNMENT AGREEMENT (this "**Agreement**"), dated as of March 1, 2019, is entered into between Xenetic Biosciences, Inc., a Nevada corporation ("**Buyer**" or "**Assignee**"), and OPKO Pharmaceuticals, LLC, a limited liability corporation organized under the laws of the state of Delaware, located at 4400 Biscayne Boulevard, Miami, FL 33137, USA ("**Opko**" or "**Assignor**" or "**Company**"). Assignor and Assignee are sometimes referred to herein collectively as the "**Parties**" and each individually as a "**Party**." Capitalized terms used herein but not otherwise defined, shall have the meaning set forth in **Article I**.

**RECITALS**

WHEREAS, a certain Intellectual Property License Agreement dated as of or approximately the date hereof (the "**IP License Agreement**") was entered into by The Scripps Research Institute, a California public benefit corporation located at 10550 North Torrey Pines Road, La Jolla, CA 92037, USA ("Scripps") and Opko regarding certain of the Company Patents;

WHEREAS, Opko wishes to assign its rights and obligations under the IP License Agreement and the Buyer wishes to acquire the IP License Agreement;

WHEREAS, simultaneously with this transaction, the Buyer and Hesperix SA, a Swiss corporation ("**Hesperix**"), and certain other parties are entering into a Share Purchase Agreement, dated as of the date hereof (the "**Share Purchase Agreement**");

WHEREAS, as a condition and an inducement to Buyer's willingness to enter into this Agreement, Opko has entered into that certain Voting Agreement with Buyer, of even date herewith, pursuant to which, among other things, Opko has agreed to vote its ownership in Buyer in favor of the transactions contemplated hereby at the Buyer's Stockholders' Meeting (as defined herein) (the "**Voting Agreement**");

WHEREAS, the assignment of the IP License Agreement in exchange for Transaction Shares (as defined herein) will be a taxable transaction for United States federal tax purposes; and

NOW, THEREFORE, in consideration of the mutual covenants and agreements hereinafter set forth and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto agree as follows:

ARTICLE I

**Definitions**

The following terms have the meanings specified or referred to in this **Article I**:

"**Action**" means any claim, action, cause of action, demand, lawsuit, arbitration, audit, notice of violation, proceeding, litigation, citation, summons, subpoena or investigation of any nature, civil, criminal, administrative, regulatory or otherwise, whether at law or in equity.

"**Affiliate**" of a Person means any other Person that directly or indirectly, through one or more intermediaries, controls, is controlled by, or is under common control with, such Person. The term "control" (including the terms "controlled by" and "under common control with") means the possession, directly or indirectly, of the power to direct or cause the direction of the management and policies of a Person, whether through the ownership of voting securities, by contract or otherwise.

"**Agreement**" has the meaning set forth in the preamble.

**"Approval"** means any approval, authorization, clearance, consent, qualification or registration, or any waiver of any of the foregoing, required to be obtained from, or any notice, statement or other communication required to be filed with or delivered to, any Governmental Authority or any other Person.

"**Basket**" has the meaning set forth in **Section 7.04(a)**.

"**Books and Records**" means all books and records of the Company with respect to the IP License Agreement and the Licensed Intellectual Property, including files, manuals, price lists, customer lists, sales and promotional materials, documents evidencing intangible rights or obligations, accounting records and litigation files (regardless of the media in which stored).

"**Blue Sky Laws**" has the meaning set forth in **Section 5.12**.

"**Business Day**" means any day except Saturday, Sunday or any other day on which commercial banks located in New York, New York are authorized or required by Law to be closed for business.

"**Buyer**" has the meaning set forth in the preamble.

"**Buyer Board**" has the meaning set forth in **Section 5.05(a)**.

"**Buyer Common Stock**" means the common stock of Buyer.

"**Buyer Financing**" has the meaning set forth in **Section 6.02(e)**.

"**Buyer Indemnitees**" has the meaning set forth in **Section 7.02**.

"**Cap**" has the meaning set forth in **Section 7.04(a)**.

"**Certificate of Domestication**" has the meaning set forth in **Section 5.05(d)**.

"**Closing**" has the meaning set forth in **Section 2.04**.

"**Closing Date**" has the meaning set forth in **Section 2.04**.

"**Closing Price**" means the volume weighted average closing trading price of the Buyer Common Stock, as reported by the Nasdaq, for the ten (10) consecutive trading days ending on the trading day immediately prior to the date of final resolution of any indemnification claim against Company hereunder.

"**Code**" means the United States Internal Revenue Code of 1986, as amended.

"**Company**" has the meaning set forth in the recitals.

**"Company Indemnitees**" has the meaning set forth in Section 7.03.

"**Company Patents**" means the patent applications listed in Exhibit A of the IP License Agreement and all of the rights appurtenant thereto including all foreign counterparts thereof and all priority applications thereof.

"**Contracts**" means all contracts, leases, deeds, mortgages, licenses, instruments, notes, commitments, undertakings, indentures, joint ventures and all other agreements, commitments and legally binding arrangements, whether written or oral.

"**Definitive Proxy Statement**" has the meaning set forth in **Section 5.05(a)**.

"**Direct Claim**" has the meaning set forth in **Section 7.05(b)**.

"**Disclosure Schedules**" means the Disclosure Schedules delivered by Company or Buyer concurrently with the execution and delivery of this Agreement.

"**Dollars or $**" means the lawful currency of the United States.

"**Domestication**" means the domestication of Buyer as a corporation pursuant to Section 388 of the Delaware General Corporation Law, as amended, and under the Laws of Nevada, whereby Buyer shall continue its existence in the State of Delaware.

"**Encumbrance**" means any charge, claim, community property interest, pledge, condition, equitable interest, lien (statutory or other), option, security interest, mortgage, easement, encroachment, right of way, right of first refusal, or restriction of any kind, including any restriction on use, voting, transfer, receipt of income or exercise of any other attribute of ownership.

"**Exchange Act**" means the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder.

**"FDA"** means the United States Food and Drug Administration, or any successor entity thereto.

"**Fundamental Representations**" has the meaning set forth in **Section 7.01**.

"**GAAP**" means generally accepted accounting principles of the United States of America consistently applied, as in effect from time to time.

"**Governmental Authority**" means any federal, state, local or foreign government or political subdivision thereof, or any agency or instrumentality of such government or political subdivision, or any self-regulated organization or other non-governmental regulatory authority or quasi-governmental authority (to the extent that the rules, regulations or orders of such organization or authority have the force of Law), or any arbitrator, court or tribunal of competent jurisdiction.

"**Governmental Order**" means any order, writ, judgment, injunction, decree, stipulation, determination or award entered by or with any Governmental Authority.

"**Indemnification Exclusions**" has the meaning set forth in **Section 7.04(c)**.

"**Indemnified Party**" has the meaning set forth in **Section 7.05**.

"**Indemnifying Party**" has the meaning set forth in **Section 7.05**.

"**Knowledge**" means the actual knowledge of the Company's Chief Patent Counsel and its executive officers.

"**Law**" means any statute, law, ordinance, regulation, rule, code, order, constitution, treaty, common law, judgment, decree, other requirement or rule of law of any Governmental Authority.

"**Licensed Intellectual Property**" has the meaning set forth in **Section 3.03.**

"**Lock-Up Agreement**" means that certain Lock-Up Agreement to be executed by each of Opko and Scripps, in the form attached hereto as Exhibit A (which shall restrict such recipient's sale or transfer of any Transaction Shares ultimately received by such recipient as provided therein and as otherwise required by Law).

"**Losses**" means losses, damages, liabilities, deficiencies, Actions, judgments, interest, awards, penalties, fines, costs or expenses of whatever kind, including reasonable attorneys' fees and the cost of enforcing any right to indemnification hereunder and the cost of pursuing any insurance providers.

"**Material Adverse Effect**" means any event, occurrence, fact, condition or change that is, or could reasonably be expected to become, individually or in the aggregate, materially adverse to (a) IP License Agreement, or (b) the ability of Company to consummate the transactions contemplated hereby on a timely basis; *provided, however,* that "Material Adverse Effect" shall not include any event, occurrence, fact, condition or change, directly or indirectly, arising out of or attributable to: (i) general economic or political conditions; (ii) conditions generally affecting the industries in which the Company operates; (iii) any changes in financial or securities markets in general; (iv) act of war (whether or not declared), armed hostilities or terrorism, or the escalation or worsening thereof; or (v) any changes in applicable Laws or accounting rules; *provided further, however,* that any event, occurrence, fact, condition or change referred to in clauses (i) through (v) immediately above shall be taken into account in determining whether a Material Adverse Effect has occurred or could reasonably be expected to occur to the extent that such event, occurrence, fact, condition or change has a disproportionate effect on the Company compared to other participants in the industries in which the Company conducts its businesses.

"**Nasdaq**" means the Nasdaq Stock Market.

"**New Buyer Bylaws**" has the meaning set forth in **Section 5.05(d)**.

"**New Buyer Charter**" has the meaning set forth in **Section 5.05(d)**.

"**Non-Fundamental Survival Period**" has the meaning set forth in **Section 7.01**.

"**NRS**" has the meaning set forth in **Section 4.02**.

"**Organizational Documents**" means (a) in the case of a Person that is a corporation, its articles or certificate of incorporation and its by-laws, regulations or similar governing instruments required by the laws of its jurisdiction of formation or organization; (b) in the case of a Person that is a partnership, its articles or certificate of partnership, formation or association, and its partnership agreement (in each case, limited, limited liability, general or otherwise); (c) in the case of a Person that is a limited liability company, its articles or certificate of formation or organization, and its limited liability company agreement or operating agreement; and (d) in the case of a Person that is none of a corporation, partnership (limited, limited liability, general or otherwise), limited liability company or natural person, its governing instruments as required or contemplated by the laws of its jurisdiction of organization.

"**Party or Parties**" has the meaning set forth in the preamble.

"**Permits**" means all permits, licenses, franchises, approvals, authorizations, registrations, certificates, variances and similar rights obtained, or required to be obtained, from Governmental Authorities.

"**Person**" means an individual, corporation, partnership, joint venture, limited liability company, Governmental Authority, unincorporated organization, trust, association or other entity.

"**Preliminary Proxy Statement**" has the meaning set forth in **Section 5.05(a)**.

"**Proxy Statement**" has the meaning set forth in **Section 5.05(a)**.

"**Purchase Price**" has the meaning set forth in **Section 2.02**.

"**Regulatory Authorities**" means the FDA or any other applicable Governmental Authority responsible for the oversight and approval of the research, development, manufacturing, distribution, or commercialization of drug, biologic, or medical device products.

"**Representative**" means, with respect to any Person, any and all directors, managers, officers, employees, consultants, financial advisors, counsel, accountants and other agents of such Person.

"**Scripps**" has the meaning set forth in the recitals.

"**SEC**" means the Securities and Exchange Commission.

"**SEC Reports**" means, collectively, all reports, schedules, forms, statements and other documents required to be filed by Buyer under the Securities Act and the Exchange Act, including the exhibits thereto and documents incorporated by reference therein.

"**Securities Act**" means the Securities Act of 1933, as amended.

"**Software**" means any and all computer software and code, whether in source code, object code, or executable code format, including systems software, application software (including mobile apps), firmware, middleware, programming tools, scripts, routines, interfaces, libraries, and databases.

"**Stockholder Approval**" has the meaning set forth in **Section 5.05(a)**.

"**Stockholders' Meeting**" has the meaning set forth in **Section 5.05(a)**.

"**Subsidiary**" of any Person means (i) a corporation of which such Person owns or controls such number of the voting securities which is sufficient to elect at least a majority of its Board of Directors or (ii) a partnership or limited liability company of which such Person (either alone or through or together with any other Subsidiary) is a partner or member.

"**Tax**" or "**Taxes**" means any and all taxes (whether federal, state, local or foreign), including, without limitation, income, gross receipts, profits, sales, use, occupation, value added, transfer, franchise, withholding, payroll, employment, excise, real property, personal property, environmental (including taxes under Section 59A of the Code), customs duties, license, severance, stamp, premium, windfall profits, capital stock, social security (or similar), unemployment, disability, alternative or add-on minimum and estimated taxes, together with any interest, penalties or additions to tax imposed with respect thereto.

"**Territory**" means worldwide.

"**Third Party Claim**" has the meaning set forth in **Section 7.05(a)**.

"**Transaction Documents**" means this Agreement, the Lock-Up Agreement, Confirmatory Assignment, and any other agreements or documents to be executed hereunder.

"**Transaction Filings**" has the meaning set forth in **Section 5.06**.

"**Transaction Shares**" has the meaning set forth in **Section 2.02**.

"**Voting Agreement**" has the meaning set forth in the recitals.

"**Xenetic Stockholder**" mean any holder of Buyer Common Stock.

ARTICLE II
**Assignment; Consideration; closing; tax treatment**

**Section 2.01 Assignment**. Subject to the terms and conditions set forth herein, at the Closing, Company shall convey, transfer, assign, and deliver to Buyer, and Buyer shall acquire and accept, all of Company's right, title and interest in and to the IP License Agreement, and Buyer agrees to assume, perform and discharge all of the obligations and liabilities of Assignor under the IP License Agreement, for the consideration specified in **Section 2.02**. The IP License Agreement is attached hereto as Exhibit B and by this reference is made a part hereof and incorporated herein. The Parties will execute a Confirmatory Assignment substantially in the form of Exhibit C attached hereto for recordation purposes.

**Section 2.02 Consideration**. As consideration for the transactions contemplated herein, Buyer shall pay Two Million Six Hundred Twenty Five Thousand (2,625,000) shares of Buyer Common Stock (the "**Purchase Price,**" and such shares of Buyer Common Stock, the "**Transaction Shares**"), regardless of the trading price per share of the Transaction Shares at the time of Closing, One Million Nine Hundred Sixty Eight Thousand Seven Hundred and Fifty (1,968,750) of which shall be issued to Company, and Six Hundred Fifty Six Thousand Two Hundred Fifty (656,250) of which Company designates Buyer to issue directly to Scripps.

**Section 2.03 Transactions to be Effected at the Closing**.

(a) At the Closing, Buyer shall deliver to Company:

(i) certificates representing the portion of the Transaction Shares to be issued to Company as set forth in **Section 2.02**;

(ii) the portion of the Transaction Shares to be issued to Scripps as set forth in **Section 2.02**;

(iii) all other agreements, documents, instruments or certificates required to be delivered by Buyer at or prior to the Closing pursuant to **Section 6.03** of this Agreement.

(b) At the Closing, Company shall deliver or shall cause to be delivered to Buyer:

(i) the Lock-Up Agreement, duly executed by Company and Scripps;

(ii) [Reserved]

(iii) a Confirmatory Assignment substantially in the form of Exhibit C attached hereto; and

(iv) all other agreements, documents, instruments or certificates required to be delivered by Company at or prior to the Closing pursuant to **Section 6.02** of this Agreement.

**Section 2.04 Closing**. Subject to the terms and conditions of this Agreement, the assignment of the IP License Agreement to the Assignee and issuance of the Transaction Shares from the Assignee to Company and Scripps contemplated hereby shall take place at a closing (the "**Closing**") to be held at 9:00 a.m., New York time, no later than two (2) Business Days after the last of the conditions to Closing set forth in **Article VI** have been satisfied or waived (other than conditions which, by their nature, are to be satisfied on the Closing Date), at the offices of Akerman LLP, 98 Southeast 7th Street, Suite 1100, Miami, Florida 33131, or at such other time or on such other date or at such other place as the Company and Buyer may mutually agree upon in writing (the day on which the Closing takes place being the "**Closing Date**").

**Section 2.05 Tax Treatment**. The assignment of the IP License Agreement by the Buyer in exchange for the Transaction Shares will be a taxable transaction for United States federal income tax purposes.

**Section 2.06 Withholding Tax**. Buyer, the Company and its Subsidiaries shall be entitled to deduct and withhold from the Purchase Price all Taxes that Buyer and the Company may be required to deduct and withhold under any provision of Tax Law. All such withheld amounts shall be promptly remitted to the relevant Governmental Authority and, accordingly, shall be treated as delivered to Company hereunder and Buyer shall promptly provide Company with written notice of its intent to deduct and withhold, and Buyer shall reasonably cooperate with Company to eliminate or reduce the basis for such deduction or withholding (including by providing Company with a reasonable opportunity to provide forms or other evidence that would exempt such amounts from withholding). Buyer shall promptly provide Company with any applicable receipts for payments remitted to a Governmental Authority pursuant to this Section 2.06.

ARTICLE III
**Representations and Warranties of Opko**

Except as set forth herein, Opko represents and warrants to Buyer that the statements contained in this **Article III** are true and correct as of the date hereof.

**Section 3.01 Organization and Authority of the Company**. Company has all requisite power and authority to execute and deliver this Agreement and each other Transaction Document to which it is a party, and to consummate the transactions contemplated hereby and thereby. The execution, delivery and performance by Company of each of the Transaction Documents to which it is a party has been duly authorized by all necessary action on the part of Company. This Agreement and the other Transaction Documents have been duly and validly executed and delivered by Company and constitute legal, valid and binding obligations of Company, enforceable against Opko and in accordance with their respective terms, subject to applicable bankruptcy, insolvency, reorganization, moratorium and similar Laws affecting creditors' rights and remedies generally and subject, as to enforceability, to general principles of equity (regardless of whether enforcement is sought in a proceeding at Law or in equity).

**Section 3.02 Conflicts; Approvals of Third Parties**. The execution, delivery and performance by Company and the other Transaction Documents to which it is a party, the consummation of the transactions contemplated hereby or thereby, and compliance by Company with the provisions hereof or thereof will not: (a) conflict with, violate, result in the breach or termination of, constitute a default under, result in an acceleration of, constitute a change of control under, or create in any party the right to accelerate, terminate, modify or cancel, any contract to which Company is a party or by which Company or its properties, assets are subject, or require an Approval from any Person in order to avoid any such conflict, violation, breach, termination, default or acceleration; (b) violate any Law or any Governmental Order; or (c) result in the creation of any Encumbrance upon the IP License Agreement or the Licensed Intellectual Property, except for any events which shall not result in a Material Adverse Effect. No Approval, Governmental Order, waiver, declaration or filing with, or notification to any Person, including any Governmental Authority, is required on the part of the Company in connection with the execution, delivery and performance of this Agreement or the other Transaction Documents, or the compliance by Company with any of the provisions hereof or thereof.

**Section 3.03 Intellectual Property**.

(a) To the Knowledge of the Company, Scripps owns, free and clear from all Encumbrances, the Company Patents; the Company possesses legally enforceable rights pursuant to a valid and enforceable written license, sublicense, agreement, or permission to use the intellectual property licensed by Company ("**Licensed Intellectual Property**") through the IP License Agreement; Company is the valid licensee of all Licensed Intellectual Property, free and clear of any and all Encumbrances and the Licensed Intellectual Property licensed by Company immediately prior to the Closing will be licensed or available for use by Buyer on identical terms and conditions immediately subsequent to the Closing hereunder, free and clear of any Encumbrances other than obligations as set forth in the IP License Agreement; neither the execution, delivery, or performance of this Agreement, nor the consummation of the transactions contemplated hereunder, will result in the loss or impairment of or payment of any additional amounts other than as provided for in the IP License Agreement, with respect to, or require the consent of any other Person in respect of, the right to own or use any Licensed Intellectual Property. Other than the IP License Agreement, there are no other royalty or licensing agreements relating to the Company or any other party with respect to the Licensed Intellectual Property or other arrangements or amounts owed to any parties with respect or relating thereto, whether conditioned on the achievement of milestones, passage of time or otherwise; and no amounts are owed under the IP License Agreement other than as provided therein.

(b) Including (i) the importing of product into the United States, (ii) selling or using in the United States, a product made by a patented process, or (iii) such use of Licensed Intellectual Property which to the Knowledge of the Company constitutes unfair competition or trade practice under the Laws of any jurisdiction, to the Knowledge of the Company, the use of the Licensed Intellectual Property has not and will not infringe upon or misappropriate any valid and enforceable intellectual property rights of third parties. The Company has never received any written charge, complaint, claim, demand, or notice alleging any such infringement or misappropriation with respect to the Licensed Intellectual Property (including any written claim that the Company must license or refrain from using any intellectual property rights of any third party). The Company is not a party to any past, nor is there any pending or, to Company's Knowledge, written threat, action, lawsuit, or other judicial, arbitral or administrative proceeding involving any Licensed Intellectual Property, including, without limitation, involving any claim that Company infringed, misappropriated or violated the intellectual property rights of any third party.

