

UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION  
Washington, D.C. 20549

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AMENDMENT NO. 3  
TO  
FORM S-1  
REGISTRATION STATEMENT  
*Under*  
*The Securities Act of 1933*

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**XENETIC BIOSCIENCES, INC.**

(Exact name of registrant as specified in its charter)

**Nevada**  
(State or other jurisdiction of  
incorporation or organization)

**2834**  
(Primary Standard Industrial  
Classification Code Number)

**45-2952962**  
(I.R.S. Employer  
Identification Number)

**99 Hayden Ave, Suite 230**  
**Lexington, Massachusetts 02421**  
**(781) 778-7720**

(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

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**Michael Scott Maguire**  
**President and Chief Executive Officer**  
**Xenetic Biosciences, Inc.**  
**99 Hayden Ave, Suite 230**  
**Lexington, Massachusetts 02421**  
**(781) 778-7720**

(Name, address, including zip code, and telephone number, including area code, of agent for service of process)

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*Copies to:*

**Mitchell D. Goldsmith**  
**Taft Stettinius & Hollister**  
**111 E. Wacker Drive, Suite 2800**  
**Chicago, Illinois 60601**  
**(312) 527-4000**

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**Goodwin Procter LLP**  
**New York Times Building**  
**620 Eighth Avenue**  
**New York, New York 10036**  
**(212) 813-8800**

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**Approximate date of commencement of proposed sale to the public:** As soon as practicable after the effective date of this registration statement.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, as amended, 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, please 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(c) 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, or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer ☐  
Non-accelerated filer (Do not check if a smaller reporting  
company)

Accelerated filer ☐  
Smaller reporting company ☒

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## EXPLANATORY NOTE

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We are submitting this Amendment No. 3 (“Amendment No. 3”) to our Registration Statement on Form S-1 that we filed with the Securities and Exchange Commission (“SEC”) on May 9, 2016 (the “Registration Statement”), as amended on June 24, 2016 (Amendment No. 1) and July 8, 2016 (Amendment No. 2), in order file Exhibits 1.1, 3.7, 4.1 and 5.1 to the Registration Statement.

This Amendment No. 3 consists only of a facing page, this explanatory note, Part II of the Registration Statement, the signature pages, the Exhibit Index and Exhibits 1.1, 3.7, 4.1 and 5.1. This Amendment No. 3 does not modify any other part of the Registration Statement. The prospectus is unchanged and has therefore been omitted from this filing.

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## PART II

### Information Not Required in Prospectus

#### Item 13. Other Expenses of Issuance and Distribution

The following table sets forth the fees and expenses, other than underwriting discounts and commissions, payable in connection with the registration of the common stock hereunder. All amounts are estimates except the SEC registration fee and the FINRA filing fee.

SEC registration fee	\$	2,014
FINRA Filing Fee		5,900
The NASDAQ Capital Market Listing fee		55,000
Printing and Engraving Expenses		10,000
Legal Fees and Expenses		435,000
Accounting fees and expenses		127,000
Transfer Agent and Registrar Fees and Expenses		1,500
Miscellaneous		10,000
Total:	\$	<u>646,414</u>

#### Item 14. Indemnification of Directors and Officers

Our officers and directors are indemnified as provided by the Nevada Revised Statutes and our bylaws.

Under the governing Nevada statutes, director immunity from liability to a company or its shareholders for monetary liabilities applies automatically unless it is specifically limited by a company's articles of incorporation. Our articles of incorporation do not contain any limiting language regarding director immunity from liability. Excepted from this immunity are:

- a willful failure to deal fairly with the company or its shareholders in connection with a matter in which the director has a material conflict of interest;
- a violation of criminal law (unless the director had reasonable cause to believe that his or her conduct was lawful or no reasonable cause to believe that his or her conduct was unlawful);
- a transaction from which the director derived an improper personal profit; and
- willful misconduct.

Our bylaws provide that we will indemnify our directors and officers to the fullest extent not prohibited by Nevada law; provided, however, that we may modify the extent of such indemnification by individual contracts with our directors and officers; and, provided, further, that we shall not be required to indemnify any director or officer in connection with any proceeding (or part thereof) initiated by such person unless:

- such indemnification is expressly required to be made by law;
- the proceeding was authorized by our Board of Directors;
- such indemnification is provided by us, in our sole discretion, pursuant to the powers vested us under Nevada law; or;
- such indemnification is required to be made pursuant to the bylaws.

Our bylaws provide that we will advance to any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative, by reason of the fact that he is or was a director or officer, of the company, or is or was serving at the request of the company as a director or executive officer of another company, partnership, joint venture, trust or other enterprise, prior to the final disposition of the proceeding, promptly following request therefore, all expenses incurred by any director or officer in connection with such proceeding upon receipt of an undertaking by or on behalf of such person to repay said amounts if it should be determined ultimately that such person is not entitled to be indemnified under our bylaws or otherwise.

Our bylaws provide that no advance shall be made by us to an officer of the company, except by reason of the fact that such officer is or was a director of the company in which event this paragraph shall not apply, in any action, suit or proceeding, whether civil, criminal, administrative or investigative, if a determination is reasonably and promptly made: (a) by the board of directors by a majority vote of a quorum consisting of directors who were not parties to the proceeding, or (b) if such quorum is not obtainable, or, even if obtainable, a quorum of disinterested directors so directs, by independent legal counsel in a written opinion, that the facts known to the decision-making party at the time such determination is made demonstrate clearly and convincingly that such person acted in bad faith or in a manner that such person did not believe to be in or not opposed to the best interests of the company.

The underwriting agreement filed as Exhibit 1.1 to this registration statement provides for indemnification of us and our directors and officers by the underwriters against certain liabilities under the Securities Act and the Exchange Act.

#### **Item 15. Recent Sales of Unregistered Securities**

The following list sets forth information as to all securities we have sold since January 1, 2013, which were not registered under the Securities Act.