(c) The Company has taken steps to protect and preserve the confidentiality of all confidential Licensed Intellectual Property.

(d) To the Company's Knowledge, the Company has complied with and is presently in compliance in all material respects, with all foreign, federal, state, local, governmental (including, but not limited to, the Federal Trade Commission and State Attorneys General), administrative, or regulatory Laws applicable to any Licensed Intellectual Property, and the Company shall take all steps necessary to ensure such compliance until Closing.

(e) To the Company's Knowledge, there are no licenses, settlement agreements, covenants not to sue or other agreements in which the Company or any Company predecessor has granted any rights or interest in or to, or permitted use of, any material Licensed Intellectual Property by any third party or affiliate.

(f) To the Company's Knowledge, the Licensed Intellectual Property is valid and enforceable and in full force; the Licensed Intellectual Property: (i) is not subject to any opposition, cancellation, interference, reissue, reexamination, derivation, revocation or post-grant proceeding and, to the Knowledge of the Company, no such proceeding is or has been threatened in writing; (ii) has not expired, lapsed, or become expressly abandoned (iii) are validly applied for; and (iv) are not the subject of any judicial, administrative or arbitral order, award, decree, injunction, lawsuit, proceeding or stipulation, or of any other proceeding or action pending before any Governmental Authority anywhere in the world other than those in the ordinary course of patent prosecution; all required filings and fees related to the Licensed Intellectual Property applications have been timely submitted with and paid to the relevant Governmental Authorities; and all maintenance fees and annuities required with respect to such Licensed Intellectual Property to date have been timely paid in full.

(g) To the Company's Knowledge: the Company and all prior and current owners of any Licensed Intellectual Property have (A) complied with the duty of candor and disclosure to the United States Patent and Trademark Office and analogous Laws outside the United States with respect to Licensed Intellectual Property; (B) not knowingly misrepresented or failed to disclose any fact or circumstance (including, with respect to Company Patents, the name of any inventor of subject matter claimed in any Company Patent) in connection with the prosecution of any Licensed Intellectual Property; and (C) not otherwise knowingly engaged in any conduct, or failed to perform any act, the result of which could reasonably be expected to adversely affect the validity, enforceability, or ownership of any Licensed Intellectual Property.

(h) To the Company's Knowledge: no fact or circumstance exists that could reasonably be expected to otherwise adversely affect the ownership of any Licensed Intellectual Property.

(i) The Company has not sent any notice to or asserted or threatened any action or claim against any third party involving or relating to the Licensed Intellectual Property and, to the Company's Knowledge, at no time has any Person infringed or misappropriated any Licensed Intellectual Property.

(j) The Company has not made a previous assignment, transfer, or agreement in conflict herewith or constituting a present or future assignment of or encumbrance of any of the Licensed Intellectual Property and has not granted any license or sublicense of any material rights under or with respect to any Licensed Intellectual Property.

(k) Company acknowledges that it and any of its direct or indirect owners and Affiliates who assisted in the creation and development of the Licensed Intellectual Property, (i) retain no ownership interest or right to use the Licensed Intellectual Property other than as may be provided under the Bayh-Dole Act or any similar foreign statute, regulation or rule; (ii) have granted an irrevocable assignment of any ownership interest may have in or to such Licensed Intellectual Property; and (iii) irrevocably waive any right or interest, including any moral rights, regarding any such Licensed Intellectual Property, to the extent permitted by applicable Law other than as may be provided under the Bayh-Dole Act or any similar foreign statute, regulation or rule. Except for Scripps, no Licensed Intellectual Property is co-owned by, exclusively licensed to, or otherwise controlled by any other Person, including any current or former employee, officer, director, consultant, contractor, scientist or inventor or clinical or research partner of or associated with the Company other than as may be provided under the Bayh-Dole Act or any similar foreign statute, regulation or rule. The Company does not owe any compensation or remuneration (other than the general compensation for employment or services) to any current or former employee, officer, director, consultant, contractor, scientist or inventor for any Licensed Intellectual Property other than under the IP License Agreement.

(l) By executing and performing its obligations under this Agreement, the Company is not in violation of any agreement between the Company and any third party relating to any of the Licensed Intellectual Property.

(m) Neither the Company nor, to the Company's Knowledge, Scripps, is in breach of or default under, and neither has provided or received any notice of any intention to terminate, the IP License Agreement, and to the Company's Knowledge, no event or circumstance has occurred that, with notice or lapse of time or both, would constitute an event of default under the IP License Agreement or result in a termination or cancelation thereof or would cause or permit the acceleration or other changes of any right or obligation or the loss of any benefit thereunder; the assignment of the IP License in this Agreement was completed in accordance with the terms of the IP License Agreement; and the IP License Agreement is in full force and effect.

**Section 3.04 Legal Proceedings; Governmental Orders.**

(a) There are no Actions pending or, to the Company's Knowledge, threatened (a) against or by the Company affecting the ownership, rights or efficacy of the IP License Agreement or the Licensed Intellectual Property; or (b) against or by the Company, that challenges or seeks to prevent, enjoin or otherwise delay the transactions contemplated by this Agreement. To the Knowledge of the Company, no event has occurred or circumstances exist that may give rise to, or serve as a basis for, any such Action.

(b) There are no outstanding Governmental Orders and no unsatisfied judgments, penalties or awards against or affecting the Company with respect to this Agreement, the IP License Agreement, or the Licensed Intellectual Property.

(c) The Company has not received any complaints or notices or Actions from or by any Persons, whether to the Company, or any Governmental Authority with respect to the IP License Agreement or the Licensed Intellectual Property, and to the Company's Knowledge, there exists no reasonable basis for any such notice, complaints or Actions.

**Section 3.05 Compliance With Laws; Permits.** With respect to this Agreement, the IP License Agreement and the Licensed Intellectual Property:

(a) the Company has complied, and currently complies in all material respects with all Laws applicable to the IP License Agreement and the Licensed Intellectual Property.

**Section 3.06 Full Disclosure.** No representation or warranty by the Company in this Agreement or any certificate or other document furnished or to be furnished to Buyer pursuant to this Agreement contains any untrue statement of a material fact, or omits to state a material fact necessary to make the statements contained therein, in light of the circumstances in which they are made, not misleading.

**Section 3.07 Independent Investigation.** The Company has conducted its own independent investigation, review and analysis of the business, results of operations, prospects, condition (financial or otherwise) or assets of Buyer, and acknowledges that it has been provided adequate access to the personnel, properties, assets, premises, books and records, and other documents and data of Buyer for such purpose. Company acknowledges and agrees that: none of Buyer, or any other Person makes or has made any representation or warranty as to Buyer or this Agreement, except as expressly set forth in **Article IV**.

**Section 3.08 Investor Representations .** Company understands that none of the Transaction Shares have been registered under the Securities Act and that the Transaction Shares are being offered and sold pursuant to an exemption from registration under the Securities Act. Company understands that the Transaction Shares are "restricted securities" under applicable U.S. federal and state securities laws and that, pursuant to these laws, Company must hold the Transaction Shares indefinitely unless the Transaction Shares are registered pursuant to the Securities Act, or an exemption from registration is available. Company understands the Transaction Shares will bear a legend to such effect. Company has substantial experience in evaluating and investing in private placement transactions of securities in companies similar to the Buyer so that it is capable of evaluating the merits and risks of its investment in the Buyer and has the capacity to bear the risks thereof. Company must bear the economic risk of this investment indefinitely unless the Transaction Shares are registered pursuant to the Securities Act, or an exemption from registration is available. Company also understands that there is no assurance that any exemption from registration under the Securities Act will be available and that, even if available, such exemption may not allow Company to transfer all or any portion of the Transaction Shares under the circumstances, in the amounts or at the times Company might propose. Company is acquiring the Transaction Shares for its own account for investment only, and not with a view towards their distribution in violation of any federal or state securities Laws.

## ARTICLE IV
## Representations and Warranties of Buyer

Except as set forth in the SEC Reports, which SEC Reports shall be deemed a part hereof and shall qualify any representation or otherwise made herein to the extent of the disclosure contained in the SEC Reports, or as set forth in the correspondingly numbered Section of the Disclosure Schedules, Buyer represents and warrants to Company that the statements contained in this **Article IV** are true and correct as of the date hereof.

**Section 4.01 Organization and Authority of Buyer.** Buyer is a corporation duly organized, validly existing and in good standing under the Laws of the state of Nevada. Subject to the consents and authorizations that will be required at the Stockholders' Meeting, Buyer has full corporate power and authority to enter into this Agreement and the other Transaction Documents to which Buyer is a party, to carry out its obligations hereunder and thereunder and to consummate the transactions contemplated hereby and thereby. The execution and delivery by Buyer of this Agreement and any other Transaction Document to which Buyer is a party, the performance by Buyer of its obligations hereunder and thereunder and the consummation by Buyer of the transactions contemplated hereby and thereby have been duly authorized by all requisite corporate action on the part of Buyer. This Agreement has been duly executed and delivered by Buyer, and (assuming due authorization, execution and delivery by Company) this Agreement constitutes a legal, valid and binding obligation of Buyer enforceable against Buyer in accordance with its terms.

**Section 4.02 No Conflicts; Approvals**.

(a) All action on the part of Buyer and its board of directors necessary for (i) the authorization, execution and delivery of this Agreement and (ii) the performance of its obligations hereunder, has been taken or will be taken prior to or upon the Closing, as applicable; provided, however, that Buyer cannot consummate the transactions contemplated hereby unless and until it receives the requisite approval of the Nasdaq and the approval of the Xenetic Stockholders pursuant to Chapter 78 of the Nevada Revised Statutes (as amended) ("**NRS**") and the Buyer's Organizational Documents. This Agreement has been duly executed by Buyer and, assuming the due authorization, execution and delivery by the other parties hereto, constitutes a valid and legally binding obligation of Buyer, except (i) as limited by Laws of general application relating to bankruptcy, insolvency and the relief of debtors and (ii) as limited by rules of Law governing specific performance, injunctive relief or other equitable remedies and by general principles of equity.

(b) The execution, delivery and performance by Buyer of this Agreement and the other Transaction Documents to which it is a party, and the consummation of the transactions contemplated hereby and thereby, do not and will not (a) conflict with or result in a violation or breach of, or default under, any provision of the Organizational Documents of Buyer or (b) conflict with or result in a violation or breach of any provision of any Law or Governmental Order applicable to Buyer. Other than Buyer's filings with the SEC and the approval required by Nasdaq as provided herein, no Approval, Permit, Governmental Order, declaration or filing with, or notice to, any Governmental Authority is required by or with respect to Buyer in connection with the execution and delivery of this Agreement and the other Transaction Documents.

**Section 4.03 Brokers**. Except as described in Section 4.03 of the Disclosure Schedules, no broker, finder or investment banker is entitled to any brokerage, finder's or other fee or commission in connection with the transactions contemplated by this Agreement or any other Transaction Document based upon arrangements made by or on behalf of Buyer.

**Section 4.04 Legal Proceedings**. There are no Actions pending or, to Buyer's knowledge, threatened against or by Buyer or any Affiliate of Buyer that challenge or seek to prevent, enjoin or otherwise delay the transactions contemplated by this Agreement. To Buyer's knowledge, no event has occurred or circumstances exist that may give rise or serve as a basis for any such Action.

**Section 4.05 Issuance of Transaction Shares**. The issuance of the Transaction Shares hereunder is duly authorized (subject to the receipt of the Stockholder Approval) and, when issued and delivered in accordance with this Agreement, will be duly and validly issued, fully paid and nonassessable, will have been issued in compliance with applicable securities Laws or exemptions therefrom, will not be issued in violation of any preemptive rights of any stockholder of Buyer or any other Person and shall be issued and delivered by Buyer to Company and Scripps, pursuant to this Agreement free of any Encumbrance, subject to the restrictions set forth herein and applicable securities Laws.

**Section 4.06 Buyer SEC Reports; Financial Statements**. Except as set forth on Section 4.06 of the Disclosure Schedules, since January 1, 2017, Buyer has filed SEC Reports on a timely basis or has received a valid extension of such time of filing and has filed any such SEC Reports prior to the expiration of any such extension. As of their respective dates, the SEC Reports complied in all material respects with the requirements of the Securities Act and the Exchange Act, as applicable, and none of the SEC Reports, when filed, contained any untrue statement of a material fact or omitted to state a material fact required to be stated therein or necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading. There have been no material adverse developments in the business of Buyer and its subsidiaries since the respective dates of such SEC Reports that are required to be disclosed pursuant to the Exchange Act that have not been disclosed. The financial statements of Buyer included in the SEC Reports comply in all material respects with applicable accounting requirements and the rules and regulations of the SEC with respect thereto as in effect at the time of filing. Such financial statements have been prepared in accordance with GAAP, except as may be otherwise specified in such financial statements or the notes thereto and except that unaudited financial statements may not contain all footnotes required by GAAP, and fairly present in all material respects the financial position of Buyer and its consolidated Subsidiaries as of and for the dates thereof and the results of operations and cash flows for the periods then ended, subject, in the case of unaudited statements, to normal, immaterial, year-end audit adjustments.

**Section 4.07 Tax Matters.** Except as set forth in **Section 4.07** of the Disclosure Schedules,

(a) Except as set forth on **Section 4.07** of the Disclosure Schedules, all income Tax Returns and all other material Tax Returns required to be filed by the Buyer and each Subsidiary thereof have been timely filed. Such Tax Returns are true, complete and correct in all material respects. All Taxes due and owing by the Buyer or any Subsidiary thereof (whether or not shown on any Tax Return) have been timely paid.

(b) Buyer and each Subsidiary thereof has withheld and paid each Tax required to have been withheld and paid in connection with amounts paid or owing to any employee, independent contractor, creditor, customer, member or other party, and complied with all information reporting and backup withholding provisions of applicable Law.

(c) Within the past three years, no claim has been made by any taxing authority in any jurisdiction where the Buyer or any Subsidiary of the Buyer does not file Tax Returns that it is, or may be, subject to Tax by that jurisdiction, that has not been finally settled or otherwise resolved.

**Section 4.08 Independent Investigation.** Buyer has conducted its own independent investigation, review and analysis of the business, results of operations, prospects, condition (financial or otherwise) or assets of the Company relating to the IP License Agreement and the Licensed Intellectual Property, and acknowledges that it has been provided adequate access to the personnel, properties, assets, premises, books and records, and other documents and data of the Company for such purpose. Buyer acknowledges and agrees that: (a) in making its decision to enter into this Agreement and to consummate the transactions contemplated hereby, Buyer has relied solely upon its own investigation and the express representations and warranties of the Company set forth in **Article III** and (b) neither the Company nor any other Person makes or has made any representation or warranty as to the Company or this Agreement, except as expressly set forth in **Article III**.

ARTICLE V
**Covenants**

**Section 5.01 Conduct of Business Prior to the Closing**. From the date hereof until the earlier to occur of the Closing or the valid termination of this Agreement in accordance with the terms hereof, except as otherwise provided in this Agreement or consented to in writing by Buyer (which consent shall not be unreasonably withheld or delayed), the Company shall (i) maintain and preserve intact the IP License Agreement and the Licensed Intellectual Property (without any amendments thereto or modifications thereof), (ii) pay any obligations thereunder when due, (iii) defend and protect their properties and assets relating to the IP License Agreement and the Licensed Intellectual Property from infringement or usurpation, and (iv) comply in all material respects with all applicable Laws relating to the IP License Agreement and the Licensed Intellectual Property.

**Section 5.02 Notice of Certain Events.**

(a) From the date hereof until the earlier to occur of the Closing or the valid termination of this Agreement in accordance with the terms hereof, Company shall promptly notify Buyer in writing of:

(i) any fact, circumstance, event or action the existence, occurrence or taking of which (A) has had, or could reasonably be expected to have, individually or in the aggregate, a Material Adverse Effect, (B) has resulted in, or could reasonably be expected to result in, any representation or warranty made by the Company hereunder not being true and correct or (C) has resulted in, or could reasonably be expected to result in, the failure of any of the conditions set forth in **Section 6.02** to be satisfied;

(ii) any notice or other communication from any Person alleging that the Approval of such Person is or may be required in connection with the transactions contemplated by this Agreement;

(iii) any notice or other communication from any Governmental Authority, solely in connection with the transactions contemplated by this Agreement; and

(iv) any Actions commenced or, to Company's Knowledge, threatened against, relating to or involving or otherwise affecting the Company that, if pending on the date of this Agreement, would have been required to have been disclosed pursuant to **Section 3.04** that relates to the consummation of the transactions contemplated by this Agreement.

**Section 5.03 Confidentiality**. From and after the Closing, the Company shall, and shall cause its respective Affiliates to, hold, and shall use its reasonable best efforts to cause its or their respective Representatives to hold, in confidence any and all information, whether written or oral, concerning the Licensed Intellectual Property and the IP License Agreement, except to the extent that the Company can show that such information (a) is generally available to and known by the public through no fault of the Company, any of its Affiliates or their respective Representatives; or (b) is lawfully acquired by the Company, any of its Affiliates or their respective Representatives from and after the Closing from sources which are not prohibited from disclosing such information by a legal, contractual or fiduciary obligation. If Company or its Affiliates or their respective Representatives are compelled to disclose any information by judicial or administrative process or by other requirements of Law, Company shall promptly notify Buyer in writing and shall disclose only that portion of such information which Company is advised by its counsel in writing is legally required to be disclosed, *provided that* Company shall use reasonable best efforts to obtain an appropriate protective order or other reasonable assurance that confidential treatment will be accorded such information.

**Section 5.04 Closing Conditions**. From the date hereof until the Closing, each Party hereto shall use reasonable best efforts to take such actions as are necessary to expeditiously satisfy the closing conditions set forth in **Article VI** hereof.

**Section 5.05 Stockholders' Meeting; Buyer Domestication**.

(a) Buyer shall cause a meeting of its stockholders (the "**Stockholders' Meeting**") to be duly called and held as soon as reasonably practicable for the purpose of voting on (i) the approval and adoption of this Agreement and the Share Purchase Agreement, (ii) the approval of the Domestication, to the extent Buyer, in its discretion, determines that such Domestication will be effectuated at the Closing Date, (iii) the approval of the transactions contemplated hereby and in the Share Purchase Agreement , (iv) the approval of the Buyer Financing, (v) the election of Dr. Alexey Vinogradov to the Buyer Board, and (vi) the approval of the issuance of Transaction Shares in connection with the transactions contemplated hereby and issuance of Buyer Common Stock in connection with the Share Purchase Agreement as necessary under the rules and regulations of Nasdaq. Subject to its fiduciary duties, the board of directors of Buyer (the "**Buyer Board**") shall recommend to its stockholders that they vote in favor of such approvals and adoption. In connection with the Stockholders' Meeting, Buyer (a) will use commercially reasonable efforts to file with the SEC as promptly as practicable after the date of this Agreement, and in any event no later than 45 days following the date of this Agreement, an SEC proxy statement pursuant to Section 14(a), Regulation 14A and Schedule 14A under the Exchange Act, and all other proxy materials for the Stockholders' Meeting (the " **Preliminary Proxy Statement**"), (b) as promptly as practicable following receipt of approval from the SEC of the Preliminary Proxy Statement, will file with the SEC and mail to its stockholders a definitive Proxy Statement (the "**Definitive Proxy Statement**" and together the Preliminary Proxy Statement, the "**Proxy Statement**") and other proxy materials, (c) will use commercially reasonable efforts to obtain the necessary or appropriate approvals by its stockholders under the Buyer's Organizational Documents and applicable Law of (i) the approval and adoptions of this Agreement and the Share Purchase Agreement, (ii) the approval of the Domestication, to the extent Buyer, in its discretion, determines that such Domestication will be effectuated at the Closing Date, (iii) the approval of the transactions contemplated hereby and in the Share Purchase Agreement, (iv) the approval of the Buyer Financing, (v) the election of Dr. Alexey Vinogradov, who shall be appointed to fill a vacancy on the Buyer Board, and (vi) the approval of the issuance of Transaction Shares in connection with the transactions contemplated hereby and issuance of Buyer Common Stock in connection with the Share Purchase Agreement as necessary under the rules and regulations of Nasdaq (items (i) through (vi), collectively, the "**Stockholder Approval**"), and (d) will otherwise comply with all Laws applicable to the Stockholders' Meeting.