1. On January 29, 2014 we entered into a stock purchase agreement (Purchase Agreement) with Baxalta (initially entered into with Baxter SA, subsequently transferred to Baxalta), pursuant to which we sold to Baxalta 324,097 shares of our common stock, par value \$0.001 per share, (Shares) for \$10 million (Purchase Price) at a price of \$30.86 per share yielding a market cap of approximately \$140 million. During 2015, Baxter agreed in writing to a further lock-up period expiring in June 2016 and certain other related restrictions. In connection with the separation of its biopharmaceuticals business to form Baxalta, Baxter assigned the Shares to Baxalta in 2015.
2. On December 31, 2014, in consideration of the assignment of certain intellectual property rights by Dmitry Genkin and FDS Pharma ASS to our subsidiary, Lipoxen Technologies Limited (Lipoxen), we issued to FDS Pharma ASS 98,327 shares of our common stock. FDS Pharma ASS is a related party of SynBio, LLC (SynBio) which is an affiliate of ours.
3. On December 31, 2014, we issued a warrant to purchase 204,394 shares of our common stock to SynBio in furtherance of our co-development clinical objectives. The initial exercise price for the purchase of the warrant is \$25.41 per share with a term of five years from the grant date. Simultaneously, warrants to purchase 9,697 shares of our common stock were issued to SynBio and PJSC Pharmsynthez (Pharmsynthez) non-director designees under the same terms and conditions of the SynBio warrant. These warrants contain vesting triggers based on the achievement by SynBio of specific clinical development objectives.
4. On December 31, 2014, we issued a warrant to purchase 96,970 shares of our common stock, to Serum Institute of India Limited (Serum Institute) in furtherance of our co-development clinical objectives. The initial exercise price for the purchase of the warrant is \$7.92 per share with a term of five years from the grant date. Simultaneously, warrants to purchase 4,852 shares of common stock were issued to Serum Institute non-director designees under the same terms and conditions of the Serum Institute warrant. These warrants contain vesting triggers based on the achievement by Serum Institute of specific clinical development objectives. Serum Institute is a related party of ours.
5. On December 31, 2014, we issued a warrant to purchase 48,485 shares of our common stock to a non-employee director for services provided to us. The initial exercise price for the purchase of the warrant is \$7.92 per share with a term of five years from the grant date. This warrant was fully vested on the date of grant.
6. On April 28, 2016, we issued in the aggregate 4,418,491 new shares of our common stock to Pharmsynthez in connection with the conversion of certain convertible promissory notes issued in 2015 and 2016, as well as the closing of that certain Asset Purchase Agreement, dated November 13, 2015, (Kevelt APA) by and among the Company, our subsidiary, Lipoxen Technologies, LTD, Kevelt, an Estonian company (Kevelt) and Pharmsynthez, parent of Kevelt. Specifically, we issued 1,373,036 shares of common stock for the conversion of notes held by Pharmsynthez plus interest accrued thereon, and 3,045,455 shares of common stock in consideration for our purchase of certain intellectual property rights from Pharmsynthez. Pursuant to the Kevelt APA, we also issued certain management warrants to certain members of management of Pharmsynthez. Such warrants may be exercised at any time on or after March 31, 2016 through the five-year anniversary of the issuance thereof.

7. In August 2015, we issued 15,986 shares of our common stock to non-employee consultants in exchange for services provided to the Company. We recorded \$196,341 as the aggregate amount of consideration received for the associated services.
8. In November 2015, in consideration of the assignment of certain intellectual property rights by Dr. Dmitry Genkin and Kirill Surkhov (together, Assignors) to Lipoxen Technologies Ltd., we issued 333,334 shares of our common stock to the Assignors pursuant to the terms of the Kevelt APA. We recorded \$3.74 million as the aggregate amount of consideration received for these certain intellectual property rights.
9. In December 2015, we issued 15,152 shares of our common stock to non-employee consultants in exchange for services provided to us. We recorded \$221,000 as the aggregate amount of consideration for the associated services.
10. On July 1, 2016, we issued a warrant to purchase 37,369 shares of our common stock to our Chief Executive Officer, Mr. M. Scott Maguire, for his deferment of salary. The initial exercise price for the purchase of the warrant is \$6.60 per share with a term of five years from the grant date. This warrant was fully vested on the date of grant.

We deemed the offers, sales and issuances of the securities described in paragraphs 1 through 8 above to be exempt from registration under the Securities Act, in reliance on Section 4(a)(2) of the Securities Act, including Regulation D and Rule 506 promulgated thereunder, regarding transactions by an issuer not involving a public offering. All purchasers of securities in transactions exempt from registration pursuant to Regulation D represented to us that they were accredited investors and were acquiring the shares for investment purposes only and not with a view to, or for sale in connection with, any distribution thereof and that they could bear the risks of the investment and could hold the securities for an indefinite period of time. The purchasers received written disclosures that the securities had not been registered under the Securities Act and that any resale must be made pursuant to a registration statement or an available exemption from such registration.

We deemed the grants of stock options described in paragraph 9 as exempt pursuant to Section 4(a)(2) of the Securities Act or to be exempt from registration under the Securities Act in reliance on Rule 701 of the Securities Act as offers and sales of securities under compensatory benefit plans and contracts relating to compensation in compliance with Rule 701. Each of the recipients of securities in any transaction exempt from registration either received or had adequate access, through employment, business or other relationships, to information about us.

All certificates representing the securities issued in the transactions described in this Item 15 included appropriate legends setting forth that the securities had not been offered or sold pursuant to a registration statement and describing the applicable restrictions on transfer of the securities. There were no underwriters employed in connection with any of the transactions set forth in this Item 15.

#### **Item 16. Exhibits and Financial Statement Schedules.**

(a) Exhibits. The exhibits to the registration statement are listed in the Exhibit Index to this registration statement.

(b) Financial Statements Schedules. Schedules not listed above have been omitted because the information required to be set forth therein is not applicable or is shown in the financial statements or notes thereto.