(b) Buyer will timely provide the Company with all material correspondence received from and to be sent to the SEC. Buyer and the Company will cooperate with each other in finalizing each proposed response; provided that Buyer shall control the final form and substance of any such response.

(c) Company shall use commercially reasonable efforts to provide promptly to Buyer such information concerning the Licensed Intellectual Property and IP License Agreement as is required under applicable Law for inclusion in the Proxy Statement. None of the information supplied or to be supplied by or on behalf of the Company for inclusion or incorporation by reference in the Proxy Statement will, at the time the Proxy Statement is filed with the SEC or at the time it is mailed to Buyer's stockholders, contain any untrue statement of a material fact or omit to state any material fact required to be stated therein or necessary in order to make the statements therein, in the light of the circumstances under which they are made, not misleading. If any information provided by the Company is discovered or any event occurs with respect to the Company, or any change occurs with respect to the other information provided by the Company included in the Proxy Statement which is required to be described in an amendment of, or a supplement to, the Proxy Statement so that such document does not include any misstatement of a material fact or omit to state any material fact necessary to make the statements therein, in light of the circumstances under which they were made, not misleading, the Company shall notify Buyer promptly of such event.

(d) To the extent Buyer, in its discretion, determines that Domestication will be effectuated at the Closing Date, promptly following the receipt of the Stockholder Approval, if obtained, but immediately prior to the Closing Date, Buyer shall file (i) with the Secretary of State of the State of Nevada a plan of conversion as contemplated by NRS 92A.105 and take such other steps as are required under the Laws of the State of Nevada with respect to the conversion of Buyer to a State of Delaware corporation and (ii) with the Secretary of State of the State of Delaware a Certificate of Corporate Domestication ("**Certificate of Domestication**") and a Certificate of Incorporation in substantially the form of Buyer's previously existing certificate of incorporation (the "**New Buyer Charter**"), and shall use commercially reasonable efforts to cause the Buyer Board to adopt Bylaws in substantially the form of Buyer's previously existing Bylaws (the "**New Buyer Bylaws**").

**Section 5.06 Transaction Filings**. As promptly as practicable (but in no event, with respect to filing, later than the date required under applicable Law), Buyer will prepare and file as soon as practicable after closing a resale registration statement to register the resale of the Transaction Shares and any filings required to be filed by it under the Nasdaq, Exchange Act, the Securities Act or any other federal or Blue Sky Laws or other Laws relating to the execution of this Agreement, the completion of the Domestication (in Buyer's discretion) and the consummation of the transactions contemplated hereby, as well as under regulations of or as required by Nasdaq and such Governmental Authorities as may require the filing of such other filings (collectively, the "**Transaction Filings**"). The Company will work together with Buyer as promptly as practicable to prepare the Transaction Filings and provide Buyer whatever information is necessary to accurately complete such filings in a timely manner.

**Section 5.07 Listing Application**. Buyer shall use its commercially reasonable efforts, to the extent allowed under the rules of Nasdaq, to take all actions and prepare all filings and other documents necessary to be filed with Nasdaq in connection with the listing application for the inclusion of the Buyer Common Stock on Nasdaq in connection with this transaction, conduct ongoing negotiations with Nasdaq with respect to such listing and perform all acts reasonably requested by Nasdaq.

**Section 5.08 Public Announcements**. Except as required by and in accordance with applicable Law or Nasdaq requirements (based upon the reasonable advice of counsel), no Party to this Agreement shall make any public announcements in respect of this Agreement or the transactions contemplated hereby or otherwise communicate with any news media without the prior written consent of the other party (which consent shall not be unreasonably withheld or delayed), and the parties shall cooperate as to the timing and contents of any such announcement.

**Section 5.09 Further Assurances**. Following the Closing, each of the Parties hereto shall, and shall cause their respective Affiliates to, execute and deliver such additional documents, instruments, conveyances and assurances and take such further actions as may be reasonably required to carry out the provisions hereof and give effect to the transactions contemplated by this Agreement.

**Section 5.10 No Termination of IP License Agreement**. Between the execution of this Agreement and the Closing, the Company shall use its commercially reasonable efforts to maintain in force and effect the IP License Agreement, and the Company shall not terminate such agreement without the consent of Buyer.

## ARTICLE VI
## Conditions to closing

**Section 6.01 Conditions to Obligations of All Parties**. The obligations of each Party to consummate the transactions contemplated by this Agreement shall be subject to the fulfillment, at or prior to the Closing, of each of the following conditions:

(a) No Governmental Authority shall have enacted, issued, promulgated, enforced or entered any Governmental Order which is in effect and has the effect of making the transactions contemplated by this Agreement illegal, otherwise restraining or prohibiting consummation of such transactions or causing any of the transactions contemplated hereunder to be rescinded following completion thereof, and no other Action shall have been commenced against Buyer or the Company which would prevent the Closing.

(b) Buyer shall have received approval of its listing application to have the Transaction Shares listed on the Nasdaq, subject to official notification.

(c) All Governmental Authorities' approvals required for the consummation of the transactions contemplated hereby, if any, shall have been obtained.

(d) The Stockholder Approval shall have been obtained.

(e) A registration statement on Form S-4 accompanying the Proxy Statement shall have become effective under the Securities Act. No stop order suspending the effectiveness of such registration statement will have been issued by the SEC and no proceedings for that purpose and no similar proceeding in respect of such registration statement will have been initiated or, to the knowledge of Buyer, threatened by the SEC.

**Section 6.02 Conditions to Obligations of Buyer**. The obligations of Buyer to consummate the transactions contemplated by this Agreement shall be subject to the fulfillment or Buyer's waiver, at or prior to the Closing, of each of the following conditions:

(a) The Company shall have effected the transactions described in **Section 2.03(b)**.

(b) Other than the representations and warranties of the Company contained in **Section 3.01** and **Section 3.02,** the representations and warranties of the Company contained in this Agreement, the other Transaction Documents and any certificate or other writing delivered pursuant hereto shall be true and correct in all respects (in the case of any representation or warranty qualified by materiality or Material Adverse Effect) or in all material respects (in the case of any representation or warranty not qualified by materiality or Material Adverse Effect) on and as of the date hereof and on and as of the Closing Date with the same effect as though made at and as of such date(except those representations and warranties that address matters only as of a specified date, the accuracy of which shall be determined as of that specified date in all respects). The representations and warranties of the Company contained in **Section 3.01** and **Section 3.02**, shall be true and correct in all respects on and as of the date hereof and on and as of the Closing Date with the same effect as though made at and as of such date (except those representations and warranties that address matters only as of a specified date, the accuracy of which shall be determined as of that specified date in all respects).

(c) The Company, shall have duly performed and complied in all material respects with all agreements, covenants and conditions required by this Agreement and each of the other Transaction Documents to be performed or complied with by them prior to or on the Closing Date.

(d) From the date of this Agreement, there shall not have occurred any Material Adverse Effect on the Company, nor shall any event or events have occurred that, individually or in the aggregate, with or without the lapse of time, could reasonably be expected to result in a Material Adverse Effect on the Company.

(e) Buyer shall have received adequate financing (the "**Buyer Financing**"), as reasonably determined by Buyer, whether in the form of a private or public offering of debt or equity securities, to fund future working capital obligations of Buyer following the Closing.

(f) The other Transaction Documents shall have been executed and delivered by Company and true and complete copies thereof shall have been delivered to Buyer.

(g) The Share Purchase Agreement, the Voting Agreement and the transactions contemplated thereunder shall have been consummated.

(h) The Company shall have delivered to Buyer such other documents or instruments as Buyer reasonably requests and are reasonably necessary to consummate the transactions contemplated by this Agreement.

**Section 6.03 Conditions to Obligations of the Company**. The obligations of the Company to consummate the transactions contemplated by this Agreement shall be subject to the fulfillment or Company's waiver, at or prior to the Closing, of each of the following conditions:

(a) Buyer shall have effected the transactions described in **Section 2.03(a)**.

(b) Other than the representations and warranties of Buyer contained in **Section 4.01**, **Section 4.02** and **Section 4.03**, the representations and warranties of Buyer contained in this Agreement, the other Transaction Documents and any certificate or other writing delivered pursuant hereto shall be true and correct in all respects (in the case of any representation or warranty qualified by materiality) or in all material respects (in the case of any representation or warranty not qualified by materiality) on and as of the date hereof and on and as of the Closing Date with the same effect as though made at and as of such date (except those representations and warranties that address matters only as of a specified date, the accuracy of which shall be determined as of that specified date in all respects). The representations and warranties of Buyer contained in **Section 4.01**, **Section 4.02** and **Section 4.03** shall be true and correct in all respects on and as of the date hereof and on and as of the Closing Date with the same effect as though made at and as of such date.

(c) Buyer shall have duly performed and complied in all material respects with all agreements, covenants and conditions required by this Agreement and each of the other Transaction Documents to be performed or complied with by it prior to or on the Closing Date.

(d) the Transaction Documents shall have been executed and delivered by Buyer, as applicable, and true and complete copies thereof shall have been delivered to the Company.

(e) The Share Purchase Agreement, the Voting Agreement and the transactions contemplated thereunder shall have been consummated.

(f) Buyer shall have completed the Buyer Financing.

ARTICLE VII
**Indemnification**

**Section 7.01 Survival**. Subject to the limitations and other provisions of this Agreement, the representations and warranties contained herein shall survive the Closing and shall remain in full force and effect until the date that is eighteen (18) months from the Closing Date (the "**Non-Fundamental Survival Period**"); *provided,* that the representations and warranties in **Section 3.01** and **Section 3.02**, **Section 4.01**, **Section 4.02, and Section 4.05** (collectively, the "**Fundamental Representations**") shall survive indefinitely. All covenants and agreements of the parties contained herein shall survive the Closing indefinitely or for the period explicitly specified therein. Notwithstanding the foregoing, any claims asserted in good faith with reasonable specificity (to the extent known at such time) and in writing by notice from the non-breaching party to the breaching party prior to the expiration date of the applicable survival period, including, if applicable, the Non-Fundamental Survival Period, shall not thereafter be barred by the expiration of the relevant representation or warranty and such claims shall survive until finally resolved.

**Section 7.02 Indemnification By Company**. Subject to the other terms and conditions of this **Article VII**, Company shall indemnify and defend each of Buyer and its Affiliates and their respective Representatives (collectively, the "**Buyer Indemnitees**") against, and shall hold each of them harmless from and against, and shall pay and reimburse each of them for, any and all Losses incurred or sustained by, or imposed upon, the Buyer Indemnitees based upon, arising out of, with respect to or by reason of:

(a) any inaccuracy in or breach or alleged breach of any of the representations or warranties of the Company contained in this Agreement or in any certificate or instrument delivered by or on behalf of the Company pursuant to this Agreement, as of the date such representation or warranty was made or as if such representation or warranty was made on and as of the Closing Date (except for representations and warranties that expressly relate to a specified date, the inaccuracy in or breach of which will be determined with reference to such specified date);

(b) any breach, alleged breach or non-fulfillment of any covenant, agreement or obligation to be performed by the Company pursuant to this Agreement;

(c) any amounts owed under the IP License Agreement prior to Closing and any fees or expenses (including without limitation any broker or accounting, legal or other professional fees or expenses) incurred by Company prior to the Closing in connection with the transactions contemplated by this Agreement; and

(d) Taxes of the Company arising from the transfer of the IP License Agreement to Buyer.

**Section 7.03 Indemnification By Buyer**. Subject to the other terms and conditions of this **Article VII**, Buyer shall indemnify and defend Company and its Affiliates and Representatives (collectively, the "**Company Indemnitees**") against, and shall hold each of them harmless from and against, and shall pay and reimburse each of them for, any and all Losses incurred or sustained by, or imposed upon, the Company Indemnitees based upon, arising out of, with respect to or by reason of:

(a) any inaccuracy in or breach or alleged breach of any of the representations or warranties of Buyer contained in this Agreement or in any certificate or instrument delivered by or on behalf of Buyer pursuant to this Agreement, as of the date such representation or warranty was made or as if such representation or warranty was made on and as of the Closing Date (except for representations and warranties that expressly relate to a specified date, the inaccuracy in or breach of which will be determined with reference to such specified date); or

(b) any breach, alleged breach, or non-fulfillment of any covenant, agreement or obligation to be performed by Buyer pursuant to this Agreement; or

(c) any amounts owed under the IP License Agreement following the Closing Date of the transactions contemplated by this Agreement.

**Section 7.04 Certain Limitations**. The indemnification provided for in **Section 7.02** and **Section 7.03** shall be subject to the following limitations:

(a) Subject to **Section 7.04(c)**, Company shall not be liable to the Buyer Indemnitees for indemnification under **Section 7.02(a)** until the aggregate amount of all Losses in respect of indemnification under **Section 7.02(a)** exceeds $50,000 (the "**Basket**"), in which event Company shall be required to pay or be liable for all such Losses in excess of the Basket. Subject to **Section 7.04(c)** and **Section 7.07**, the aggregate amount of all Losses for which Company shall be liable pursuant to **Section 7.02(a)** shall not exceed fifteen percent (15%) of the Transaction Shares issued to OPKO, based on the Closing Price (the "**Cap**").

(b) Subject to **Section 7.04(c)**, Buyer shall not be liable to the Company Indemnitees for indemnification under **Section 7.03(a)** until the aggregate amount of all Losses in respect of indemnification under **Section 7.03(a)** exceeds the Basket, in which event Buyer shall be required to pay or be liable for all such Losses in excess of the Basket. Subject to **Section 7.04(c)**, the aggregate amount of all Losses for which Buyer shall be liable pursuant to **Section 7.03(a)** shall not exceed the Cap.

(c) Notwithstanding the foregoing, the limitations set forth in **Section 7.04(a)** and **Section 7.04(b)** shall not apply to Losses based upon, arising out of, with respect to or by reason of (i) any inaccuracy in or breach of any Fundamental Representation, (ii) intentional breach, intentional misrepresentation, criminal misconduct, or fraud by any Indemnifying Party, or (iii) **Section 7.02(c), Section 7.02(d), or Section 7.03(c)**(collectively, the "**Indemnification Exclusions**").

(d) For purposes of this **Article VII**, notwithstanding anything contained herein to the contrary, any inaccuracy in or breach or alleged breach of any representation or warranty shall be determined without regard to any materiality, Material Adverse Effect or other similar qualification contained in or otherwise applicable to such representation or warranty.

**Section 7.05 Indemnification Procedures.** The party making a claim under this **Article VII** is referred to as the "**Indemnified Party**", and the party against whom such claims are asserted under this **Article VII** is referred to as the "**Indemnifying Party**".

(a) Third Party Claims. If any Indemnified Party receives notice of the assertion or commencement of any Action made or brought by any Person who is not a party to this Agreement or an Affiliate of a party to this Agreement or a Representative of the foregoing (a "**Third Party Claim**") against such Indemnified Party with respect to which the Indemnifying Party is obligated to provide indemnification under this Agreement, the Indemnified Party shall give the Indemnifying Party reasonably prompt written notice thereof, but in any event not later than thirty (30) calendar days after receipt of such notice of such Third Party Claim. The failure of the Indemnified Party to give reasonably prompt notice of any Third Party Claim shall not release, waive or otherwise affect the Indemnifying Party's obligations with respect thereto unless, and only to the extent, that the Indemnifying Party can demonstrate actual material loss and material prejudice as a result of such failure. Such notice by the Indemnified Party shall describe the Third Party Claim in reasonable detail, shall include copies of all material written evidence thereof and shall indicate the estimated amount, if reasonably practicable, of the Loss that has been or may be sustained by the Indemnified Party. The Indemnifying Party shall have the right to participate in, or by giving written notice to the Indemnified Party, to assume the defense of any Third Party Claim at the Indemnifying Party's expense and by the Indemnifying Party's own counsel, and the Indemnified Party shall cooperate in good faith in such defense; *provided,* that such Indemnifying Party shall not have the right to defend or direct the defense of any such Third Party Claim that (x) the Indemnified Party reasonably believes an adverse determination with respect to the Third Party Claim would be materially detrimental to or materially injure the Indemnified Party's reputation or future business prospects, or (y) seeks an injunction or other equitable relief against the Indemnified Party, and the Indemnifying Party shall be liable for the reasonable fees and expenses of counsel to the Indemnified Party in each jurisdiction for which the Indemnified Party reasonably determines counsel is required. In the event that the Indemnifying Party assumes the defense of any Third Party Claim, it shall have the right to take such action as it deems necessary to avoid, dispute, defend, appeal or make counterclaims pertaining to any such Third Party Claim in the name and on behalf of the Indemnified Party. The Indemnified Party shall have the right to participate in the defense of any Third Party Claim with counsel selected by it subject to the Indemnifying Party's right to control the defense thereof. The fees and disbursements of such counsel shall be at the expense of the Indemnified Party, *provided,* that if in the reasonable opinion of counsel to the Indemnified Party, (A) there are legal defenses available to an Indemnified Party that are different from or additional to those available to the Indemnifying Party; (B) there exists a conflict of interest between the Indemnifying Party and the Indemnified Party; or (C) the claim for indemnification relates to or arises in connection with any criminal or quasi criminal or regulatory proceeding, action, indictment, allegation or investigation, the Indemnifying Party shall be liable for the reasonable fees and expenses of counsel to the Indemnified Party in each jurisdiction for which the Indemnified Party determines counsel is required. If the Indemnifying Party elects not to compromise or defend such Third Party Claim, fails to promptly notify the Indemnified Party in writing of its election to defend as provided in this Agreement, or fails to diligently prosecute the defense of such Third Party Claim, the Indemnified Party may, pay, compromise, defend such Third Party Claim and seek indemnification for any and all Losses based upon, arising from or relating to such Third Party Claim. The Company and Buyer shall cooperate with each other in all reasonable respects in connection with the defense of any Third Party Claim, including making available (subject to the provisions of **Section 5.03**) records relating to such Third Party Claim and furnishing, without expense (other than reimbursement of actual out-of-pocket expenses) to the defending party, management employees or appropriate persons of the non-defending party as may be reasonably necessary for the preparation of the defense of such Third Party Claim. Notwithstanding any other provision of this Agreement, the Indemnifying Party shall not enter into settlement of any Third Party Claim without the prior written consent of the Indemnified Party.

(b) Direct Claims. Any Action by an Indemnified Party on account of a Loss which does not result from a Third Party Claim (a "**Direct Claim**") shall be asserted by the Indemnified Party giving the Indemnifying Party reasonably prompt written notice thereof, but in any event not later than thirty (30) days after the Indemnified Party has actual knowledge of such Direct Claim. The failure of the Indemnified Party to give reasonably prompt notice of any Direct Claim shall not release, waive or otherwise affect the Indemnifying Party's obligations with respect thereto unless, and only to the extent, that the Indemnifying Party can demonstrate actual material loss and material prejudice as a result of such failure. Such notice by the Indemnified Party shall describe the Direct Claim in reasonable detail, shall include copies of all material written evidence thereof and shall indicate the estimated amount, if reasonably practicable, of the Loss that has been or may be sustained by the Indemnified Party. The Indemnifying Party shall have thirty (30) days after its receipt of such notice to respond in writing to such Direct Claim. The Indemnified Party shall allow the Indemnifying Party and its professional advisors to investigate the matter or circumstance alleged to give rise to the Direct Claim, and whether and to what extent any amount is payable in respect of the Direct Claim and the Indemnified Party shall assist the Indemnifying Party's investigation by giving such information and assistance (including access to the Company's premises and personnel and the right to examine and copy any accounts, documents or records) as the Indemnifying Party or any of its professional advisors may reasonably request.

**Section 7.06 Payments**. Once a Loss is agreed to by the Indemnifying Party or is determined to be payable pursuant to this **Article VII**, the Indemnifying Party shall satisfy its obligations within two (2) Business Days of such determination by wire transfer of immediately available funds.