#### **Item 17. Undertakings.**

Insofar as indemnification for liabilities arising under the Securities Act of 1933, as amended (the 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 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 Act and will be governed by the final adjudication of such issue. The Registrant hereby undertakes that:

- (a) 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 the 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 the 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.
- (b) 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.
- (c) 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.
- (d) 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.
- (e) The undersigned registrant hereby undertakes that, for purposes of determining any liability under the Securities Act of 1933, each filing of the registrant's annual report pursuant to section 13(a) or section 15(d) of the Securities Exchange Act of 1934 (and, where applicable, each filing of an employee benefit plan's annual report pursuant to section 15(d) of the Securities Exchange Act of 1934) that is incorporated by reference in the registration statement 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.
- (f) Insofar as indemnification for liabilities arising under the Securities Act of 1933 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 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 Act and will be governed by the final adjudication of such issue.
- (g) For purposes of determining any liability under the Securities Act of 1933, the information omitted from the form of prospectus filed as part of this registration statement in reliance upon Rule 430A and contained in a form of prospectus filed by the registrant pursuant to Rule 424(b)(1) or (4) or 497(h) under the Securities Act shall be deemed to be part of this registration statement as of the time it was declared effective.
- (h) For the purpose of determining any liability under the Securities Act of 1933, each post-effective amendment that contains a form of prospectus 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.

## SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the registrant has duly caused this Registration Statement on Form S-1 to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Lexington, Commonwealth of Massachusetts, on July 13, 2016.

XENETIC BIOSCIENCES, INC.

By: /s/ Michael Scott Maguire  
Michael Scott Maguire  
Chief Executive Officer and President

## POWER OF ATTORNEY AND SIGNATURES

We, the undersigned officers and directors of Xenetic Biosciences, Inc., hereby severally constitute and appoint Michael Scott Maguire, our true and lawful attorney, with full power, to sign for us in our names in the capacities indicated below, all amendments to this report, and generally to do all things in our names and on our behalf in such capacities to enable Xenetic Biosciences, Inc. to comply with the provisions of the Securities Exchange Act of 1934, as amended, and all requirements of the Securities and Exchange Commission.

Pursuant to the requirements of the Securities Act of 1933, as amended, this Registration Statement and Power of Attorney has been signed by the following person in the capacities and on the date indicated.

<u>Name</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Michael Scott Maguire</u> Michael Scott Maguire	President, Chief Executive Officer and Director (Principal Executive Officer and Principal Financial Officer)	July 13, 2016
<u>*</u> Firdaus Jal Dastoor FCS	Director	July 13, 2016
<u>*</u> Darlene Deptula-Hicks	Director	July 13, 2016
<u>*</u> Dr. Roger Kornberg	Director	July 13, 2016
<u>*</u> Roman Knyazev	Director	July 13, 2016
<u>/s/ Jeffrey F. Eisenberg</u> Jeffrey F. Eisenberg	Director	July 13, 2016
*By: <u>/s/ Michael Scott Maguire</u> Michael Scott Maguire <i>Attorney-in-Fact</i>		July 13, 2016



# EXHIBIT INDEX

Exhibit No.	Exhibit Index	Form	Incorporated by Reference Date	Number	Filed Herewith
1.1	Form of Underwriting Agreement				X
2.1	Scheme of Arrangement (court order)	8-K	01/29/2014	2.1	
3.1	Articles of Incorporation	S-1	11/21/2011	3.1	
3.2	Certificate of Amendment to Articles of Incorporation	8-K	02/12/2013	3.1	
3.3	Certificate of Amendment to Articles of Incorporation	8-K	02/27/2013	3.1	
3.4	Certificate of Amendment to Articles of Incorporation	10-Q	01/10/2014	3.1	
3.5	Certificate of Change Pursuant to NRS 78.209	10-Q	01/10/2014	3.2	
3.6	Certificate of Amendment to Articles of Incorporation	8-K	09/30/2015	3.1	
3.7	Certificate of Change Pursuant to NRS 78.209				X
3.7	Bylaws	S-1	11/21/2011	3.2	
4.1	Form of Common Stock Certificate of the Registrant				X
5.1	Legal Opinion				X
10.1	Possible Offer for Xenetic Biosciences plc by General Sales & Leasing, Inc., dated October 21, 2013	8-K	10/21/2013	9.1	
10.2	Recommended Acquisition of Xenetic Biosciences plc by General Sales & Leasing, Inc. including Scheme of Arrangement	8-K and 8-K/A	11/25/2013	9.1	
10.3	Announcement of Recommended Offer by General Sales and Leasing, Inc. for shares of Xenetic Biosciences plc, dated November 12, 2013	8-K	11/25/2013	9.2	
10.4	Agreement of Conveyance, Transfer and Assignment of Subsidiaries and Assumption of Obligations dated November 12, 2013 between General Sales Inc., Leasing, Inc., Oxbridge Technology Partners, SA, Shift It Media Company and General Aircraft, Inc.	10-K	11/27/2013	9.3	
10.5†	Form of Rules of the Lipoxen plc Unapproved Share Option Plan dated July 18, 2000 (as amended by a resolution of the board of directors of Lipoxen plc passed on March 14, 2006)	10-K	04/15/2014	10.5	
10.6†	Form of Xenetic Biosciences plc 2007 Share Option Scheme and US Addendum (as established in 2007 and by resolution of shareholders in 2010 and awarded by board resolution in 2012)	10-K	04/15/2014	10.6	
10.7†	Form of Xenetic Biosciences, Inc. Equity Incentive Plan, effective January 23, 2014	10-K	04/15/2014	10.7	
10.8	Master Clinical Research Services Agreement between Novotech Pty Limited and Xenetic Biosciences plc dated Feb. 6, 2013	10-K	04/15/2014	10.17	