**Section 7.07 Exclusive Remedies**. Subject to **Section 9.11,** the Parties acknowledge and agree that their sole and exclusive remedy with respect to any and all claims (other than claims arising from fraud, criminal activity or willful misconduct on the part of a party hereto in connection with the transactions contemplated by this Agreement) for any breach of any representation, warranty, covenant, agreement or obligation set forth herein or otherwise relating to the subject matter of this Agreement, shall be pursuant to the indemnification provisions set forth in this **Article VII**. In furtherance of the foregoing, each Party hereby waives, to the fullest extent permitted under Law, any and all rights, claims and causes of action for any breach of any representation, warranty, covenant, agreement or obligation set forth herein or otherwise relating to the subject matter of this Agreement it may have against the other parties hereto and their Affiliates and each of their respective Representatives arising under or based upon any Law, except pursuant to the indemnification provisions set forth this **Article VII**. Nothing in this **Section 7.07** shall limit any Person's right to seek and obtain any equitable relief to which any Person shall be entitled or to seek any remedy on account of any party's fraudulent, criminal or intentional misconduct.

ARTICLE VIII
**Termination**

**Section 8.01** **Termination**. This Agreement may be terminated at any time prior to the Closing:

(a) by the mutual written consent of Company and Buyer;

(b) by Buyer by written notice to Company if:

(i) Buyer is not then in material breach of any provision of this Agreement and there has been a breach, inaccuracy in or failure to perform any representation, warranty, covenant or agreement made by the Company pursuant to this Agreement that would give rise to the failure of any of the conditions specified in **Article VI** and such breach, inaccuracy or failure has not been cured by the Company within ten (10) days of Company's receipt of written notice of such breach from Buyer; or

(ii) any of the conditions set forth in **Section 6.01** or **Section 6.02** shall not have been, or if it becomes apparent that any of such conditions will not be, fulfilled by July 1, 2019, unless such failure shall be due to the failure of Buyer to perform or comply with any of the covenants, agreements or conditions hereof to be performed or complied with by it prior to the Closing;

(c) by Company by written notice to Buyer if:

(i) the Company is not then in material breach of any provision of this Agreement and there has been a breach, inaccuracy in or failure to perform any representation, warranty, covenant or agreement made by Buyer pursuant to this Agreement that would give rise to the failure of any of the conditions specified in **Article VI** and such breach, inaccuracy or failure has not been cured by Buyer within ten (10) days of Buyer's receipt of written notice of such breach from Company; or

(ii) any of the conditions set forth in **Section 6.01** or **Section 6.03** shall not have been, or if it becomes apparent that any of such conditions will not be, fulfilled by July 1, 2019, unless such failure shall be due to the failure of the Company to perform or comply with any of the covenants, agreements or conditions hereof to be performed or complied with by any of them prior to the Closing; or

(d) by Buyer or Company in the event that (i) there shall be any Law that makes consummation of the transactions contemplated by this Agreement illegal or otherwise prohibited or (ii) any Governmental Authority shall have issued a Governmental Order restraining or enjoining the transactions contemplated by this Agreement, and such Governmental Order shall have become final and non-appealable.

**Section 8.02** **Effect of Termination**. In the event of the termination of this Agreement in accordance with this Article, this Agreement shall forthwith become void and there shall be no liability on the part of any party hereto except:

(a) as set forth in this **Article VIII** and **Article IX** hereof; and

(b) that nothing herein shall relieve any party hereto from liability for any willful breach or material breach of any provision hereof, or for fraud or criminal misconduct.

ARTICLE IX
**Miscellaneous**

**Section 9.01 Expenses**. Except as otherwise expressly provided herein, all costs and expenses, including, without limitation, fees and disbursements of counsel, financial advisors and accountants, incurred in connection with this Agreement and the transactions contemplated hereby shall be paid by the Party incurring such costs and expenses, whether or not the Closing shall have occurred.

**Section 9.02 Notices**. All notices, requests, consents, claims, demands, waivers and other communications hereunder shall be in writing and shall be deemed to have been given (a) when delivered by hand (with written confirmation of receipt); (b) when received by the addressee if sent by a nationally recognized overnight courier (receipt requested); (c) on the date sent by facsimile or e-mail of a PDF document (with confirmation of transmission) if sent during normal business hours of the recipient, and on the next Business Day if sent after normal business hours of the recipient or (d) on the third day after the date mailed, by certified or registered mail, return receipt requested, postage prepaid. Such communications must be sent to the respective parties at the following addresses (or at such other address for a party as shall be specified in a notice given in accordance with this **Section 9.02**):

**If to Company**:

OPKO Pharmaceuticals, LLC
4400 Biscayne Boulevard
Miami, FL 33137
Facsimile: 305-575-4140
E-mail: MBrowder@opko.com
Attention: Monte Browder, Esq.

with a copy (which shall not constitute notice) to:

OPKO Health, Inc.
4400 Biscayne Boulevard
Miami, FL 33137
Facsimile: 305-575-4140
E-mail: KInman@opko.com, SRubin@opko.com
Attn: Kate Inman, Esq.,
Steve Rubin

**If to Buyer**:

Xenetic Biosciences, Inc.
40 Speen Street, Suite 102
Framingham, MA 01701
E-mail: j.eisenberg@xeneticbio.com
Attn: Special Committee
Jeffrey F. Eisenberg, Chief Executive Officer

with a copy (which shall not constitute notice) to:

Akerman LLP
Three Brickell City Centre
98 Southeast Seventh Street
Suite 1100
Miami, Florida 33131
Facsimile: (305) 374.5095
Email: Teddy.Klinghoffer@Akerman.com
Andrea.Fisher@Akerman.com
Attn: Teddy Klinghoffer, Esq.
Andrea Fisher Evans, Esq.

**Section 9.03 Interpretation**. For purposes of this Agreement, (a) words "include," "includes" and "including" shall be deemed to be followed by the words "without limitation"; (b) the word "or" is not exclusive; and (c) the words "herein," "hereof," "hereby," "hereto" and "hereunder" refer to this Agreement as a whole. Unless the context otherwise requires, references herein: (x) to Articles, Sections, Disclosure Schedules and Exhibits mean the Articles and Sections of, and Disclosure Schedules and Exhibits attached to, this Agreement; (y) to an agreement, instrument or other document means such agreement, instrument or other document as amended, supplemented and modified from time to time to the extent permitted by the provisions thereof and (z) to a statute means such statute as amended from time to time and includes any successor legislation thereto and any regulations promulgated thereunder. This Agreement shall be construed without regard to any presumption or rule requiring construction or interpretation against the party drafting an instrument or causing any instrument to be drafted. The Disclosure Schedules and Exhibits referred to herein shall be construed with, and as an integral part of, this Agreement to the same extent as if they were set forth verbatim herein.

**Section 9.04 Headings**. The headings in this Agreement are for reference only and shall not affect the interpretation of this Agreement.

**Section 9.05 Severability**. If any term or provision of this Agreement is invalid, illegal or unenforceable in any jurisdiction, such invalidity, illegality or unenforceability shall not affect any other term or provision of this Agreement or invalidate or render unenforceable such term or provision in any other jurisdiction. Upon such determination that any term or other provision is invalid, illegal or unenforceable, the parties hereto shall negotiate in good faith to modify this Agreement so as to effect the original intent of the parties as closely as possible in a mutually acceptable manner in order that the transactions contemplated hereby be consummated as originally contemplated to the greatest extent possible.

**Section 9.06 Entire Agreement**. This Agreement, the Disclosure Schedules and the other Transaction Documents constitute the sole and entire agreement of the parties to this Agreement with respect to the subject matter contained herein and therein, and supersede all prior and contemporaneous understandings and agreements, both written and oral, with respect to such subject matter. No Party is relying on any representation and warranty of the other party not specifically set forth herein. In the event of any inconsistency between the statements in the body of this Agreement and those in the other Transaction Documents, the Exhibits and Disclosure Schedules (other than an exception expressly set forth as such in the Disclosure Schedules), the statements in the body of this Agreement will control.

**Section 9.07 Successors and Assigns**. This Agreement shall be binding upon and shall inure to the benefit of the parties hereto and their respective successors and permitted assigns. Neither Party may assign its rights or obligations hereunder without the prior written consent of the other Party, which consent shall not be unreasonably withheld or delayed; *provided, however*, that prior to the Closing Date, Buyer may, without the prior written consent of Company assign all or any portion of its rights under this Agreement to one or more of its direct or indirect wholly-owned subsidiaries. No assignment shall relieve the assigning party of any of its obligations hereunder.

**Section 9.08 No Third-party Beneficiaries**. Except as provided in **Article VII**, this Agreement is for the sole benefit of the Parties hereto and their respective successors and permitted assigns and nothing herein, express or implied, is intended to or shall confer upon any other Person or entity any legal or equitable right, benefit or remedy of any nature whatsoever under or by reason of this Agreement.

**Section 9.09 Amendment and Modification; Waiver**. This Agreement may only be amended, modified or supplemented by an agreement in writing signed by Buyer and Company. No waiver by any party of any of the provisions hereof shall be effective unless explicitly set forth in writing and signed by Buyer or Company. No waiver by any Party shall operate or be construed as a waiver in respect of any failure, breach or default not expressly identified by such written waiver, whether of a similar or different character, and whether occurring before or after that waiver. No failure to exercise, or delay in exercising, any right, remedy, power or privilege arising from this Agreement shall operate or be construed as a waiver thereof; nor shall any single or partial exercise of any right, remedy, power or privilege hereunder preclude any other or further exercise thereof or the exercise of any other right, remedy, power or privilege.

**Section 9.10 Governing Law; Submission to Jurisdiction; Waiver of Jury Trial.**

(a) This Agreement shall be governed by and construed in accordance with the internal laws of the State of Delaware without giving effect to any choice or conflict of law provision or rule (whether of the State of Delaware or any other jurisdiction).

(b) ANY LEGAL SUIT, ACTION OR PROCEEDING ARISING OUT OF OR BASED UPON THIS AGREEMENT, THE OTHER TRANSACTION DOCUMENTS OR THE TRANSACTIONS CONTEMPLATED HEREBY OR THEREBY MAY BE INSTITUTED IN THE FEDERAL COURTS OF THE UNITED STATES OF AMERICA OR THE COURTS OF THE STATE OF DELAWARE IN EACH CASE LOCATED IN THE COUNTY OF NEW CASTLE, AND EACH PARTY IRREVOCABLY SUBMITS TO THE EXCLUSIVE JURISDICTION OF SUCH COURTS IN ANY SUCH SUIT, ACTION OR PROCEEDING. SERVICE OF PROCESS, SUMMONS, NOTICE OR OTHER DOCUMENT BY MAIL TO SUCH PARTY'S ADDRESS SET FORTH HEREIN SHALL BE EFFECTIVE SERVICE OF PROCESS FOR ANY SUIT, ACTION OR OTHER PROCEEDING BROUGHT IN ANY SUCH COURT. THE PARTIES IRREVOCABLY AND UNCONDITIONALLY WAIVE ANY OBJECTION TO THE LAYING OF VENUE OF ANY SUIT, ACTION OR ANY PROCEEDING IN SUCH COURTS AND IRREVOCABLY WAIVE AND AGREE NOT TO PLEAD OR CLAIM IN ANY SUCH COURT THAT ANY SUCH SUIT, ACTION OR PROCEEDING BROUGHT IN ANY SUCH COURT HAS BEEN BROUGHT IN AN INCONVENIENT FORUM.

(c) EACH PARTY ACKNOWLEDGES AND AGREES THAT ANY CONTROVERSY WHICH MAY ARISE UNDER THIS AGREEMENT OR THE OTHER TRANSACTION DOCUMENTS IS LIKELY TO INVOLVE COMPLICATED AND DIFFICULT ISSUES AND, THEREFORE, EACH SUCH PARTY IRREVOCABLY AND UNCONDITIONALLY WAIVES ANY RIGHT IT MAY HAVE TO A TRIAL BY JURY IN RESPECT OF ANY LEGAL ACTION ARISING OUT OF OR RELATING TO THIS AGREEMENT, THE OTHER TRANSACTION DOCUMENTS OR THE TRANSACTIONS CONTEMPLATED HEREBY OR THEREBY. EACH PARTY TO THIS AGREEMENT CERTIFIES AND ACKNOWLEDGES THAT (A) NO REPRESENTATIVE OF ANY OTHER PARTY HAS REPRESENTED, EXPRESSLY OR OTHERWISE, THAT SUCH OTHER PARTY WOULD NOT SEEK TO ENFORCE THE FOREGOING WAIVER IN THE EVENT OF A LEGAL ACTION, (B) SUCH PARTY HAS CONSIDERED THE IMPLICATIONS OF THIS WAIVER, (C) SUCH PARTY MAKES THIS WAIVER VOLUNTARILY, AND (D) SUCH PARTY HAS BEEN INDUCED TO ENTER INTO THIS AGREEMENT BY, AMONG OTHER THINGS, THE MUTUAL WAIVERS AND CERTIFICATIONS IN THIS **SECTION 9.10(C)**.

**Section 9.11 Specific Performance**. The Parties agree that irreparable damage would occur if any provision of this Agreement were not performed in accordance with the terms hereof and that the Parties shall be entitled to specific performance of the terms hereof, in addition to any other remedy to which they are entitled at law or in equity.

**Section 9.12 Prevailing Party Fees**. In the event of a dispute arising under this Agreement or any Transaction Documents, if a lawsuit is filed, the prevailing Party shall be entitled to recover its attorneys' fees, costs and expenses, including those incurred in any appellate proceeding or in the process of determining the amount of such fees, or in collection or enforcement of any judgment, award or the like, from the non-prevailing party.

**Section 9.13 Counterparts**. This Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which together shall be deemed to be one and the same agreement. A signed copy of this Agreement delivered by facsimile, e-mail or other means of electronic transmission shall be deemed to have the same legal effect as delivery of an original signed copy of this Agreement.

**IN WITNESS WHEREOF**, the Parties hereto have caused this Agreement to be executed as of the date first written above by their respective officers thereunto duly authorized.

**ASSIGNEE:**

OPKO PHARMACEUTICALS, LLC

By: /s/ Dr. Phillip Frost
Name: Dr. Phillip Frost
Title: Chairman & Chief Executive Officer

**BUYER:**

XENETIC BIOSCIENCES, INC.

By: /s/ Jeffrey Eisenberg
Name: Jeffrey Eisenberg
Title:CEO

**Exhibit A**

**Lock-up Agreement**

**EXHIBIT A**

_____, 2019

Xenetic Biosciences, Inc.
40 Speen Street, Suite 102
Framingham, MA 01701
Attn: Jeffrey F. Eisenberg, Chief Executive Officer

Ladies and Gentlemen:

OPKO Pharmaceuticals, LLC, a limited liability corporation organized under the laws of the state of Delaware, whose address is 4400 Biscayne Boulevard, Miami, FL 33137, USA ("**OPKO**") understands that as an inducement to Xenetic Biosciences, Inc. (the "**Buyer**") to enter into that certain Assignment Agreement dated as of March 1, 2019, by and among Buyer and OPKO, and the transactions contemplated thereby, OPKO hereby enters into this lock-up agreement (this "**Lock-Up Agreement**") and agrees that OPKO will not, during the period commencing on the date hereof and ending one hundred eighty (180) days after the date hereof (the "**Lock-Up Period**"), (1) offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, lend, or otherwise transfer or dispose of, directly or indirectly, any shares of capital stock of Buyer or any securities convertible into or exercisable or exchangeable for shares of capital stock of Buyer, whether now owned or hereafter acquired by the undersigned or with respect to which the undersigned has or hereafter acquires the power of disposition (collectively, the "**Lock-Up Securities**"); (2) enter into any swap or other arrangement that transfers to another, in whole or in part, any of the economic consequences of ownership of Lock-Up Securities, whether any such transaction is to be settled by delivery of shares of Lock-Up Securities, in cash or otherwise; (3) make any demand for or exercise any right with respect to the registration of any Lock-Up Securities; or (4) publicly disclose the intention to make any offer, sale, pledge or disposition, or to enter into any transaction, swap, hedge or other arrangement relating to any Lock-Up Securities. Notwithstanding the foregoing, and subject to the conditions below, the undersigned may transfer Lock-Up Securities as a *bona fide* gift, by will or intestacy, or to a family member or trust for the benefit of a family member (for purposes of this Lock-Up Agreement, "family member" means any relationship by blood, marriage or adoption, not more remote than first cousin) or as a *bona fide* gift to a charity or educational institution;*provided* that in the case of any such transfer pursuant to the foregoing, (i) any such transfer shall not involve a disposition for value, (ii) each transferee shall sign and deliver to Buyer a lock-up agreement substantially in the form of this Lock-Up Agreement, and (iii) no filing under Section 16(a) of the Exchange Act shall be required or shall be voluntarily made, except for a Form 5. OPKO also agrees and consents to the entry of stop transfer instructions with Buyer's transfer agent and registrar against the transfer of the undersigned's Lock-Up Securities, except in compliance with this Lock-Up Agreement.

OPKO understands that this Lock-Up Agreement is irrevocable and shall be binding upon OPKO's legal representatives, successors, and assigns.
Very truly yours,

**OPKO Pharmaceuticals, LLC**

By:_____
[Name]
Its: _____
[Title]

**Exhibit B**

To be filed with the Securities and Exchange Commission at a later date under separate cover.

**Exhibit C**

**CONFIRMATORY ASSIGNMENT**

WHEREAS, this CONFIRMATORY ASSIGNMENT ("**Assignment**") dated as of _____ , 2019 (the "Effective Date"), is made by and between OPKO PHARMACEUTICALS, LLC, a limited liability corporation organized under the laws of the state of Delaware, with an office at 4400 Biscayne Boulevard, , FL 33137, USA ("Assignor ") and XENETIC BIOSCIENCES, INC., a corporation organized under the laws of the state of Nevada, with an office at 40 Speen Street, Suite 102, Framingham, MA 01701("Assignee "). Hereinafter, Assignor and Assignee will collectively be referred to as the "**Parties**", or individually as a "**Party**".

WHEREAS, a certain Intellectual Property License Agreement dated as of or approximately the date hereof (the "IP License Agreement") was entered into by The Scripps Research Institute, a California public benefit corporation located at 10550 North Torrey Pines Road, La Jolla, CA 92037, USA ("Scripps") and Assignor regarding certain new and useful inventions entitled "ARTICLES AND METHODS DIRECTED TO PERSONALIZED THERAPY OF CANCER" for which the following patent applications were filed:

| | | | |
|---|---|---|---|
| **RU2017134483**<br>**filed Oct. 4, 2017**<br>**C1256.70030RU00** | **RU2018112009**<br>**filed Apr. 4, 2018**<br>**C1256.70031RU00** | **RU2018134321**<br>**filed Oct. 1, 2018**<br>**C1256.70033RU00** | **PCT/RU2018/000653**<br>**filed Oct. 4, 2018**<br>**C1256.70030WO00** |

(collectively, the "Patents").

WHEREAS, Assignor and Assignee have entered into that certain Assignment Agreement, dated as of March 1, 2019 (the "Purchase Agreement"); and

WHEREAS, under the terms of the Purchase Agreement, Assignor has conveyed, transferred and assigned to Assignee, the rights and obligations of the Assignor under the IP License Agreement and has agreed to execute and deliver this Assignment Agreement to sell, assign and transfer to Assignee its rights and obligations in the IP License Agreement and for recording with the USPTO.

NOW, THEREFORE, for good and valuable consideration paid by Assignee, including the premises and covenants set forth in the Purchase Agreement, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

Assignor hereby sells, conveys, transfers, assigns, and delivers to Assignee and Assignee hereby acquires and accepts, all of Company's right, title and interest in and to the IP License Agreement, and Assignee agrees to assume, perform and discharge all of the obligations and liabilities of Assignor under the IP License Agreement. Assignor hereby authorizes the Commissioner for Patents in the USPTO to record and register this Assignment Agreement upon request by Assignee.

*[Signature Page Follows]*

IN TESTIMONY WHEREOF, Assignor and Assignee each has caused this Assignment Agreement to be executed by its respective duly authorized representative as of the Effective Date.

**ASSIGNOR:**

OPKO PHARMACEUTICALS, LLC

By: _____
Name:
Title:

**ASSIGNEE:**

XENETIC BIOSCIENCES, INC.

By:_____
Name:
Title:

**Schedule 4.03 Brokers**

Letter of Engagement between Maxim Group and the Strategic Alternatives Committee of the Board of Directors of Xenetic Biosciences, Inc. dated May 16, 2018.