<b>Exhibit No.</b>	<b>Exhibit Index</b>	<b>Form</b>	<b>Incorporated by Reference Date</b>	<b>Number</b>	<b>Filed Herewith</b>
10.9†	Employment Agreement, dated November 3, 2009, between Lipoxen plc and Michael Scott Maguire	10-K/A	02/18/2015	10.01	
10.10	Form of Lease for Ledgemont Research Center, Lexington, Massachusetts dated August 1, 2013 between One Ledgemont LLC and Xenetic Bioscience, Inc.	10-K/A	02/18/2015	10.03	
10.11	Stock Purchase Agreement, dated January 29, 2014, between Xenetic Biosciences, Inc. and Baxter Healthcare SA	10-K/A	02/18/2015	10.08	
10.12	Stock Purchase Agreement Amendment No. 1, dated February 14, 2014, between Xenetic Biosciences, Inc. and Baxter Healthcare SA	10-K/A	02/18/2015	10.09	
10.13	Exclusive Research, Development and License Agreement, dated August 15, 2005, between Lipoxen Technologies Limited, Baxter Healthcare SA and Baxter Healthcare Corporation	10-K/A	02/18/2015	10.10	
10.14	Letter Agreement, dated December 11, 2006, between Lipoxen Technologies Limited, Baxter Healthcare SA, Baxter Healthcare Corporation and Serum Institute of India Limited	10-K/A	02/18/2015	10.11	
10.15	Amendment to the Exclusive Research, Development and License Agreement, dated December 13, 2006, between Lipoxen Technologies Limited, Baxter Healthcare SA and Baxter Healthcare Corporation	10-K/A	02/18/2015	10.12	
10.16	Second Amendment to the Exclusive Research, Development and License Agreement, dated May 28, 2009, between Lipoxen Technologies Limited, Baxter Healthcare SA and Baxter Healthcare Corporation	10-K/A	02/18/2015	10.13	
10.17	Amendment Number Four to the Exclusive Research, Development and License Agreement, dated August 10, 2010, between Lipoxen Technologies Ltd., Baxter Healthcare SA and Baxter Healthcare Corporation	10-K/A	02/18/2015	10.14	
10.18	Amendment Number Five to the Exclusive Research, Development and License Agreement, dated September 15, 2010, between Lipoxen Technologies Ltd., Baxter Healthcare SA and Baxter Healthcare Corporation	10-K/A	02/18/2015	10.15	
10.19	Form of Sixth Amendment to the Exclusive Research, Development and License Agreement, dated January 29, 2014, between Lipoxen Technologies Limited, Baxter Healthcare SA and Baxter Healthcare Corporation	10-K/A	02/18/2015	10.16	

<b>Exhibit No.</b>	<b>Exhibit Index</b>	<b>Form</b>	<b>Incorporated by Reference Date</b>	<b>Number</b>	<b>Filed Herewith</b>
10.20	Agreement on Co-Development and the Terms of Exclusive License dated August 4, 2011 between Lipoxen plc, Lipoxen Technologies LTD and SynBio LLC	10-K/A	02/18/2015	10.18	
10.21	Subscription Agreement in respect of ordinary shares in the capital of Lipoxen plc dated August 4, 2011 between SynBio LLC and Lipoxen plc	10-K/A	02/18/2015	10.19	
10.22	Collaboration, Licence and Development Agreement, dated November 11, 2009, between Pharmasynthez ZAO and Lipoxen Technologies Ltd.	10-K/A	02/18/2015	10.20	
10.23	Exclusive Patent and Know How Licence and Manufacturing Agreement, dated August 4, 2011, between Lipoxen plc, Lipoxen Technologies Ltd and Serum Institute of India Limited	10-K/A	02/18/2015	10.21	
10.24†	Employment Agreement, dated April 30, 2012, between Xenetic Bioscience, Inc. and Dr. Henry Hoppe IV.	10-K/A	02/18/2015	10.23	
10.25	Intellectual Property Assignment between Dmitry Genkin, FDS Pharma, Lipoxen Technologies Limited and Xenetic Biosciences Inc.	10-K	04/15/2015	10.1	
10.26	SynBio LLC Warrant to Purchase Common Stock of Xenetic Bioscience, Incorporated	10-K	04/15/2015	10.2	
10.27	Serum Institute of India Limited Warrant to Purchase Common Stock of Xenetic Bioscience, Incorporated	10-K	04/15/2015	10.03	
10.28	Firdaus Jal Dastoor Warrant to Purchase Common Stock of Xenetic Bioscience, Incorporated	10-K	04/15/2015	10.4	
10.29	Securities Purchase Agreement, dated May 2015, between Xenetic Bioscience, Inc. and OJSC Pharmsynthez	8-K	07/08/2015	10.1	
10.30	Ten Percent (10%) Senior Secured Collateralized Convertible Promissory Note, dated July 1, 2015, between Xenetic Bioscience, Inc. and OJSC Pharmsynthez	8-K	07/08/2015	10.2	
10.31	Registration Rights Agreement, dated July 1, 2015, between Xenetic Bioscience, Inc. and OJSC Pharmsynthez	8-K	07/08/2015	10.3	
10.32	Security Agreement dated July 1, 2015, between Xenetic Bioscience, Inc. and OJSC Pharmsynthez	8-K	07/08/2015	10.4	
10.33	Subsidiary Guarantee dated July 1, 2015, between Xenetic Bioscience, Inc. and OJSC Pharmsynthez	8-K	07/08/2015	10.5	
10.34	Common Stock Purchase Warrant, dated July 1, 2015	8-K	07/08/2015	10.6	
10.35	Form of Assignment and Assumption Agreement	8-K	07/08/2015	10.7	

Exhibit No.	Exhibit Index	Form	Incorporated by Reference Date	Number	Filed Herewith
10.36	Settlement Agreement, dated August 27, 2015, between Xenetic Biosciences (UK) Limited, Xenetic Biosciences, Inc., Lipoxen Technologies Limited and Colin Hill	8-K	09/02/2015	10.1	
10.37	Form of Asset Purchase Agreement, dated as of November 13, 2015, by and among Xenetic Biosciences, Inc., Lipoxen Technologies, LTD, a U.K. corporation, AS Kevelt, an Estonian company and OJSC Pharmsynthez	8-K	11/16/2015	10.1	
10.38	Form of Ten Percent (10%) Senior Secured Convertible Promissory Note	8-K	11/16/2015	10.2	
10.39	Form of Common Stock Purchase Warrant	8-K	11/16/2015	10.3	
10.40	Form of Common Stock Purchase Warrant	8-K	11/16/2015	10.4	
10.41	Form of Amended and Restated Ten Percent (10%) Senior Secured Convertible Promissory Note	8K	11/16/2015	10.5	
10.42	Form of Amended and Restated Common Stock Purchase Warrant	8-K	11/16/2015	10.6	
10.43	Form of First Amendment to Securities Purchase Agreement	8-K	11/16/2015	10.7	
10.44	Form of First Amendment to Registration Rights Agreement	8-K	11/16/2015	10.8	
10.45	Form of First Amendment to Security Agreement	8-K	11/16/2015	10.9	
10.46	Form of First Amendment to Subsidiary Guarantee	8-K	11/16/2015	10.10	
10.47	Form of Transition, Services and Resupply Agreement by and among Xenetic Bioscience, Inc., AS Kevelt and OJSC Pharmsynthez	8-K	11/16/2015	10.11	
10.48†	Letter Agreement re. Appointment of Non – Employee, Independent Director of Xenetic Biosciences, Inc. for Roger D. Kornberg dated February 2016	8-K	02/29/2016	10.1	
10.49†	Deferred Salary Security Agreement with Mr. Maguire	8-K	07/06/2016	10.1	
10.50	Form of Ten Percent (10%) Junior Secured Convertible Promissory Note – Due Deferral End Date	8-K	07/06/2016	10.2	
10.51	Form of Common Stock Purchase Warrant	8-K	07/06/2016	10.3	
10.52†	Letter Agreement re. Appointment of Non – Employee, Independent Director of Xenetic Biosciences, Inc. for Jeffrey F. Eisenberg dated July 2016	8-K	07/12/2016	10.1	
21.1	List of Subsidiaries	S-1	06/24/2016	21.1	
23.1	Consent of Marcum LLP	S-1	07/08/2016	23.1	
23.2	Consent of Ernst & Young LLP	S-1	07/08/2016	23.2	
23.2	Consent of Counsel (included in Exhibit 5.1)				X
24.1	Power of Attorney (included on signature page)	S-1	05/09/2016	24.1	
101	XBRL (eXtensible Business Reporting Language)	S-1	06/24/2016	101	

† Indicates a management contract or any compensatory plan, contract or arrangement.

**UNDERWRITING AGREEMENT**

**between**

**XENETIC BIOSCIENCES, INC.**

**and**

**LADENBURG THALMANN & CO. INC.**

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**XENETIC BIOSCIENCES, INC.**

**UNDERWRITING AGREEMENT**

New York, New York  
[ ], 2016

Ladenburg Thalmann & Co. Inc.  
570 Lexington Avenue  
11<sup>th</sup> Floor  
New York, New York 10022

Ladies and Gentlemen:

The undersigned, Xenetic Biosciences, Inc., a corporation formed under the laws of the State of Nevada (collectively with its subsidiaries and affiliates, including, without limitation, all entities disclosed or described in the Registration Statement (as hereinafter defined) as being subsidiaries or affiliates of Xenetic Biosciences, Inc., the “**Company**”), hereby confirms its agreement (this “**Agreement**”) with Ladenburg Thalmann & Co. Inc. (hereinafter referred to as “you” (including its correlatives) or the “**Underwriter**”) as follows:

1. Purchase and Sale of Securities.

1.1 Securities.

1.1.1. Nature and Purchase of Securities. On the basis of the representations and warranties herein contained, but subject to the terms and conditions herein set forth, the Company agrees to issue and sell, and the Underwriter agrees to purchase: (i) [ ] shares (each, a “**Share**,” and collectively, the “**Shares**”) of the Company’s common stock, par value \$0.001 per share (the “**Common Stock**”), and (ii) warrants to purchase up to [ ] shares of Common Stock in the form set forth in Exhibit A (each, a “**Warrant**”, and collectively, the “**Warrants**”), with an exercise price of \$[ ] per whole share of Common Stock. The purchase price per combined Share and Warrant to be paid by the Underwriter to the Company shall be \$[ ] per combined Share and Warrant. The Shares and Warrants are collectively called the “**Securities**.” The shares of Common Stock underlying the Warrants are called the “**Warrant Shares**.” The Shares are to be offered initially to the public at the offering price set forth on the cover page of the Prospectus (as defined in Section 2.1.1 hereof).

1.1.2. Security Payment and Delivery.

(i) Delivery and payment for the Securities shall be made at 10:00 a.m., Eastern time, on the third (3<sup>rd</sup>) Business Day following the effective date (the “**Effective Date**”) of the Registration Statement (as defined in Section 2.1.1 below) (or the fourth (4<sup>th</sup>) Business Day following the Effective Date if the Registration Statement is declared effective after 4:01 p.m., Eastern time) or at such earlier time as shall be agreed upon by the Underwriter and the Company, at the offices of Goodwin Procter LLP, 620 Eighth Avenue, New York, NY 10018 (“**Underwriter’s Counsel**”), or at such other place (or remotely by facsimile or other electronic transmission) as shall be agreed upon by the Underwriter and the Company. The hour and date of delivery and payment for the Securities is called the “**Closing Date**.”

(ii) Payment for the Securities shall be made on the Closing Date by wire transfer in federal (same day) funds, payable to the order of the Company upon delivery of the certificates (in form and substance satisfactory to the Underwriter) representing the Securities (or through the facilities of the Depository Trust Company (“DTC”)) for the account of the Underwriter. The Securities shall be registered in such name or names and in such authorized denominations as the Underwriter may request in writing at least two (2) full Business Days prior to the Closing Date. The Company shall not be obligated to sell or deliver the Securities except upon tender of payment by the Underwriter for all of the Securities. The term “**Business Day**” means any day other than a Saturday, a Sunday or a legal holiday or a day on which banking institutions are authorized or obligated by law to close in New York, New York.