**Schedule 4.06 Buyer SEC Reports**

None.

**Schedule 4.07 (a) Tax Matters**

The following tax returns have not been filed:

| | |
|---|---|
| Xenetic Biosciences (UK) Ltd | 2013, 2014, 2015, 2016 & 2017 |
| Lipoxen technologies, Ltd. | 2013, 2014, 2015, 2016 & 2017 |

NOTE: No tax due for any years as significant tax losses have been incurred within each subsidiary. Minimum payments have been made for both entities.

**APPENDIX D**

**LICENSE AGREEMENT**
**BETWEEN**
**OPKO PHARMACEUTICALS, LLC**
**AND**
**THE SCRIPPS RESEARCH INSTITUTE**

THIS Agreement (the "AGREEMENT") is between OPKO Pharmaceuticals, LLC, a Delaware limited liability company having a principal place of business located at 4400 Biscayne Boulevard, Miami, Florida 33138 ("LICENSEE"), and The Scripps Research Institute, a California, nonprofit public benefit corporation, whose address is 10550 North Torrey Pines Road, La Jolla, California 92037 ("SCRIPPS" or "LICENSOR").

**RECITALS**

A. LICENSOR is engaged in fundamental scientific biomedical and biochemical research including research relating to, among other things, development of highly selective ligands of B cell receptors expressed on lymphoma cells and related cytotoxic drugs including CAR-T therapeutics, that may be useful for the treatment of lymphoma.

B. LICENSEE is engaged in research and development of therapeutic and diagnostic products for major unmet medical needs including renal diseases and disorders, urological diseases and disorders, metabolic diseases and disorders and other diseases and conditions.

C. LICENSOR has the exclusive right to grant a license to its ownership interest in the PATENT RIGHTS and the SCRIPPS TECHNOLOGY (each as hereinafter defined), subject to certain rights of the U.S. Government resulting from the receipt by LICENSOR of certain funding from the U.S. Government.

D. LICENSOR desires to grant to LICENSEE and LICENSEE wishes to acquire, an exclusive worldwide right and license to LICENSOR's interest in the PATENT RIGHTS and SCRIPPS TECHNOLOGY, subject to the terms and conditions set forth herein, with a view to developing and marketing therapeutic products.

**NOW, THEREFORE**, in consideration of the mutual covenants and premises herein contained, the parties agree as follows:

**1. EFFECTIVE DATE**

This AGREEMENT is effective February 25, 2019 ("EFFECTIVE DATE").

**2. DEFINITIONS**

As used in this AGREEMENT, the following terms have the meanings indicated:

2.1 **AFFILIATE** means any entity which directly or indirectly controls, or is controlled by LICENSEE. The term "control" as used herein means (a) in the case of corporate entities, direct or indirect ownership of at least fifty percent (50%) of the stock or shares entitled to vote for the election of directors; or (b) in the case of non-corporate entities, direct or indirect ownership of at least fifty percent (50%) of the equity interest with the power to direct the management and policies of such non-corporate entities. AFFILIATES shall be subject to all obligations and liabilities imposed upon LICENSEE under this Agreement. Unless otherwise specified, the term LICENSEE includes AFFILIATES.

2.2 **CHALLENGE.** LICENSEE or a SUBLICENSEE (as applicable) will be deemed to have made a "CHALLENGE" of the PATENT RIGHTS if LICENSEE or its SUBLICENSEE: (a) institutes or maintains, or causes its counsel to institute or maintain on LICENSEE's or such SUBLICENSEE's behalf, any interference, opposition, re-examination, post-grant review, or similar proceeding with respect to any PATENT RIGHTS with the U.S. Patent and Trademark Office or any foreign patent office; or (b) makes any filing or institutes or maintains any action or legal proceeding on LICENSEE's or such SUBLICENSEE's behalf with a court or other governmental body (including, without limitation, the U.S. Patent and Trademark Office or any foreign patent office) alleging (or authorizes the institution of any such action or proceeding alleging) that any of the PATENT RIGHTS are invalid or unenforceable.

2.3 **FDA** means the US Food and Drug Administration, or any successor entity.

2.4 **LICENSED PROCESS** means any process or method claimed in the PATENT RIGHTS.

2.5 **LICENSED PRODUCT** means a product (a) the manufacture, importation, sale, offer for sale or use of which would, but for the license granted herein, infringe any of the PATENT RIGHTS, (b) that is comprised of, utilizes, or incorporates any SCRIPPS TECHNOLOGY, or (c) that is made using a LICENSED PROCESS.

2.6 **NET SALES** means the gross amounts invoiced by LICENSEE or its SUBLICENSEE on all SALES of LICENSED PRODUCTS, which are covered by a VALID CLAIM, to customers, including resellers and distributors, *, (if not previously deducted from the amount invoiced): (a) *, (b) *, (c) *, (d) *, and (e) *.

The deductible items listed in sub-clauses (a) – (e) above shall be either (i) included as line items on the invoice, or (ii) documented as being specifically attributable to actual sales of LICENSED PRODUCTS, in accordance with United States Generally Accepted Accounting Principles ("**GAAP**") or International Financing Reporting Standards ("**IFRS**"), as applicable, consistently applied throughout the organization of the selling party, provided that such amounts are included in the quarterly royalty reports that LICENSEE sends to LICENSOR pursuant to Section 5.6. If LICENSEE or other selling party receives refunds or reimbursements of any amounts deducted as set forth herein, then such refunded or reimbursed amounts shall be considered NET SALES in the applicable reporting period in which such refunded or reimbursed amounts are received.

In the event that a product containing the LICENSED PRODUCT is SOLD in a finished combination package containing such LICENSED PRODUCT packaged together in combination with one or more other products, devices, equipment or components (a "**COMBINATION PRODUCT**"), NET SALES for such COMBINATION PRODUCT will be calculated by multiplying actual NET SALES of such COMBINATION PRODUCT by the fraction A/(A+B) where A is the selling price of the LICENSED PRODUCT if SOLD separately in finished form and B is the selling price of any other products, equipment or components in the COMBINATION PRODUCT if sold separately in finished form provided that the selling price of any COMBINATION PRODUCT shall not be less than A+B. In the event that a product containing LICENSED PRODUCT or one or more of such products, equipment or components in the COMBINATION PRODUCT are not sold separately, then the parties shall negotiate in good faith a formula for calculating NET SALES for such COMBINATION PRODUCT that reflects the respective contributions of the product containing LICENSED PRODUCT and such other products, equipment or components to the overall value of such COMBINATION PRODUCT. LICENSEE covenants that it will not intentionally manipulate any part of the fraction A/ (A+B) to avoid or reduce royalty payments or obligations that would otherwise be due for sales of LICENSED PRODUCT in combination form or otherwise.

* Portions of this Exhibit have been omitted and filed separately with the Securities and Exchange Commission pursuant to a request for confidential treatment.

2.7 **PATENT RIGHTS** shall mean:

a. the patents and application(s) set forth on **EXHIBIT A** attached hereto;

b. the foreign counterpart patent applications of the respective applications referenced in subclause (a) above, but only to the extent the claims of such foreign applications are entitled to the priority date of the respective application(s) referenced in subclause (a) above;

c. the patents issued from the application(s) referenced in subclauses (a) and (b);

d. divisionals, continuations, reissues, reexaminations, and extensions of any patent or application set forth in subclauses (a) - (c) above;

e. all claims of continuations-in-part of any applications referenced in subclauses (a) and (b) above, provided that the claims of such applications are entitled to the benefit of the priority date of the application(s) referenced in subclause (a) above.

2.8 **SCRIPPS TECHNOLOGY** means LICENSOR's technology that is described in the PATENT RIGHTS and is inclusive of information, data and know-how made or developed by LICENSOR in the course of its activities leading to its submission of the publication entitled "Autocrine-based Selection of Ligands for Personalized CAR-T Therapy of Lymphoma" with authors that are inclusive of LICENSOR's employees Richard A. Lerner and Jia Xie and multiple additional non-LICENSOR authors. LICENSOR's ownership interest in the PATENT RIGHTS and the SCRIPPS TECHNOLOGY derives from employees Richard A. Lerner and Jia Xie's activities undertaken under an employment agreement with LICENSOR and/or through an assignment of patent rights.

2.9 **SALE, SELL or SOLD** means the transfer or disposition for value of a LICENSED PRODUCT to a party other than LICENSEE or SUBLICENSEES.

2.10 **SUBLICENSEE** means any third party to whom the LICENSEE grants a sublicense with respect to the rights conferred upon the LICENSEE under this AGREEMENT, as contemplated by Section 4.4. In addition, "SUBLICENSEE" shall include any further third party SUBLICENSEES that may be permitted under Section 4.4.

2.11 **SUBLICENSE REVENUES** means all revenues and other consideration paid to the LICENSEE or to an AFFILIATE in consideration of (a) the grant of rights that includes a sublicense to the PATENT RIGHTS, (b) the grant of distribution or marketing rights with respect to LICENSED PRODUCTS, and/or (c) the sale or other transfer of that portion of LICENSEE's or an AFFILIATE's business or assets that relates to the rights granted under this AGREEMENT. SUBLICENSE REVENUES shall not include any consideration received for sales made through an asset sale, stock sale, merger or other combination, or any other transfer of LICENSEE'S entire business (a "Change of Control Event"). Without limiting the generality of the foregoing, SUBLICENSE REVENUES shall include all upfront fees, license fees, milestone payments, technology access fees, premiums above the fair market value on sales of LICENSEE's or an AFFILIATE's debt or equity securities, annual maintenance fees, and any other payments with respect to such sublicense, distribution or marketing rights, or sale or other transfer. SUBLICENSE REVENUES include amounts received from a SUBLICENSEE under the terms of the agreement in which the sublicense is granted and under the terms of other agreements entered into between LICENSEE and SUBLICENSEE as part of the same transaction as the agreement that includes the grant of the sublicense. However, SUBLICENSE REVENUES shall exclude: (i) royalties on a SUBLICENSEE's sales of LICENSED PRODUCTS; and (ii) payments for LICENSEE's or an AFFILIATE's debt or equity securities that are at or below the fair market value of such securities as of the date of receipt of such payments as mutually determined by the parties. Any non-cash SUBLICENSE REVENUES received by LICENSEE or by an AFFILIATE shall be valued at its fair market value as of the date of receipt as mutually determined by the parties. Any such non-cash SUBLICENSE REVENUES received by LICENSEE (i.e., equity) shall be passed through to LICENSOR in the same form received by LICENSEE consistent with the terms herein.

2.12 **TERRITORY** means worldwide.

2.13 **VALID CLAIM** means a claim of an issued and unexpired patent or a claim of a pending patent application within the PATENT RIGHTS which has not been held unpatentable, invalid or unenforceable by a court or other government agency of competent jurisdiction and has not been admitted to be invalid or unenforceable through reissue, reexamination, disclaimer or otherwise; provided, however, that if the holding of such court or agency is later reversed by a court or agency with overriding authority, the claim shall be reinstated as a VALID CLAIM with respect to NET SALES made after the date of such reversal. Notwithstanding the foregoing provisions of this Section 2.13, if a claim of a pending patent application within the PATENT RIGHTS has not issued as a claim of an issued patent within the PATENT RIGHTS, within nine (9) years after the filing date from which such claim takes priority, such pending claim shall not be a VALID CLAIM for purposes of this AGREEMENT.

**3. WARRANTY AND LIMITATION OF LIABILITY**

3.1 LICENSOR MAKES NO WARRANTIES OR REPRESENTATIONS CONCERNING THE SCRIPPS TECHNOLOGY OR PATENT RIGHTS, OR ANY OTHER MATTER WHATSOEVER, INCLUDING WITHOUT LIMITATION ANY EXPRESS, IMPLIED, OR STATUTORY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NON-INFRINGEMENT OF THIRD PARTY RIGHTS, TITLE, ACCURACY, OR ARISING OUT OF COURSE OF CONDUCT OR TRADE CUSTOM OR USAGE, AND LICENSOR DISCLAIMS ALL SUCH EXPRESS, IMPLIED, OR STATUTORY WARRANTIES. LICENSOR MAKES NO WARRANTY OR REPRESENTATION AS TO THE VALIDITY, SCOPE, OR ENFORCEABILITY OF THE PATENT RIGHTS OR THE SCRIPPS TECHNOLOGY, OR THAT ANY LICENSED PRODUCT, LICENSED PROCESS, PATENT RIGHTS, OR SCRIPPS TECHNOLOGY WILL BE FREE FROM AN INFRINGEMENT ON PATENTS OR OTHER INTELLECTUAL PROPERTY RIGHTS OF THIRD PARTIES, OR THAT NO THIRD PARTIES ARE IN ANY WAY INFRINGING UPON ANY PATENT RIGHTS OR SCRIPPS TECHNOLOGY COVERED BY THIS AGREEMENT. FURTHER, LICENSOR HAS MADE NO INVESTIGATION AND MAKES NO REPRESENTATION OR WARRANTY THAT THE PATENT RIGHTS OR THE SCRIPPS TECHNOLOGY ARE SUITABLE FOR LICENSEE'S PURPOSES.

3.2 IN NO EVENT SHALL EITHER PARTY BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, EXEMPLARY OR CONSEQUENTIAL DAMAGES (INCLUDING FOR LOST PROFITS OR EXPECTED SAVINGS) ARISING OUT OF OR IN CONNECTION WITH THIS AGREEMENT OR ITS SUBJECT MATTER, EXCEPT WITH RESPECT TO LICENSEE'S INDEMNITY OBLIGATIONS UNDER SECTION 11. LICENSOR'S AGGREGATE LIABILITY, IF ANY, FOR ALL DAMAGES OR OTHER RELIEF OF ANY KIND RELATING TO THIS AGREEMENT OR ITS SUBJECT MATTER SHALL NOT EXCEED THE AMOUNT PAID BY LICENSEE TO LICENSOR UNDER THIS AGREEMENT. THE FOREGOING EXCLUSIONS AND LIMITATIONS SHALL APPLY TO ALL CLAIMS AND ACTIONS OF ANY KIND AND ON ANY THEORY OF LIABILITY, WHETHER BASED ON CONTRACT, TORT (INCLUDING, BUT NOT LIMITED TO NEGLIGENCE OR STRICT LIABILITY), OR ANY OTHER GROUNDS, AND REGARDLESS OF WHETHER SUCH PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, AND NOTWITHSTANDING ANY FAILURE OF ESSENTIAL PURPOSE OF ANY LIMITED REMEDY. THE PARTIES FURTHER AGREE THAT EACH WARRANTY DISCLAIMER, EXCLUSION OF DAMAGES OR OTHER LIMITATION OF LIABILITY HEREIN IS INTENDED TO BE SEVERABLE AND INDEPENDENT OF THE OTHER PROVISIONS BECAUSE THEY EACH REPRESENT SEPARATE ELEMENTS OF RISK ALLOCATION BETWEEN THE PARTIES.

**4. LICENSE**

4.1 Subject to Sections 4.2 and 4.3 hereof, LICENSOR hereby grants to LICENSEE an exclusive, worldwide, royalty-bearing license, with rights to sublicense under Section 4.4, to the PATENT RIGHTS to develop make, have made, use, have used, sell, have sold, offer to sell, and import LICENSED PRODUCTS and/or LICENSED PROCESSES. LICENSOR hereby grants to LICENSEE a non-exclusive, worldwide license to SCRIPPS TECHNOLOGY.

4.2 LICENSEE and LICENSOR acknowledge that LICENSOR has received, and expects to continue to receive, funding from the United States Government in support of LICENSOR's research activities. LICENSEE and LICENSOR acknowledge and agree that their respective rights and obligations pursuant to this AGREEMENT shall be subject to the rights of the United States Government, existing and as amended, which may arise or result from LICENSOR's receipt of research support from the United States Government, including but not limited to, 37 CFR 401, the National Institutes of Health ("NIH") Grants Policy Statement and the NIH Guidelines for Obtaining and Disseminating Biomedical Research Resources.

4.3 LICENSOR reserves the right to use the PATENT RIGHTS and SCRIPPS TECHNOLOGY for any internal, non-commercial, research or educational purposes without LICENSOR being obligated to pay LICENSEE any royalties or other compensation or to account to LICENSEE in any way. In addition, LICENSOR reserves the right to grant non-exclusive licenses to use the PATENT RIGHTS or the SCRIPPS TECHNOLOGY for internal, non-commercial research and educational purposes to other nonprofit or academic institutions, without the other nonprofit or academic institution being obligated to pay LICENSEE any royalties or other compensation or to account to LICENSEE in any way provided that in each case LICENSOR and the non-exclusive licensees are prohibited from developing, making, having made, using, importing, exporting, distributing, selling or offering for sale LICENSED PRODUCTS.

4.4 LICENSEE may grant sublicenses in the TERRITORY to any party with respect to the rights conferred upon LICENSEE under this AGREEMENT. SUBLICENSEES shall not have the right to further sublicense without LICENSOR's prior written consent, which shall not be unreasonable withheld. This consent requirement does not apply to any assignments to an AFFILIATE; or made as part of a sale, regardless of whether such a sale occurs through an asset sale, stock sale, merger or other combination, or any other transfer of LICENSEE'S entire business; or that part of LICENSEE's business that exercise all rights granted under this AGREEMENT. Any sublicense granted under this Section 4.4 shall be subject in all respects to the applicable provisions contained in this AGREEMENT (including the provisions regarding government interest, reservation of rights, development efforts, reporting, audit rights, indemnity, insurance, CHALLENGES, warranty disclaimer, limitation of liability, confidentiality, and rights upon expiration or termination). In the event of a conflict between this AGREEMENT and the terms of any sublicense, the terms of this AGREEMENT shall control. LICENSEE shall at all times remain responsible for the compliance by any SUBLICENSEE with the terms of this AGREEMENT, including the payment of all amounts that may become due hereunder as a result of any SUBLICENSEE's activities. LICENSEE must deliver to LICENSOR a true and correct copy of each sublicense granted by LICENSEE, and any modification or termination thereof, within 30 days after execution, modification, or termination. If this AGREEMENT is terminated, LICENSOR agrees to accept existing SUBLICENSEES in good standing at the date of termination, provided that such SUBLICENSEES continue to be in compliance with all of the terms of this AGREEMENT.

4.5 This AGREEMENT confers no license or rights by implication, estoppel, or otherwise under any patent application, patent, or SCRIPPS' intellectual property other than the PATENT RIGHTS regardless of whether such patent application, patent, or intellectual property is dominant or subordinate to the PATENT RIGHTS.

**5. PAYMENTS AND REPORTS**

5.1 In consideration of rights granted by LICENSOR to LICENSEE under this AGREEMENT, LICENSEE will pay or deliver to LICENSOR the consideration provided for in this Article 5. *LICENSEE shall pay to LICENSOR a royalty equal * for all LICENSED PRODUCTS (the "ROYALTY").

5.2 All SUBLICENSE REVENUES shall be reported and SUBLICENSE PAYMENTS (defined below) paid to LICENSOR by LICENSEE within * of LICENSEE's receipt of such SUBLICENSE REVENUES. LICENSEE's reports to LICENSOR regarding SUBLICENSE REVENUES shall contain an explanation and calculation of the amount of SUBLICENSE PAYMENTS due to LICENSOR. LICENSEE shall pay LICENSOR a non-creditable, non-refundable percentage of SUBLICENSE REVENUES ("SUBLICENSE PAYMENTS") as follows: * of SUBLICENSE REVENUES received within * from the EFFECTIVE DATE; * of SUBLICENSE REVENUES received after * from the EFFECTIVE DATE and before * from the EFFECTIVE DATE; and * of SUBLICENSE REVENUES received after * from the EFFECTIVE DATE.