2. Representations and Warranties of the Company. The Company represents and warrants to the Underwriter as of the Applicable Time (as defined below) and as of the Closing Date, as follows:

2.1 Filing of Registration Statement.

2.1.1. Registration Pursuant to the Securities Act. The Company has filed with the U.S. Securities and Exchange Commission (the “**Commission**”) a registration statement, and an amendment or amendments thereto, on Form S-1 (File No. 333-178082), including any related prospectus or prospectuses, for the registration of the Securities and Warrant Shares under the Securities Act of 1933, as amended (the “**Securities Act**”), which registration statement and amendment or amendments have been prepared by the Company in all material respects in conformity with the requirements of the Securities Act and the rules and regulations of the Commission under the Securities Act (the “**Regulations**”) and will contain all material statements that are required to be stated therein in accordance with the Securities Act and the Regulations. Except as the context may otherwise require, such registration statement, as amended, on file with the Commission at the time the registration statement became effective (including the Preliminary Prospectus included in the registration statement, financial statements, schedules, exhibits and all other documents filed as a part thereof or incorporated by reference therein and all information deemed to be a part thereof as of the Effective Date pursuant to paragraph (b) of Rule 430A of the Regulations (the “**Rule 430A Information**”)), is referred to herein as the “**Registration Statement**.” If the Company files any registration statement pursuant to Rule 462(b) of the Regulations, then after such filing, the term “**Registration Statement**” shall include such registration statement filed pursuant to Rule 462(b). The Registration Statement has been declared effective by the Commission on the date hereof.

Each prospectus used prior to the effectiveness of the Registration Statement, and each prospectus that omitted the Rule 430A Information that was used after such effectiveness and prior to the execution and delivery of this Agreement (including the financial statements, schedules, exhibits and all other documents filed as a part thereof or incorporated by reference therein), is herein called a “**Preliminary Prospectus**.” The Preliminary Prospectus, subject to completion, dated [ ], 2016, that was included in the Registration Statement immediately prior to the Applicable Time is hereinafter called the “**Pricing Prospectus**.” The final prospectus in the form first furnished to the Underwriter for use in the Offering (including the financial statements, schedules, exhibits and all other documents filed as a part thereof or incorporated by reference therein) is hereinafter called the “**Prospectus**.” Any reference to the “most recent Preliminary Prospectus” shall be deemed to refer to the latest Preliminary Prospectus included in the Registration Statement.

“**Applicable Time**” means [ ]:00 a.m., Eastern time, on the date of this Agreement.

“**Issuer Free Writing Prospectus**” means any “issuer free writing prospectus,” as defined in Rule 433 of the Regulations (“**Rule 433**”), including without limitation any “free writing prospectus” (as defined in Rule 405 of the Regulations) relating to the Securities that is: (i) required to be filed with the Commission by the Company, (ii) a “road show that is a written communication” within the meaning of Rule 433(d)(8)(i), whether or not required to be filed with the Commission, or (iii) exempt from filing with the Commission pursuant to Rule 433(d)(5)(i) because it contains a description of the Securities or of the Offering that does not reflect the final terms, in each case in the form filed or required to be filed with the Commission or, if not required to be filed, in the form retained in the Company’s records pursuant to Rule 433(g).

**“Issuer General Use Free Writing Prospectus”** means any Issuer Free Writing Prospectus that is intended for general distribution to prospective investors (other than a “*bona fide* electronic road show,” as defined in Rule 433 (the “**Bona Fide Electronic Road Show**”)), as evidenced by its being specified in Schedule 2-B hereto.

**“Issuer Limited Use Free Writing Prospectus”** means any Issuer Free Writing Prospectus that is not an Issuer General Use Free Writing Prospectus.

**“Pricing Disclosure Package”** means any Issuer General Use Free Writing Prospectus issued at or prior to the Applicable Time, the Pricing Prospectus and the information included on Schedule 2-A hereto, all considered together.

2.1.2. Registration Pursuant to the Exchange Act. The Securities and the Warrant Shares are registered pursuant to Section 12(b) under the Securities Exchange Act of 1934, as amended (the “**Exchange Act**”). The Company has taken no action designed to, or likely to have the effect of, terminating the registration of the Securities and the Warrant Shares under the Exchange Act, nor has the Company received any notification that the Commission is contemplating terminating such registration.

2.2 No Stop Orders, etc. Neither the Commission nor, to the best of the Company’s knowledge, any state regulatory authority has issued any order preventing or suspending the use of the Registration Statement, any Preliminary Prospectus or the Prospectus or has instituted or, to the best of the Company’s knowledge, threatened to institute, any proceedings with respect to such an order. The Company has complied with each request (if any) from the Commission for additional information.

### 2.3 Disclosures in Registration Statement

#### 2.3.1. Compliance with Securities Act and 10b-5 Representation

(i) Each of the Registration Statement and any post-effective amendment thereto, at the time it became effective, at the date hereof and at the Closing Date, complied or will comply in all material respects with the requirements of the Securities Act and the Regulations. Each Preliminary Prospectus, including the prospectus filed as part of the Registration Statement as originally filed or as part of any amendment or supplement thereto, and the Prospectus, at the time each was filed with the Commission, complied in all material respects with the requirements of the Securities Act and the Regulations. Each Preliminary Prospectus delivered to the Underwriter for use in connection with this Offering and the Prospectus was or will be identical to the electronically transmitted copies thereof filed with the Commission pursuant to EDGAR, except to the extent permitted by Regulation S-T. The Company meets the requirements under Form S-1 necessary for incorporation by reference of its Exchange Act reports.

(ii) Neither the Registration Statement nor any amendment thereto, at its effective time, as of the date of this Agreement, at the Closing Date, contained, contains or will contain an untrue statement of a material fact or omitted, omits or will omit to state a material fact required to be stated therein or necessary to make the statements therein not misleading; *provided, however*, that the Company makes no representation or warranty with respect to any statements or omissions made in reliance upon and in conformity with information relating to the Underwriter and furnished by the Underwriter expressly for use in the Registration Statement (including any post-effective amendment thereto), the Pricing Disclosure Package, any Issuer Free Writing Prospectus or any testing-the-waters communication made in reliance on Section 5(d) of the Securities Act, and which information the parties acknowledge and agree consists solely of the information and disclosures set forth in the “*Underwriting*” section of the Prospectus (collectively, the “**Underwriter’s Information**”).



(iii) The Pricing Disclosure Package, as of the Applicable Time and as of any Additional Closing Date, as the case may be, did not, does not and will not include an untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading; provided, however, that this representation and warranty shall not apply to statements made or statements omitted in reliance upon and in conformity with the Underwriter's Information.

(iv) Neither the Prospectus nor any amendment or supplement thereto (including any prospectus wrapper), as of its issue date, at the time of any filing with the Commission pursuant to Rule 424(b), at the Closing Date, included, includes or will include an untrue statement of a material fact or omitted, omits or will omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading; provided, however, that this representation and warranty shall not apply to the Underwriter's Information.

(v) The Company has not distributed any prospectus or other offering material in connection with the offering and sale of the Securities other than the Pricing Disclosure Package.

(vi) The Company has provided a copy to the Underwriter of each Issuer Free Writing Prospectus (as defined above) used in the sale of the Securities. The Company has filed all Issuer Free Writing Prospectuses required to be so filed with the Commission, and no order preventing or suspending the effectiveness or use of any Issuer Free Writing Prospectus is in effect and no proceedings for such purpose have been instituted or are pending, or, to the knowledge of the Company, are contemplated or threatened by the Commission. When taken together with the rest of the Pricing Disclosure Package or the Final Prospectus, since its first use and at all relevant times since then, no Issuer Free Writing Prospectus has, does or will include (1) any untrue statement of a material fact or omission to state any material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading, or (2) information that conflicted, conflicts or will conflict with the information contained in the Registration Statement or the Final Prospectus; *provided, however*, that the Company makes no representation or warranty with respect to any statements or omissions made in reliance upon and in conformity with the Underwriter's Information. Each Issuer Free Writing Prospectus satisfied, as of its issue date and at all subsequent times through the Prospectus Delivery Period (as defined below in Section 3.4), all other conditions as may be applicable to its use as set forth in Rules 164 and 433 under the Securities Act, including any legend, record-keeping or other requirements.

(vii) The statements set forth in the Registration Statement, the Pricing Disclosure Package and the Prospectus under the caption "Description of Securities" insofar as they purport to constitute a summary of the terms of the Securities and documents referred to therein, are, in all respects, accurate.

2.3.2. Disclosure of Agreements. The agreements and documents conform in all material respect to the description thereof in the Registration Statement, the Pricing Disclosure Package and the Prospectus, and there are no agreements or other documents required by the Securities Act and the Regulations to be described in the Registration Statement, the Pricing Disclosure Package and the Prospectus or to be filed with the Commission as exhibits to the Registration Statement, that have not been so described or filed. Each agreement or other instrument (however characterized or described) to which the Company is a party or by which it is or may be bound or affected and (i) that is referred to in the Registration Statement, the Pricing Disclosure Package and the Prospectus, or (ii) is material to the Company's business, has been duly authorized and validly executed by the Company, is in full force and effect in all material respects and is enforceable against the Company and, to the Company's knowledge, the other parties thereto, in accordance with its terms, except (x) as such enforceability may be limited by bankruptcy, insolvency, reorganization, moratorium or similar laws affecting creditors' rights generally and by general principles of equity, (y) as enforceability of any indemnification or contribution provision may be limited under the federal and state securities laws, and (z) that the remedy of specific performance and injunctive and other forms of equitable relief may be subject to the equitable defenses and to the discretion of the court before which any proceeding therefor may be brought. None of such agreements or instruments has been assigned by the Company, and neither the Company nor, to the best of the Company's knowledge, any other party is in default thereunder and, to the best of the Company's knowledge, no event has occurred that, with the lapse of time or the giving of notice, or both, would constitute a default thereunder except for any such default that would not have or reasonably be expected to result in a Material Adverse Change (as defined below). To the best of the Company's knowledge, performance by the Company of the material provisions of such agreements or instruments will not result in a violation of any existing applicable law, rule, regulation, judgment, order or decree of any governmental agency or court, domestic or foreign, having jurisdiction over the Company or any of its assets or businesses (each, a "**Governmental Entity**"), including, without limitation, those relating to environmental laws and regulations except for any such violation that would not have or reasonably be expected to result in a Material Adverse Change.

2.3.3. Regulations. The disclosures in the Registration Statement, the Pricing Disclosure Package and the Prospectus concerning the effects of federal, state, local and foreign regulation on the Offering and the Company's business as currently contemplated are correct in all material respects and, to the Company's knowledge, no other such material regulations are required to be disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus which are not so disclosed.

2.3.4. Forward-Looking Statements. The Company had a reasonable basis for, and made in good faith, each "forward-looking statement" (within the meaning of Section 27A of the Securities Act or Section 21E of the Exchange Act) contained or incorporated by reference in the Registration Statement, the Pricing Disclosure Package, and the Final Prospectus, in each case at the time such "forward-looking statement" was made.

## 2.4 Changes After Dates in Registration Statement

2.4.1. No Material Adverse Change. Since the respective dates as of which information is given in the Registration Statement, the Pricing Disclosure Package and the Prospectus, except as otherwise specifically stated therein: (i) there has been no material adverse change in the financial position or results of operations of the Company, nor any change or development that, singularly or in the aggregate, would reasonably be expected to involve a material adverse change, in or affecting the condition (financial or otherwise), results of operations, business, assets or prospects of the Company (a "**Material Adverse Change**"); (ii) there have been no material transactions entered into by the Company, other than as contemplated pursuant to this Agreement; and (iii) no officer or director of the Company has resigned from any position with the Company.