For clarity, LICENSEE shall not be obligated to pay any portion of sublicensing fees or payments it receives from a third party which are attributable to a sublicense or grant of rights to LICENSEE technology which does not constitute part of the PATENT RIGHTS. For further clarity, LICENSOR acknowledges that LICENSEE intends to assign its rights under this AGREEMENT to Xenetic Biosciences, Inc., a Nevada corporation ("**XBIO**") (the "**XBIO ASSIGNMENT**") in exchange for 2,625,000 shares of XBIO common stock (the "**LICENSEE XBIO SHARES**"). The XBIO ASSIGNMENT will be considered a sublicense or assignment for purposes of this AGREEMENT. At the closing of the XBIO ASSIGNMENT, LICENSEE shall direct that 656,250 of the LICENSEE XBIO SHARES (the "**SHARES**") be issued to LICENSOR as the sole SUBLICENSE PAYMENT for the XBIO ASSIGNMENT (with LICENSEE retaining the remaining 1,968,750 LICENSEE XBIO SHARES). At the closing of the XBIO ASSIGNMENT, LICENSOR agrees to execute that certain Lock-Up Agreement, attached hereto as **EXHIBIT B** with respect to its SHARES and to be bound by the terms thereof. It is the parties' intent that all the benefits and burdens of ownership of the SHARES will be issued to the LICENSOR on the closing date of the XBIO ASSIGNMENT. From and after the effective date of the XBIO ASSIGNMENT and the issuance of 656,250 SHARES to LICENSOR pursuant to this provision, XBIO shall be deemed to be the LICENSEE hereunder, and OPKO Pharmaceuticals, LLC shall have no further obligations to LICENSOR under this AGREEMENT.

5.3 LICENSEE also agrees to pay and shall pay LICENSOR the following non-creditable, non-refundable milestones as follows:

| Milestone | Payment | |
|---|---|---|
| Upon a Change of Control Event in which total consideration is less than or equal to $* | $ | * |
| Upon a Change of Control Event in which total consideration exceeds $* | $ | * |
| * | $ | * |
| Upon reaching aggregate NET SALES of $* in any combination of markets and/or indications | $ | * |
| Upon reaching aggregate NET SALES of $* in any combination of markets and/or indications | $ | * |

* Portions of this Exhibit have been omitted and filed separately with the Securities and Exchange Commission pursuant to a request for confidential treatment.

5.4 In the event of late payments to LICENSOR due under this Article 5, a penalty of * of the amount due will be assessed monthly and due additionally from LICENSEE for each such late payment.

5.5 During the term of this AGREEMENT and for * thereafter, LICENSEE agrees to keep complete and accurate records of its and its SUBLICENSEES' NET SALES under the license granted in this AGREEMENT in sufficient detail to enable the royalties and milestones payable hereunder to be determined. LICENSOR shall have the right to request that an audit be performed on LICENSEE's accounting records by an independent auditor reasonably acceptable to LICENSEE, on a confidential basis, for the purpose of determining whether LICENSEE has complied with the payment and expenditure terms of this AGREEMENT. LICENSOR agrees such audits shall not be requested any more frequently than *. If a payment deficiency for *, whichever is larger, then *. The auditor shall disclose to LICENSOR only information relating to the accuracy of the payments and required expenditures.

5.6 Within * after the end of * of the valid term of this AGREEMENT, beginning immediately after the first commercial SALE of LICENSED PRODUCT or LICENSED PROCESS, LICENSEE must deliver to LICENSOR a true and accurate written report, even if no payments are due LICENSOR, giving the particulars of the business conducted by LICENSEE and its SUBLICENSEE(S), if any exist, during the preceding * under this AGREEMENT as are pertinent to calculating payments hereunder. Such reports will be on a per-country and per-product basis and presented substantially in the form as shown in **EXHIBIT C** attached hereto. Simultaneously with the delivery of each report, LICENSEE must pay to LICENSOR the amount due, if any, for the period of each report.

5.7 All amounts payable here by LICENSEE must be paid in United States dollars without deductions for taxes, assessments, fees, or charges of any kind. Royalties accruing on SALES in countries other than the United States must be paid in United States dollars in amounts based on the rate of exchange as quoted in the Wall Street Journal (WSJ) as of the last business day of the reporting period. If the WSJ does not publish any such rate, a comparable rate publication will be agreed upon from time to time by the parties, and with respect to each country for which such rate is not published by the WSJ or in a comparable publication, the parties will use the prevailing rate for bank cable transfers for such date, as quoted by leading United States banks in New York City dealing in the foreign exchange market.

5.8 All payments must be payable to LICENSOR and sent to the address listed in Section 17.2.

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5.9 Payment Increase in the Event of a CHALLENGE.

a. In the event LICENSEE or a SUBLICENSEE directly institutes, makes, or maintains any CHALLENGE, the royalty obligations specified in Section 5 shall be * from the date the challenging party first institutes or makes such CHALLENGE and during the pendency of such CHALLENGE, and shall continue to apply after the conclusion of such CHALLENGE in the event that at least *.

b. LICENSEE will provide written notice to SCRIPPS at * prior to LICENSEE or a SUBLICENSEE instituting or making any CHALLENGE, and LICENSEE agrees that the challenging party will not institute such CHALLENGE for at least * after the date of such notice. *. During such * period, the parties will discuss the same and attempt in good faith to resolve such issues.

**6. DILIGENCE; REGULATORY MATTERS**

6.1 LICENSEE agrees that during the term of this AGREEMENT, it shall use (whether directly or through its SUBLICENSEES) commercially reasonable efforts to develop and commercialize, or have developed and commercialized, LICENSED PRODUCTS in the TERRITORY. *. It is understood by LICENSEE and LICENSOR that prospective development is preliminary in nature and the actual development schedule and timing will vary based upon relevant factors at the time, including the results of animal, human and toxicology studies, the ability to synthesize and manufacture compounds for clinical and commercial use, patent and other proprietary positions of the product, product labeling or anticipated labeling, market potential, financial return, medical and clinical considerations, regulatory environment and competitive market conditions, and other technical, legal, scientific, medical or commercial factors. Thereafter, LICENSEE shall continue to diligently undertake and pursue the development and commercialization of the LICENSED PRODUCTS. If at any time, LICENSEE determines to formally discontinue development or commercialization of the LICENSED PRODUCTS, LICENSEE shall notify LICENSOR in writing within * of such decision. If LICENSEE fails to comply with the commercially reasonable efforts described above or formally discontinues development or commercialization of LICENSED PRODUCT, LICENSOR shall notify LICENSEE of its position with respect to such efforts and LICENSEE shall have at least * to provide evidence of such commercially reasonable efforts. If the Parties do not resolve this matter within * thereafter, the dispute can move to alternative dispute resolution pursuant to Section 16 herein.

6.2 Should LICENSEE commence manufacture and/or marketing of LICENSED PRODUCTS in the TERRITORY, it hereby represents and warrants that it shall make, offer to sell and sell LICENSED PRODUCTS in the TERRITORY, and otherwise conduct its market activities, in compliance with all laws, regulations, safety and health requirements, and other conditions imposed by the governmental authorities of the jurisdictions in which LICENSEE shall make and/or sell the LICENSED PRODUCT.

6.3 Except as otherwise set forth herein, LICENSEE shall be solely responsible for all communications with governmental authorities in connection with the LICENSED PRODUCT in the TERRITORY. *

* Portions of this Exhibit have been omitted and filed separately with the Securities and Exchange Commission pursuant to a request for confidential treatment.

**7. TERM; TERMINATION**

7.1 The term of this AGREEMENT shall begin on the EFFECTIVE DATE of this AGREEMENT and continue until this AGREEMENT is terminated as provided herein or until the expiration of the last-to-expire patent within the PATENT RIGHTS in the TERRITORY, or following * from the first commercial SALE of a LICENSED PRODUCT, whichever is later, on a country-by-country basis.

7.2 This AGREEMENT will terminate:

a. automatically if LICENSEE becomes bankrupt and/or if the business of LICENSEE is placed in the hands of a receiver, assignee, or trustee, whether by voluntary act of LICENSEE or otherwise, makes an assignment for the benefit of creditors, or has any other proceedings filed against LICENSEE under any bankruptcy or insolvency laws; or

b. upon * written notice from LICENSOR if LICENSEE becomes insolvent unless, before the end of the * period, LICENSEE provides LICENSOR with evidence of its solvency; or

c. upon * written notice from LICENSOR if LICENSEE breaches or defaults on its obligation to make payments (if any are due) or reports, in accordance with the terms of Article 5 hereunder, unless, before the end of the * period, LICENSEE has cured the breach or default and so notifies LICENSOR, stating the manner of the cure; or

d. upon * written notice if LICENSEE breaches or defaults on any other obligation under this AGREEMENT, unless, before the end of the * period, LICENSEE has cured the breach or default and so notifies LICENSOR, stating the manner of the cure; or

e. at any time by mutual written agreement between LICENSEE AND LICENSOR; or

f. if LICENSEE defaults upon its indemnification or insurance obligations under Article 11 unless LICENSEE has contested and/or cured the default and so notifies LICENSOR stating the manner of the basis for contesting the default and the manner of the cure; or

g. if LICENSEE is convicted of a felony relating to the development, manufacture, use, marketing, distribution, or sale of the LICENSED PRODUCTS; or

h. at any time upon * written notice by LICENSEE to LICENSOR, provided that LICENSEE pays to * before the expiration of such * notice period.

7.3 If this AGREEMENT is terminated for any cause:

a. nothing herein will be construed to release either party of any obligation matured prior to the effective date of the termination;

b. after the effective date of the termination, LICENSEE will provide LICENSOR with a written inventory of all LICENSED PRODUCTS in process of manufacture, in use or in stock. LICENSEE may SELL any such LICENSED PRODUCTS following such termination if it pays to LICENSOR earned royalties thereon and any other amount due pursuant to the terms of Article 5; and

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c. the parties will be bound by the provisions of Articles 2 (Definitions), 3 (Limitation of Liability), 5 (Payments and Reports), 9 (Assignment), 11 (Indemnification and Insurance), 12 (Use Of Name), 13 (Confidential Information), 15 (Export Control), 16 (Alternate Dispute Resolution), and 17 (General) of this AGREEMENT.

**8. INFRINGEMENT BY THIRD PARTIES**

8.1 Prosecution of Infringements.

a. *. LICENSEE and LICENSOR shall inform each other promptly in writing in the event either party becomes aware of any alleged infringement of the PATENT RIGHTS by a third party and of any available evidence thereof.

b. * , which shall not be unreasonably withheld or delayed. * agrees to * for the reasonable * incurred * in participating in any such proceeding with * and providing such assistance to *.

c. * shall promptly notify *.

8.2 Defense of Infringements.

a. LICENSEE shall, * have the first right, but not the obligation, to defend any suits against LICENSEE or SUBLICENSEES alleging infringement of any third party patent right due to the development and/or commercialization of LICENSED PRODUCTS by LICENSEE or any SUBLICENSEE. LICENSEE shall promptly notify LICENSOR in writing of such claims, and LICENSOR shall cooperate with LICENSEE in connection with any such claim at *. * shall, * have the right to join any such legal proceeding and to be represented in any legal proceeding by independent counsel of its choosing. In no event shall * have any liability whatsoever for any damages, litigation costs, or other amounts due to any third party (except for costs of * own counsel as provided above). If the third party patent right is held not to be infringed or is held unenforceable or invalid, any recovery of damages with respect to such suit shall be distributed to LICENSOR and LICENSEE * based upon the * amount of monies spent by LICENSOR and LICENSEE *. For clarity, the parties agree that this Section 8.2 shall in no way limit LICENSEE's obligations under Section 11.1.

* Portions of this Exhibit have been omitted and filed separately with the Securities and Exchange Commission pursuant to a request for confidential treatment.

8.3 LICENSEE shall have the right to settle any such claim, at its own expense and subject to LICENSOR's consent, which shall not be unreasonably withheld or delayed.

**9. ASSIGNMENT**

Except in connection with (i) the assignment of this AGREEMENT to an AFFILIATE, (ii) as part of a sale, regardless of whether such sale occurs through an asset sale, stock sale, merger or other combination, or any other transfer of LICENSEE'S entire business, or (iii) as contemplated in the transactions described in Section 5.2, LICENSEE may not assign this AGREEMENT without the prior written consent of LICENSOR, which will not be unreasonably withheld. Any assignment not complying with the requirements of this Section 9 is void *ab initio.* This AGREEMENT shall be binding upon any successors in interest of LICENSEE.

**10. PATENT MARKING**

LICENSEE must permanently and legibly mark all products, packaging and documentation manufactured or SOLD by it under this AGREEMENT with a patent notice as may be permitted or required under Title 35, United States Code.

**11. INDEMNIFICATION AND INSURANCE**

11.1 LICENSEE shall hold harmless, indemnify, and defend LICENSOR and any parent, subsidiary, or other affiliated entity of LICENSOR and their respective trustees, officers, directors, employees, scientists, students, successors, assigns, agents, and other representatives (collectively, the "LICENSOR INDEMNITEES") from and against all damages, liabilities, losses, and other expenses, including reasonable attorney's fees, expert witness fees, and costs incurred by the LICENSOR INDEMNITEES, with respect to any claims, demands, or causes of action whatsoever brought by a third party, whether or not a lawsuit or other proceeding is filed (collectively, "Claims"), arising out of or resulting from, (a) the exercise or practice of the license granted hereunder by LICENSEE and its SUBLICENSEES and AFFILIATES or their officers, employees, agents or representatives; (b) alleged defects or other problems with any of the LICENSED PRODUCTS, LICENSED PROCESSES, or manufactured, sold, distributed, or rendered by or on behalf of LICENSEE or any SUBLICENSEE, including without limitation any personal injuries, death or property damages related thereto, (c) the research, development, manufacture, use, marketing, advertising, distribution, sale or importation of any LICENSED PRODUCT, LICENSED PROCESS, by on or behalf of LICENSEE or any of its SUBLICENSEES, (d) the negligent or willful acts or omissions of LICENSEE or any of its SUBLICENSEES, (e) any allegations that LICENSED PRODUCTS, LICENSED PROCESSES, by or on behalf of LICENSEE or any SUBLICENSEE and/or any trademarks, service marks, logos, symbols, slogans, or other materials used in connection with or to market LICENSED PRODUCTS, LICENSED PROCESSES, violate or infringe upon the trademarks, service marks, trade dress, trade names, copyrights, patents, works of authorship, inventorship rights, trade secrets, database rights, rights under unfair competition laws, rights of publicity, privacy or defamation, or any other intellectual or industrial property right of any third party, (f) LICENSEE's or any AFFILIATE's or SUBLICENSEE's failure to comply with any applicable laws, rules or regulations, and/or (g) LICENSEE's or any AFFILIATE's or SUBLICENSEE's labeling, packaging or patent marking of any LICENSED PRODUCT or containers thereof by or on behalf of LICENSEE or any SUBLICENSEE. LICENSEE shall not enter into any settlement, stipulated judgment or similar arrangement with respect to such Claims that impose any obligation on LICENSOR INDEMNITEES, that does not unconditionally release LICENSOR INDEMNITEES from all liability or that would have an adverse effect on LICENSOR's reputation or business without LICENSOR's prior written consent. Notwithstanding the above, the LICENSOR INDEMNITEES, at their expense, shall have the right to retain separate independent counsel to assist in defending any such Claims. In the event LICENSEE fails to promptly indemnify and defend such Claims or pay LICENSOR INDEMNITEES' expenses as provided above, LICENSOR INDEMNITEES shall have the right, but not the obligation, to defend themselves, and in that case, LICENSEE shall reimburse LICENSOR INDEMNITEES for all their reasonable attorneys' fees, costs, and damages incurred in settling or defending such Claims within * of each of the LICENSOR INDEMNITEES' written requests. This indemnity shall be a direct payment obligation and not merely a reimbursement obligation of LICENSEE to LICENSOR INDEMNITEES.

* Portions of this Exhibit have been omitted and filed separately with the Securities and Exchange Commission pursuant to a request for confidential treatment.

11.2 Beginning at the time when any LICENSED PRODUCT, is being distributed or SOLD (including for the purpose of obtaining regulatory approvals) by LICENSEE or by a SUBLICENSEE, LICENSEE will, at its sole cost and expense, procure and maintain commercial general liability insurance in amounts not less than * per incident and * annual aggregate. During clinical trials involving any LICENSED PRODUCT, , LICENSEE shall, at its sole cost and expense, procure and maintain commercial general liability insurance in the same amounts and terms as specified above. LICENSEE's commercial general liability insurance shall provide coverage for clinical trial coverage, product liability, personal injury, broad form property damage, advertising injury, premises-operations, products and completed operations, and contractual liability coverage for LICENSEE's indemnity and other obligations under this AGREEMENT. LICENSEE will have the LICENSOR and LICENSOR INDEMNITEES named as additional insureds on any commercial general liability and product liability insurance policies maintained by LICENSEE, its AFFILIATES, and its SUBLICENSEES. Such commercial general liability insurance will provide (i) product liability coverage; (ii) broad form contractual liability coverage for LICENSEE'S indemnification under this AGREEMENT; and (iii) coverage for litigation costs.

11.3 LICENSEE will provide LICENSOR with written evidence of such insurance upon LICENSOR's request. LICENSEE will provide LICENSOR with written notice of at least 15 days prior to the cancellation, non-renewal or material change in such insurance.

11.4 LICENSEE will maintain such commercial general liability and product liability insurance beyond the expiration or termination of this AGREEMENT during (i) the period that any LICENSED PRODUCT developed pursuant to this AGREEMENT is being commercially distributed or SOLD by or on behalf of a LICENSEE or a SUBLICENSEE; and (ii) a reasonable period of time after the period described in sub-clause (i) above, which in no event shall be less than 10 years.

**12. USE OF NAME**

LICENSEE may not use the names of LICENSOR without express written consent from LICENSOR except as required by governmental law, rule or regulation. Such names include "The Scripps Research Institute," "Scripps," "TSRI," "Scripps Research," or any variation thereof.

**13. CONFIDENTIAL INFORMATION**

13.1 The parties agree that all information forwarded to one by the other for the purposes of this AGREEMENT (i) is to be received in strict confidence, (ii) is to be used only for the purposes of this AGREEMENT, and (iii) is not to be disclosed by the recipient party, its agents or employees without the prior written consent of the disclosing party, except to the extent that the recipient party can establish competent written proof that such information:

a. was in the public domain at the time of disclosure;

b. later became part of the public domain through no act or omission of the recipient party, its employees, agents, successors or assigns;

c. was lawfully disclosed to the recipient party by a third party having the right to disclose it;

d. was already known by the recipient party at the time of disclosure without any obligation of confidentiality, as evidenced by the recipient party's pre-existing written records;

e. was independently developed by the recipient party, as evidenced by the recipient party's pre-existing or contemporaneous written records; or

f. is required by law or regulation to be disclosed, provided however, that the disclosing party shall first give the recipient party written notice and adequate opportunity to object to such order for disclosure or to request confidential treatment.

* Portions of this Exhibit have been omitted and filed separately with the Securities and Exchange Commission pursuant to a request for confidential treatment.

13.2 Information shall not be deemed to be available to the public or to be in the recipient's possession merely because it:

a. includes information that falls within an area of general knowledge available to the public or to the recipient (i.e., it does not include the specific information provided by the other party); or

b. can be reconstructed in hindsight from a combination of information from multiple sources that are available to the public or to the recipient, if not one of those sources actually taught or suggested the entire combination, together with its meaning and importance.

13.3 Each party's obligation of confidence hereunder shall be fulfilled by using at least the same degree of care with the other party's confidential information as it uses to protect its own confidential information. This obligation shall exist while this AGREEMENT is in force and for *.

13.4 LICENSEE agrees that LICENSOR shall have the right to publish in accordance with its general policies and that this AGREEMENT shall not restrict, in any fashion, LICENSOR's right to publish.

13.5 Except as other required by law, no party shall originate or distribute any publication, news release, or other public announcement, written or oral, whether in the public press, stockholders' reports, or otherwise, relating to this AGREEMENT or to any sublicense hereunder, or to the performance hereunder or under any such sublicense agreements without the prior written consent of the other party, which consent shall not be unreasonably withheld. Scientific publications published in accordance with Section 13.4 of this AGREEMENT shall not be construed as publicity governed by this Section 13.5.

13.4 LICENSEE agrees that LICENSOR shall have the right to publish in accordance with its general policies and that this AGREEMENT shall not restrict, in any fashion, LICENSOR's right to publish.

13.5 Except as other required by law, no party shall originate or distribute any publication, news release, or other public announcement, written or oral, whether in the public press, stockholders' reports, or otherwise, relating to this AGREEMENT or to any sublicense hereunder, or to the performance hereunder or under any such sublicense agreements without the prior written consent of the other party, which consent shall not be unreasonably withheld. Scientific publications published in accordance with Section 13.4 of this AGREEMENT shall not be construed as publicity governed by this Section 13.5.

**14. PATENT ADMINISTRATION**

14.1 From and after the date of this AGREEMENT, the provisions of this Section 14.1 shall control the prosecution of any patent application and maintenance of any patent included within the PATENT RIGHTS. Subject to the requirements, limitations and conditions of this AGREEMENT, * and (b) *. * shall select the patent attorney, subject to * written approval, which approval shall not be unreasonably withheld. * shall have full rights of consultation with * and with the patent attorney so selected on all matters relating to the PATENT RIGHTS and * has the right to charge * fees for any time reviewing patent prosecution documents filed hereunder.

14.2 * shall (i) keep * informed as to the filing, prosecution and maintenance of patents and patent applications with the PATENT RIGHTS, (ii) furnish to * copies of documents relevant to any such filing, prosecution, and maintenance, and (iii) allow * reasonable opportunity to comment on documents filed with any patent office which would affect the PATENT RIGHTS or * interests thereunder.

* Portions of this Exhibit have been omitted and filed separately with the Securities and Exchange Commission pursuant to a request for confidential treatment.

14.3 * acknowledges and agrees that *, and that the license granted hereunder is in * as described herein. * shall pay for *. * agrees to pay all such expenses directly or to reimburse * for the payment of such expenses within * after * receives an itemized invoice from *.

14.4 In the event * elects to discontinue payment for the * within the PATENT RIGHTS, such patent application or patent shall be excluded from the definition of PATENT RIGHTS and from the scope of the license granted hereunder. * at least * days prior written notice of any such election.

**15. EXPORT CONTROL**

LICENSEE acknowledges that it is subject to and agrees to abide by the United States laws and regulations (including the Export Administration Act of 1979 and Arms Export Control Act) controlling the export of technical data, computer software, laboratory prototypes, biological material and other commodities. The transfer of such items may require a license from the cognizant agency of the GOVERNMENT or written assurances by LICENSEE that it shall not export such items to certain foreign countries without prior approval of such agency. LICENSEE hereby gives written assurance that it will comply with, and will cause its AFFILIATES and SUBLICENSEES to comply with, all United States export control laws and regulations, that it bears sole responsibility for any violation of such laws and regulations by itself or its AFFILIATES or SUBLICENSEES, and that it will indemnify and defend LICENSOR (in accordance with Section 11) for the consequences of any such violation. LICENSOR neither represents that a license is or is not required or that, if required, it shall be issued.

**16. ALTERNATE DISPUTE RESOLUTION**

16.1 Any controversy or claim arising out of or relating to this AGREEMENT, or the breach thereof, or the relationship or activities between the parties (other than patent disputes), shall be first referred to senior management of each party for resolution. If senior management fails to resolve such controversy or claim within 30 days, then such controversy or claim shall be submitted to mediation. The mediator shall be a retired judge or other neutral third party mutually selected by LICENSOR and LICENSEE who has at least ten years' experience in mediating or arbitrating cases in the biopharmaceutical industry and regarding the same or substantially similar subject matter as the dispute between LICENSOR and LICENSEE. If the parties are unable to agree on such mediator within 20 days after they exchange initial lists of potential mediators, a mediator with the same qualifications will be selected by the JAMS office in San Diego located at 401 B Street, San Diego, CA 92101 (after consultation with the parties).

a. The location of the mediation shall be in the county of San Diego, California. LICENSOR and LICENSEE hereby irrevocably submit to the exclusive jurisdiction and venue of the meditator mutually selected by the parties or to the neutral mediator selected by JAMS of San Diego for purposes of the mediation. In the event mediation is unsuccessful as provided in subclause (b) or (c) below, the parties hereby irrevocably submit to the exclusive jurisdiction and venue of the federal and state courts located in San Diego County, California for any action or proceeding regarding this AGREEMENT.

b. If the dispute is not resolved through mediation, either party may refer the dispute to a court of competent jurisdiction in San Diego County, California.

c. Prior to or while a mediation proceeding is pending, either party has the right to seek and obtain injunctive and other equitable relief from a court of competent jurisdiction to enforce that party's rights hereunder.

* Portions of this Exhibit have been omitted and filed separately with the Securities and Exchange Commission pursuant to a request for confidential treatment.

**17. GENERAL**

17.1 This AGREEMENT constitutes the entire and only agreement between the parties for PATENT RIGHTS and all other prior negotiations, representations, agreements, and understandings are hereby superseded. No agreements altering or supplementing these terms may be made except by a written document signed by both parties.

17.2 Any payments required by this AGREEMENT to be paid to LICENSOR must be payable to The Scripps Research Institute and sent to:

The Scripps Research Institute
*
*
*

17.3 Any notice required by this AGREEMENT must be given by email or confirmed by personal delivery (including delivery by reputable messenger services such as Federal Express) or by prepaid, first class, certified mail, return receipt requested, addressed in the case of LICENSOR to:

The Scripps Research Institute
*
*
*

or in the case of LICENSEE to:

OPKO Pharmaceuticals, LLC
4400 Biscayne Blvd.
Miami, Florida 33137
ATTENTION: Legal Department
Fax: (305) 575-4140

or other addresses as may be given from time to time under the terms of this notice provision.

17.4 LICENSEE must comply with all applicable national, state and local laws and regulations in connection with its activities pursuant to this AGREEMENT. In addition, LICENSOR requires that all of its suppliers, licensees, partners, subcontractors, distributors, consultants, agents and other parties with whom LICENSOR does business to act at all times in a professional and ethical manner in carrying out their obligations, services, and contractual obligations. To that end, the LICENSEE, any LICENSEE AFFILIATE, and any SUBLICENSEE shall comply with all country, federal, state and local anti-bribery laws, ordinances, codes, regulations, rules, policies and procedures, including, but not limited to, the U.S. Foreign Corrupt Practices Act.

17.5 Failure of any party to enforce a right under this AGREEMENT or at law or in equity will not act as a waiver of that right, unless such waiver is in writing and signed by the waiving party.

* Portions of this Exhibit have been omitted and filed separately with the Securities and Exchange Commission pursuant to a request for confidential treatment.

17.6 Headings are included herein for convenience only and shall not be used to construe this AGREEMENT.

17.7 If any part of this AGREEMENT is for any reason found to be unenforceable, all other parts nevertheless remain enforceable, and the stricken provision shall be revised in a manner that best reflects the original intent of the parties.

17.8 Neither party shall be held liable or responsible to the other party nor be deemed to have defaulted under or breached this AGREEMENT for failure or delay in fulfilling or performing any term of this AGREEMENT when such failure or delay is caused by or results from causes beyond the reasonable control of the affected party, including, without limitation, fire, floods, earthquakes, natural disasters, embargoes, war, acts of war (whether war is declared or not), insurrections, riots, civil commotions, strikes, lockouts or other labor disturbances, or acts, omissions or delays in acting by any governmental authority.

17.9 In the event of a dispute between the parties or any default hereunder, the party prevailing in the resolution of such dispute or default shall be entitled to recover its reasonable attorneys' fees and other costs incurred in connection with resolving such dispute or default in addition to any other relief to which it is entitled.

**IN WITNESS WHEREOF**, the parties hereto have caused their duly authorized representatives to execute this AGREEMENT.

**The Scripps Research Institute**

By /s/ Matthew Tremblay
Matthew Tremblay
Chief Operating Officer

Date 2/26/19

**OPKO Pharmaceuticals, LLC**

By /s/ Steven D. Rubin
Steven D. Rubin
Executive Vice President

Date 2/25/19

**EXHIBIT A**

**PATENT RIGHTS**

PCT Application filed on October 4, 2018 entitled ARTICLES AND METHODS DIRECTED TO PERSONALIZED THERAPY OF CANCER and priority applications of the same title having Russian Application No. 2017134483 filed October 4, 2017; Russian Application No. 2018112009 filed April 4, 2018 and Russian Application No. 2018134321 filed October 1, 2018 and all applications claiming priority to such filings.

**EXHIBIT B**

**Lock-Up Agreement**

Xenetic Biosciences, Inc.
40 Speen Street, Suite 102
Framingham, MA 01701
Attn: Jeffrey F. Eisenberg, Chief Executive Officer

Ladies and Gentlemen:

The Scripps Research Institute, a California, nonprofit public benefit corporation, whose address is 10550 North Torrey Pines Road, La Jolla, California 92037 ("Scripps") understands that as an inducement to Xenetic Biosciences, Inc. (the "**Buyer**") to enter into that certain Share Purchase Agreement dated as of February [•], 2019, by and among Buyer, Hesperix SA, a Swiss corporation (the "**Company**"), the owners of the Company parties thereto (the "**Sellers**"), and Alexey Andreevich Vinogradov, as the representative of the Sellers and the transactions contemplated thereby, Scripps hereby enters into this lock-up agreement (this "**Lock-Up Agreement**") and agrees that Scripps will not, during the period commencing on the date hereof and ending one hundred eighty (180) days after the date hereof (the "**Lock-Up Period**"), (1) offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, lend, or otherwise transfer or dispose of, directly or indirectly, any shares of capital stock of Buyer or any securities convertible into or exercisable or exchangeable for shares of capital stock of Buyer, whether now owned or hereafter acquired by the undersigned or with respect to which the undersigned has or hereafter acquires the power of disposition (collectively, the "**Lock-Up Securities**"); (2) enter into any swap or other arrangement that transfers to another, in whole or in part, any of the economic consequences of ownership of Lock-Up Securities, whether any such transaction is to be settled by delivery of shares of Lock-Up Securities, in cash or otherwise; (3) make any demand for or exercise any right with respect to the registration of any Lock-Up Securities; or (4) publicly disclose the intention to make any offer, sale, pledge or disposition, or to enter into any transaction, swap, hedge or other arrangement relating to any Lock-Up Securities. Notwithstanding the foregoing, and subject to the conditions below, the undersigned may transfer Lock-Up Securities as a *bona fide* gift, by will or intestacy, or to a family member or trust for the benefit of a family member (for purposes of this Lock-Up Agreement, "family member" means any relationship by blood, marriage or adoption, not more remote than first cousin) or as a *bona fide* gift to a charity or educational institution;*provided* that in the case of any such transfer pursuant to the foregoing, (i) any such transfer shall not involve a disposition for value, (ii) each transferee shall sign and deliver to Buyer a lock-up agreement substantially in the form of this Lock-Up Agreement, and (iii) no filing under Section 16(a) of the Exchange Act shall be required or shall be voluntarily made, except for a Form 5. Scripps also agrees and consents to the entry of stop transfer instructions with Buyer's transfer agent and registrar against the transfer of the undersigned's Lock-Up Securities, except in compliance with this Lock-Up Agreement.

Scripps understands that this Lock-Up Agreement is irrevocable and shall be binding upon Scripps' legal representatives, successors, and assigns.

Very truly yours,

**The Scripps Research Institute**

By:_____
[Name]

Its:_____
[Title]

**EXHIBIT C**

**Royalty Report**

Period: / / through / /

Licensee:_____ Agreement #:

| **Country** | **Quantity Produced** | **Gross Sales ($)** | ***Less Allowances** | **Net Sales ($)** | **Royalty Rate** | **Conversion Rate (if applicable)** | **Royalties Due this period(US$)** |
|---|---|---|---|---|---|---|---|
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| Sublicensees: | | | | | | | |
| _____ | | | | | | | |
| _____ | | | | | | | |

Subtotal:_____
Less Advanced Royalty Balance (if any):_____
TOTAL ROYALTIES DUE THIS PERIOD:_____

* Please indicate in the following space the specific types of deductions and the corresponding amounts used to calculate Allowances:_____
_____

Prepared by -- Name:_____
Title:_____
Date:_____

Mail completed report and royalty payment (make checks payable to: The Scripps Research Institute)

[---------]
ATTENTION: [----------]

**APPENDIX E**

January 10, 2019

Strategic Alternatives Committee
do the Board of Directors
Xenetic Biosciences, Inc.
99 Hayden Ave., Ste. 230
Lexington, MA 02421
Ladies and Gentlemen:

You have requested our opinion (the "Opinion"), as investment bankers, as to the fairness from a financial point of view to the holders of the outstanding shares of Xenetic Biosciences, Inc. ("Xenetic" or the "Company") of consideration valued at $15 million which amount was agreed to by Parties (as defined below) to be paid to the shareholders of Hesperix SA ("Hesperix" or the "Target") in the proposed acquisition of all common stocks of Hesperix by Xenetic (the "Transaction") (hereafter Hesperix and Xenetic are collectively referred to herein as the "Parties"). The aggregate purchase price is derived from a previously agreed upon price per share of $2.00 multiplied by the number of shares to be issued to Hesperix shareholders (the "Consideration"). At the closing of the Transaction, Xenetic will issue Seven Million Five Hundred Thousand (7,500,000) shares of common stock to holders of Hesperix common stock. The terms and conditions of the Transaction are set forth in a form of share purchase agreement to be entered into between Hesperix, its principals and Xenetic, which form has been provided to Maxim by Xenetic (the "Share Purchase Agreement"). Pursuant to the Share Purchase Agreement: Xenetic will acquire all common stock held by Hesperix shareholders for the value assigned to the Consideration. The Opinion is based upon, among the other matters addressed herein, the parameters, assumptions and calculations set forth in the materials attached hereto as Exhibit A (the "Materials"). The Opinion is also subject to the following assumptions, conditions, qualifications, notices and disclaimers.

Maxim Group LLC ("Maxim") provides a multitude of financial services including investment banking; private wealth management; and global institutional equity, fixed-income and derivatives sales and trading as well as equity research. Maxim and its affiliates, or other related entities or individuals, may at any time purchase, sell, hold or vote long or short positions and investments in securities, derivatives, loans, commodities, currencies, credit default swaps and other financial instruments of the Company, and any of their respective affiliates and third parties, or any currency or commodity that may be involved in the Transaction. Maxim will receive a fee from the Company for acting as the financial advisor to Xenetic and for delivering the Opinion as well as reimbursement of certain expenses. Maxim may also receive an additional fee from the Company relating to a subsequent financing that the Company may consummate after the execution of a definitive agreement between the Parties. The closing of the Transaction is conditioned upon this subsequent financing. Maxim's fee for issuing the Opinion will be due in its entirety upon the delivery of the Opinion, irrespective of whether the Transaction is completed. The Company has agreed to indemnify Maxim against certain liabilities, and to reimburse it for certain liabilities in connection with Maxim providing the Opinion. No controlling person of Maxim is directly personally receiving compensation or other remuneration from any of the Parties.

In connection with the Opinion, we have reviewed, including but not limited to, the following information/documents: the Share Purchase Agreement, and certain internal financial analyses and forecasts for Hesperix prepared by Xenetic management and Hesperix management, as approved for our use by the Company as the case may be (the "Forecasts"). We reviewed the publicly-traded comparable companies of Hesperix; reviewed the financial terms of certain recently closed venture capital investments, strategic transactions, business combinations, and acquisitions within the Biotechnology industry. In rendering the Opinion, we have assumed that the definitive Share Purchase Agreement will not differ materially from the draft that we reviewed, and that there will be no change to the contemplated structure of the Transaction by the Parties. We have also assumed, with your permission , that each share of common stock of the Company issued to the shareholders of the Target as the Consideration, is valued at two dollars per share, notwithstanding the historical prices of the common stock or the price that such common stock is being traded on the NASDAQ Stock Exchange on the date of the Opinion or the date of the closing of the Transaction.

In order to render this Opinion, we have relied upon and assumed, without assuming any responsibility for independent verification, the accuracy and completeness of all the financial, legal, regulatory, tax, accounting and other documentation and information provided to, discussed with, or reviewed by us and have, with your consent, relied on such information as being complete and accurate in all material respects, including any documentation and information originally produced by the Parties and provided by the Company to Maxim.

In that regard, we have assumed with Xenetic's consent that the Forecasts have been reasonably prepared on a basis reflecting the best currently available estimates and judgments of the management of the Xenetic and Hesperix the and those financial projections produced by both Xenetic and Hesperix and provided by Xenetic to Maxim. We have assumed that there were no material changes in the assets, liabilities, financial condition, results of operations, reserves, business operations since the date of the financial statements referenced herein. Moreover, it is understood that the Forecasts are based on numerous variables and assumptions that are inherently uncertain, including without limitation, factors related to general economic, market and competitive conditions. Accordingly, actual results could vary significantly from those set forth in such Forecasts, and as noted previously, Maxim has relied on these Forecasts without independent verification or analyses and does not in any respect assume any responsibility for the accuracy or completeness thereof. We have not made an independent evaluation or appraisal of the assets and liabilities (including any joint ventures, contingent, derivative or other off-balance-sheet assets and liabilities) of the Company or any of its subsidiaries, the Target or any of its subsidiaries, joint ventures and we have not been furnished with any such evaluation or appraisal. We have assumed that all governmental, regulatory or other consents and approvals necessary for the consummation of the Transaction (including shareholder approval) will be obtained without any adverse effect on the expected benefits of the Transaction in any way meaningful to our analysis. We are not actuaries and our services did not include any actuarial determination or evaluation by us or any attempt to evaluate actuarial assumptions, and we have relied on the Company with respect to the appropriateness and adequacy of reserves of the Company and actuarial assumptions used by the Company in connection with the Forecasts. In that regard, we have made no analysis of, and express no opinion as to, the appropriateness or adequacy of reserves or actuarial assumptions. Maxim has relied upon assurances by the Parties that they are unaware of any facts that would make their respective information incomplete or misleading. Maxim has no obligation to update or modify the Opinion.

Our Opinion does not address the underlying business decision of Xenetic or the Target to engage in the Transaction, or the relative merits of the Transaction as compared to any strategic alternatives that may be available to Xenetic; nor does it address any legal, regulatory, tax or accounting matters. This Opinion addresses only the fairness from a financial point of the Transaction to the holders of outstanding shares of Xenetic, as of the date hereof as described below. We do not express any view on, and our Opinion does not address, any other term or aspect of the Share Purchase Agreement or Transaction or any term or aspect of any other agreement or instrument contemplated by the Share Purchase Agreement or entered into or amended in connection with the Transaction, nor as to the fairness of the amount or nature of any compensation to be paid or payable to any of the officers, directors, or employees of the Target or class of such persons, in connection with the Transaction. Our Opinion is necessarily based on the economic, monetary, market and other conditions as in effect on, and the information made available to us as of, the date hereof and we assume no responsibility for updating, revising or reaffirming this Opinion based on circumstances, developments or events occurring after the date hereof. Our Opinion does not compare the relative merits of the Transaction with any other alternative transaction or business strategy which may have been available to or considered by the Special Committee, Xenetic or its Board, or address the underlying business decision of the Special Committee, Xenetic or its Board to proceed with the Transaction. Maxim was not requested to, and did not, explore alternatives to the Transaction or solicit interest of any other parties in pursuing transactions with Xenetic.

The Opinion has been prepared exclusively for the use of the Special Committee of the Board of Directors of Xenetic in its deliberation of the Transaction and may not be used for any other purpose including any filings or reports filed with the Securities and Exchange Commission without our prior written consent, except unless required to be produced pursuant to a valid legal or regulatory request. The Opinion has not been prepared for Xenetic or its shareholders, nor will it grant them any rights or remedies. The Opinion does not constitute a recommendation as to how the Special Committee, Board or any holder of securities should vote with respect to such Transaction or any other matter if a vote is required. This Opinion has been approved by a committee of Maxim investment banking and other professionals in accordance with our customary practice. This opinion does not cover the fairness to Target shareholders who may have received its own opinion.

Based upon and subject to the forgoing, it is our opinion that, as of the date hereof, the Consideration being paid to Hesperix in accordance with the Merger Agreement is fair from a financial point of view to Xenetic Biosciences and its stockholders.

Yours truly,

MAXIM GROUP LLC

By: /s/ Jim Alfaro
Name: Jim Alfaro
Title: Senior Managing Director, Investment Banking

By: /s/ Chris Avery
Name: Chris Avery
Title: Managing Director Investment Banking

By: /s/ Clifford A. Teller
Name: Clifford A. Teller
Title: Executive Managing Director, Investment Banking

## PART II

## INFORMATION NOT REQUIRED IN PROXY STATEMENT

### Item 20. Indemnification of Directors and Officers

Nevada law provides that a Nevada corporation may indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed proceeding, except an action by or in the right of the corporation, by reason of the fact that such person is or was a director, officer, employee or agent of the corporation, or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation or other enterprise, against expenses, including attorneys' fees, judgments, fines and amounts paid in settlement actually and reasonably incurred by such person in connection with the proceeding, if such person:

- is not liable for breach of his or her fiduciary duties to the corporation; or
- acted in good faith and in a manner which he or she reasonably believed to be in or not opposed to the best interests of the corporation, and, with respect to any criminal action or proceeding, had no reasonable cause to believe his or her conduct was unlawful.

In addition, a Nevada corporation may indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action by or in the right of the corporation to procure a judgment in its favor by reason of the fact that such person is or was a director, officer, employee or agent of the corporation, or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation or other enterprise against expenses, including amounts paid in settlement and attorneys' fees actually and reasonably incurred by such person in connection with the defense or settlement of the action, if he or she:

- is not liable for breach of his or her fiduciary duties to the corporation; or
- acted in good faith and in a manner which he or she reasonably believed to be in or not opposed to the best interests of the corporation.

Under Nevada law, indemnification may not be made for any claim as to which such a person has been adjudged by a court of competent jurisdiction, after exhaustion of all appeals therefrom, to be liable to the corporation or for amounts paid in settlement to the corporation, unless and only to the extent that a court of competent jurisdiction determines that in view of all the circumstances of the case, the person is fairly and reasonably entitled to indemnity for such expenses as the court deems proper.

To the extent that a director, officer, employee or agent of a corporation has been successful on the merits or otherwise in defense of any non-derivative proceeding or any derivative proceeding, or in defense of any claim, issue or matter therein, the corporation shall indemnify such person against expenses, including attorneys' fees, actually and reasonably incurred in connection with the defense.

Further, Nevada law permits a Nevada corporation to purchase and maintain insurance or to make other financial arrangements on behalf of any person who is or was a director, officer, employee or agent of the corporation, or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation or other enterprise for any liability asserted against him or her and liability and expenses incurred by him or her in his or her capacity as a director, officer, employee or agent, or arising out of his or her status as such, whether or not the corporation has the authority to indemnify such person against such liability and expenses.

Under our charter and bylaws, we are obligated to indemnify any director, officer, employee or agent of the company to the fullest extent permitted by the NRS, as described above. We have entered into separate indemnification agreements with our directors and executive officers, in addition to the indemnification provided for in our charter and bylaws. These agreements, among other things, require us to indemnify our directors and executive officers who have met the standards of conduct that make it permissible under the NRS for us to indemnify the claimant for certain expenses, including attorneys' fees, judgments, fines and settlement amounts incurred by such person in any action or proceeding arising out of their services as one of our directors, officers, employees or agents, or any of our subsidiaries or any other company or enterprise to which the person provides services at our request. We believe that these charter and bylaw provisions and indemnification agreements are necessary to attract and retain qualified persons as directors.

In addition, indemnification is required to continue as to a person who has ceased to be a director or officer and inures to the benefit of his or her heirs, executors and administrators. Subject to the exceptions detailed below, we may indemnify a person seeking indemnification in connection with a proceeding (or part thereof) initiated by the person seeking indemnification only if the proceeding (or part thereof) was authorized by our board of directors. We may indemnify any employee or agent of us to an extent greater than required by law only if and to the extent that our directors, in their discretion, may determine.

If we do not pay a claim for indemnification within 60 days after a written claim has been received by us or pay an advancement of expenses under our bylaws in full within 20 days after a written claim has been received by us, the claimant may bring suit against us to recover the unpaid amount of the claim and, if successful in whole or in part, the claimant also will be entitled to be paid the expense of prosecuting such claim to the fullest extent permitted by applicable law. In any such action, we would have the burden of proving that the claimant is not entitled to the requested indemnification or advancement of expenses.

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to our directors, officers and controlling persons pursuant to the foregoing provisions, or otherwise, we have been advised that in the opinion of the SEC this indemnification is against public policy as expressed in the Securities Act and is therefore unenforceable.

**Item 21. Exhibits and Financial Statement Schedules**

(a) See Exhibit Index

(b) Financial Statement Schedules

All schedules are omitted because they are not applicable or not required, or because the required information is shown either in the consolidated financial statements or in the notes thereto included with this registration statement on Form S-4.

(c) Opinions

The opinion of Maxim Group LLC, financial advisor to the Xenetic board of directors, is attached as Appendix E to the proxy statement/prospectus that forms a part of this registration statement.

A list of exhibits filed with this registration statement on Form S-4 is set forth on the Exhibit Index below and is incorporated herein by reference.

| Exhibit Number | Description |
|---|---|
| 2.1 | Share Purchase Agreement (Incorporated by reference to Exhibit 2.1 in the Company's Current Report on Form 8-K, filed on March 4, 2019). **† |
| 3.1 | Articles of Incorporation (Incorporated by reference to Exhibit 3.1 in the Company's Registration Statement on Form S-1, filed on November 21, 2011). |
| 3.2 | Certificate of Amendment to Articles of Incorporation (Incorporated by reference to Exhibit 3.1 in the Company's Current Report on Form 8-K, filed on February 12, 2013). |
| 3.3 | Certificate of Amendment to Articles of Incorporation (Incorporated by reference to Exhibit 3.1 in the Company's Current Report on Form 8-K, filed on February 27, 2013). |
| 3.4 | Certificate of Amendment to Articles of Incorporation (Incorporated by reference to Exhibit 3.1 in the Company's Quarterly Report on Form 10-Q, filed on January 10, 2014). |
| 3.5 | Certificate of Change Pursuant to NRS 78.209 (Incorporated by reference to Exhibit 3.2 in the Company's Quarterly Report on Form 10-Q, filed on January 10, 2014). |
| 3.6 | Certificate of Amendment to Articles of Incorporation (Incorporated by reference to Exhibit 3.1 in the Company's Current Report on Form 8-K, filed on September 30, 2015). |
| 3.7 | Amended and Restated Bylaws (Incorporated by reference to Exhibit 3.1 in the Company's Current Report on Form 8-K, filed on February 27, 2017). |
| 3.8 | Form of Amended and Restated Certificate of Designation of Preferences, Rights and Limitations of Series A Preferred Stock (Incorporated by reference to Exhibit 3.8 in the Company's Registration Statement on Form S-1/A, filed on October 27, 2016). |
| 3.9 | Second Amended and Restated Certificate of Designation of Preferences, Rights and Limitations of Series B Preferred Stock (Incorporated by reference to Exhibit 3.9 in the Company's Registration Statement on Form S-1/A, filed on October 31, 2016). |
| 4.1 | Form of Common Stock Certificate of the Registrant (Incorporated by reference to Exhibit 4.1 in the Company's Registration Statement on Form S-1/A, filed on July 14, 2016). |
| 4.2 | Xenetic Biosciences, Inc. Shareholder Voting Agreement dated October 26, 2016 between Xenetic Biosciences Inc. and SynBio, LLC(Incorporated by reference to Exhibit 4.2 in the Company's Registration Statement on Form S-1/A, filed on October 27, 2016). |
| 4.3 | SynBio LLC Warrant to Purchase Common Stock of Xenetic Bioscience, Incorporated(Incorporated by reference to Exhibit 10.2 in the Company's Annual Report on Form 10-K, filed on April 15, 2015). |
| 4.4 | Serum Institute of India Limited Warrant to Purchase Common Stock of Xenetic Bioscience, Incorporated(Incorporated by reference to Exhibit 10.03 in the Company's Annual Report on Form 10-K, filed on April 15, 2015). |

| Exhibit Number | Description |
|---|---|
| 4.5 | Firdaus Jal Dastoor Warrant to Purchase Common Stock of Xenetic Bioscience, Incorporated(Incorporated by reference to Exhibit 10.04 in the Company's Annual Report on Form 10-K, filed on April 15, 2015). |
| 4.6 | Form of Common Stock Purchase Warrant (Incorporated by reference to Exhibit 10.3 in the Company's Current Report on Form 8-K, filed on November 16, 2015). |
| 4.7 | Form of Common Stock Purchase Warrant (Incorporated by reference to Exhibit 10.4 in the Company's Current Report on Form 8-K, filed on November 16, 2015). |
| 4.8 | Form of Amended and Restated Common Stock Purchase Warrant (Incorporated by reference to Exhibit 10.6 in the Company's Current Report on Form 8-K, filed on November 16, 2015). |
| 4.9 | Form of Common Stock Purchase Warrant (Incorporated by reference to Exhibit 10.3 in the Company's Current Report on Form 8-K, filed on July 8, 2016). |
| 4.10 | Form of Common Stock Purchase Warrant (Incorporated by reference to Exhibit 10.53 in the Company's Registration Statement on Form S-1/A, filed on October 31, 2016). |
| 4.11 | Form of Ten Percent (10%) Senior Secured Convertible Promissory Note(Incorporated by reference to Exhibit 10.2 in the Company's Current Report on Form 8-K, filed on November 16, 2015). |
| 4.12 | Form of Ten Percent (10%) Junior Secured Convertible Promissory Note – Due Deferral End Date(Incorporated by reference to Exhibit 10.2 in the Company's Current Report on Form 8-K, filed on July 8, 2016). |
| 4.13 | Form of Amended and Restated Ten Percent (10%) Senior Secured Convertible Promissory Note(Incorporated by reference to Exhibit 10.5 in the Company's Current Report on Form 8-K, filed on November 16, 2015). |
| 4.14 | Registration Rights Agreement, dated July 1, 2015, between Xenetic Bioscience, Inc. and OJSC Pharmsynthez(Incorporated by reference to Exhibit 10.3 in the Company's Current Report on Form 8-K, filed on July 8, 2015). |
| 4.15 | Form of First Amendment to Registration Rights Agreement (Incorporated by reference to Exhibit 10.8 in the Company's Current Report on Form 8-K, filed on November 16, 2015). |
| 4.16 | Form of Pre-Funded Warrant (Incorporated by reference to Exhibit 4.1 in the Company's Current Report on Form 8-K, filed on March 7, 2019). |
| 4.17 | Form of Purchase Warrant (Incorporated by reference to Exhibit 4.2 in the Company's Current Report on Form 8-K, filed on March 7, 2019). |
| 5.1 | Opinion of Akerman LLP* |
| 10.1 | OPKO Assignment Agreement (Incorporated by reference to Exhibit 10.1 in the Company's Current Report on Form 8-K, filed on March 4, 2019). † |
| 10.2 | Voting Agreement - Pharmsynthez (Incorporated by reference to Exhibit 10.2 in the Company's Current Report on Form 8-K, filed on March 4, 2019). |
| 10.3 | Voting Agreement – OPKO (Incorporated by reference to Exhibit 10.3 in the Company's Current Report on Form 8-K, filed on March 4, 2019). |
| 10.4 | Voting Agreement – Dr. Genkin (Incorporated by reference to Exhibit 10.4 in the Company's Current Report on Form 8-K, filed on March 4, 2019). |
| 10.5 | Form of Securities Purchase Agreement (Incorporated by reference to Exhibit 10.1 in the Company's Current Report on Form 8-K, filed on March 7, 2019). |
| 21.1 | Subsidiaries |
| 23.1 | Consent of Marcum LLP |
| 23.2 | Consent of Akerman LLP (Included in Exhibit 5.1)* |
| 24.1 | Power of Attorney (contained on signature page) |
| 99.1 | Consent of Maxim Group LLC, financial advisor to Xenetic Biosciences, Inc. |
| 101.INS | XBRL Instance Document. |
| 101.SCH | XBRL Taxonomy Extension Schema Document. |
| 101.CAL | XBRL Taxonomy Extension Calculation Linkbase Document. |
| 101.DEF | XBRL Taxonomy Extension Definition Linkbase Document. |
| 101.LAB | XBRL Taxonomy Extension Label Linkbase Document. |
| 101.PRE | XRBL Taxonomy Extension Presentation Linkbase Document. |

* To be filed by Amendment

** Schedules and similar attachments to the Share Purchase Agreement, dated as of March 1, 2019, have been omitted pursuant to Item 601(b)(2) of Regulation S-K. The registrant hereby undertakes to furnish on a supplemental basis a copy of any omitted schedules and similar attachments to the Securities and Exchange Commission upon request.

† Certain portions of the exhibit have been omitted pursuant to a confidential treatment request. Omitted information has been filed separately with the SEC.

**Item 22. Undertakings**

(a) The undersigned registrant hereby undertakes

(1) To file, during any period in which offers or sales are being made, a post-effective amendment to this registration statement:

(i) To include any prospectus required by section 10(a)(3) of the Securities Act of 1933;

(ii) To reflect in the prospectus any facts or events arising after the effective date of this registration statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in this registration statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the Commission pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than 20% change in the maximum aggregate offering price set forth in the "Calculation of Registration Fee" table in the effective registration statement;

(iii) To include any material information with respect to the plan of distribution not previously disclosed in this registration statement or any material change to such information in this registration statement;

(2) That, for the purpose of determining any liability under the Securities Act of 1933, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

(3) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.

(4) That, for the purpose of determining liability under the Securities Act of 1933, to any purchaser: if the registrant is subject to Rule 430C, each prospectus filed pursuant to Rule 424(b) as part of a registration statement relating to an offering, other than registration statements relying on Rule 430B or other than prospectuses filed in reliance on Rule 430A, shall be deemed to be part of and included in the registration statement as of the date it is first used after effectiveness. Provided, however, that no statement made in a registration statement or prospectus that is part of the registration statement or made in a document incorporated or deemed incorporated by reference into the registration statement or prospectus that is part of the registration statement will, as to a purchaser with a time of contract of sale prior to such first use, supersede or modify any statement that was made in the registration statement or prospectus that was part of the registration statement or made in any such document immediately prior to such date of first use.

(5) That, for the purpose of determining liability of the registrant under the Securities Act of 1933 to any purchaser in the initial distribution of the securities, the undersigned registrant undertakes that in a primary offering of securities of the undersigned registrant pursuant to this registration statement, regardless of the underwriting method used to sell the securities to the purchaser, if the securities are offered or sold to such purchaser by means of any of the following communications, the undersigned registrant will be a seller to the purchaser and will be considered to offer or sell such securities to such purchaser:

(i) Any preliminary prospectus or prospectus of the undersigned registrant relating to the offering required to be filed pursuant to Rule 424;

(ii) Any free writing prospectus relating to the offering prepared by or on behalf of the undersigned registrant or used or referred to by the undersigned registrant;

(iii) The portion of any other free writing prospectus relating to the offering containing material information about the undersigned registrant or its securities provided by or on behalf of the undersigned registrant; and

(iv) Any other communication that is an offer in the offering made by the undersigned registrant to the purchaser.

(b) The undersigned registrant hereby undertakes as follows:

(1) That, prior to any public reoffering of the securities registered hereunder through use of a prospectus which is a part of this registration statement, by any person or party who is deemed to be an underwriter within the meaning of Rule 145(c), the issuer undertakes that such reoffering prospectus will contain the information called for by the applicable registration form with respect to reofferings by persons who may be deemed underwriters, in addition to the information called for by the other items of the applicable form.

(2) That, every prospectus (i) that is filed pursuant to paragraph (c)(1) immediately preceding, or (ii) that purports to meet the requirements of Section 10(a)(3) of the Securities Act and is used in connection with an offering of securities subject to Rule 415, will be filed as a part of an amendment to the registration statement and will not be used until such amendment is effective, and that, for purposes of determining any liability under the Securities Act, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

(c) Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Securities Act and will be governed by the final adjudication of such issue.

(d) The undersigned registrant hereby undertakes to respond to requests for information that is incorporated by reference into this prospectus pursuant to Item 4, 10(b), 11, or 13 of this Form, within one business day of receipt of such request, and to send the incorporated documents by first class mail or other equally prompt means. This includes information contained in documents filed subsequent to the effective date of the registration statement through the date of responding to the request.

(e) The undersigned registrant hereby undertakes to supply by means of a post-effective amendment all information concerning a transaction, and the company being acquired involved therein, that was not the subject of and included in the registration statement when it became effective.

**SIGNATURES**

Pursuant to the requirements of the Securities Act of 1933, the Registrant has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Framingham, Commonwealth of Massachusetts, as of this 29th day of March, 2019.

**XENETIC BIOSCIENCES, INC.**

By:/s/ Jeffrey F. Eisenberg
Name: Jeffrey F. Eisenberg
Title: Chief Executive Officer

**POWER OF ATTORNEY**

KNOW ALL MEN BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Jeffrey F. Eisenberg and James F. Parslow acting singly, his true and lawful attorney-in-fact and agent, with full power of substitution and resubstitution for him and in his name, place and stead, in any and all capacities to sign any and all amendments including post-effective amendments to this registration statement, and any additional related registration statement filed pursuant to Rule 462(b) under the Securities Act of 1933, as amended (including post-effective amendments to this registration statement and any such related registration statements), and to file the same, with all exhibits thereto, and any other documents in connection therewith, granting unto said attorney-in-fact and agent full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorney-in-fact and agent, or his substitute, may lawfully do or cause to be done by virtue thereof.

Pursuant to the requirements of the Securities Act of 1933, as amended, this registration statement has been signed by the following persons in the capacities and on the dates indicated.

| Signature | Title | Date |
|---|---|---|
| /s/ Jeffrey F. Eisenberg<br>Jeffrey F. Eisenberg | Chief Executive Officer<br>(Principal Executive Officer) | March 29, 2019 |
| /s/ James Parslow<br>James Parslow | Chief Financial Officer<br>(Principal Financial Officer and Principal Accounting Officer) | March 29, 2019 |
| /s/ James Callaway<br>James Callaway | Director | March 29, 2019 |
| /s/ Firdaus Jal Dastoor FCS<br>Firdaus Jal Dastoor FCS | Director | March 29, 2019 |
| /s/ Dmitry Genkin<br>Dmitry Genkin | Director | March 29, 2019 |
| /s/ Roman Knyazev<br>Roman Knyazev | Director | March 29, 2019 |
| /s/ Roger Kornberg<br>Roger Kornberg | Director | March 29, 2019 |
| /s/ Adam Logal<br>Adam Logal | Director | March 29, 2019 |

Exhibit 21

**SUBSIDIARIES OF REGISTRANT**

| **Subsidiary** | **Country / State of Incorporation** |
|---|---|
| Xenetic Biosciences (UK), Ltd. | United Kingdom registered company |
| Lipoxen Technologies, Ltd. | United Kingdom registered company |
| Xenetic Bioscience, Inc. | Delaware |
| SymbioTec, GmbH | German Registered Company |

Exhibit 23.1

INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM'S CONSENT

We consent to the inclusion in this Registration Statement of Xenetic Biosciences, Inc. on Form S-4 of our report dated March, 29, 2019, which includes an explanatory paragraph as to the Company's ability to continue as a going concern, with respect to our audits of the consolidated financial statements of Xenetic Biosciences, Inc. as of December 31, 2018 and 2017 and for each of the two years in the period ended December 31, 2018, which report appears in the Proxy Statement/Prospectus, which is part of this Registration Statement. We also consent to the reference to our Firm under the heading "Experts" in such Proxy Statement/Prospectus.

/s/ Marcum LLP

Marcum LLP
Boston, MA
March 29, 2019

Exhibit 99.1

**CONSENT OF MAXIM GROUP LLC**

We hereby consent to the use of our opinion letter dated January 10, 2019 to the Strategic Alternatives Committee of the Board of Directors of Xenetic Biosciences, Inc. ("Xenetic") included as Appendix E to the Proxy Statement/Prospectus which forms a part of the Registration Statement on Form S-4 relating to the proposed acquisition of all common stocks of Hesperix SA, and references to such opinion in such Proxy Statement/Prospectus. In giving such consent, we do not admit that we come within the category of persons whose consent is required under Section 7 of the Securities Act of 1933, as amended, or the rules and regulations of the Securities and Exchange Commission thereunder, nor do we thereby admit that we are experts with respect to any part of such Registration Statement within the meaning of the term "Experts" as used in the Securities Act of 1933, as amended, or the rules and regulations of the Securities and Exchange Commission thereunder.

MAXIM GROUP LLC

/s/ Maxim Group LLC

New York, New York
March 29, 2019