2.4.2. Recent Securities Transactions, etc. Subsequent to the respective dates as of which information is given in the Registration Statement, the Pricing Disclosure Package and the Prospectus, and except as may otherwise be indicated or contemplated herein or disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus, neither the Company nor any Subsidiary has: (i) issued any securities or incurred any liability or obligation, direct or contingent, for borrowed money except obligations incurred in the ordinary course of business; or (ii) declared or paid any dividend or made any other distribution on or in respect to its capital stock.

2.5 Disclosures in Commission Filings. None of the Company's filings with the Commission contain an untrue statement of a material fact or omit to state any material fact necessary in order to make the statements therein, in light of the circumstances in which they were made, not misleading; and the Company has made all filings with the Commission required under the Exchange Act.

2.6 Independent Accountants. To the knowledge of the Company, Marcum LLP (the "**Auditor**"), whose report is filed with the Commission and incorporated by reference as part of the Registration Statement, the Pricing Disclosure Package and the Prospectus is an independent registered public accounting firm as required by the Securities Act and the Regulations and the Public Company Accounting Oversight Board. The Auditor has not, during the periods covered by the financial statements included or incorporated by reference in the Registration Statement, the Pricing Disclosure Package and the Prospectus, provided to the Company any non-audit services, as such term is used in Section 10A(g) of the Exchange Act.

2.7 Financial Statements, etc. The financial statements, including the notes thereto and supporting schedules, included or incorporated by reference in the Registration Statement, the Pricing Disclosure Package and the Prospectus, fairly present the financial position and the results of operations of the Company at the dates and for the periods to which they apply; and such financial statements have been prepared in conformity with U.S. generally accepted accounting principles ("**GAAP**"), consistently applied throughout the periods involved (provided that unaudited interim financial statements are subject to year-end audit adjustments that are not expected to be material in the aggregate and do not contain all footnotes required by GAAP) and the supporting schedules included or incorporated by reference in the Registration Statement present fairly the information required to be stated therein. No other financial statements or schedules are required under the Securities Act to be included or incorporated by reference in the Registration Statement, the Pricing Disclosure Package or the Final Prospectus. Each of the Registration Statement, the Pricing Disclosure Package and the Prospectus discloses all material off-balance sheet transactions, arrangements, obligations (including contingent obligations), and other relationships of the Company with unconsolidated entities or other persons that may have a material current or future effect on the Company's financial condition, changes in financial condition, results of operations, liquidity, capital expenditures, capital resources, or significant components of revenues or expenses. Except as disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus, (a) neither the Company nor any of its direct and indirect subsidiaries, including each entity disclosed or described in the Registration Statement as being a subsidiary of the Company (each, a "**Subsidiary**" and, collectively, the "**Subsidiaries**") has incurred any material liabilities or obligations, direct or contingent, or entered into any material transactions other than in the ordinary course of business, (b) the Company has not declared or paid any dividends or made any distribution of any kind with respect to its capital stock, (c) there has not been any change in the capital stock of the Company or any of its subsidiaries, or, other than in the course of business, any grants under any stock compensation plan, (d) there has not been any material change in the Company's long-term or short-term debt, and (e) there has not been the occurrence of any Material Adverse Change. Any information contained in the Registration Statement, the Pricing Disclosure Package and the Prospectus regarding "non-GAAP financial measures" (as defined in Regulation G) complies with Regulation G and Item 10 of Regulations S-K, to the extent applicable.

2.8 Authorized Capital; Options, etc. The Company had, at the date or dates indicated in the Registration Statement, the Pricing Disclosure Package and the Prospectus, the duly authorized, issued and outstanding capitalization as set forth therein. Based on the assumptions stated in the Registration Statement, the Pricing Disclosure Package and the Prospectus, the Company will have on the Closing Date the adjusted stock capitalization set forth therein. Except as set forth in, or contemplated by, the Registration Statement, the Pricing Disclosure Package and the Prospectus, on the Effective Date and on the Closing Date, there will be no stock options, warrants, or other rights to purchase or otherwise acquire any authorized, but unissued shares of Common Stock of the Company or any security convertible into or exercisable for shares of Common Stock of the Company, or any contracts or commitments to issue or sell shares of Common Stock or any such options, warrants, rights or convertible securities (other than as a result of the grant in the ordinary course of stock options under the Company's existing equity incentive plans).

## 2.9 Valid Issuance of Securities, etc.

2.9.1. Outstanding Securities. All issued and outstanding shares of capital stock of the Company issued prior to the transactions contemplated by this Agreement have been duly authorized and validly issued and are fully paid and non-assessable and have been issued in compliance with all applicable securities laws; the holders thereof have no rights of rescission with respect thereto, and are not subject to personal liability by reason of being such holders; and none of such securities were issued in violation of the preemptive rights of any holders of any security of the Company or similar contractual rights granted by the Company. The authorized shares of Common Stock conform in all material respects to all statements relating thereto contained in the Registration Statement, the Pricing Disclosure Package and the Prospectus. The offers and sales of the outstanding shares of Common Stock were at all relevant times either registered under the Securities Act and the applicable state securities or “blue sky” laws or, based in part on the representations and warranties of the purchasers of such shares, exempt from such registration requirements.

2.9.2. Securities Sold Pursuant to this Agreement. The Shares which may be sold hereunder by the Company have been duly authorized and, when issued, delivered and fully paid for in accordance with the terms of this Agreement, will have been validly issued and will be fully paid and nonassessable; the Warrants which may be sold hereunder by the Company have been duly authorized for issuance and sale by the Company and, when executed, issued and delivered and fully paid for in accordance with the terms of this Agreement, will constitute legal, valid and binding obligations of the Company, enforceable in accordance with their terms, except as the enforceability thereof may be limited by bankruptcy, insolvency, reorganization or similar laws affecting the rights of creditors generally and subject to general principles of equity; the Warrant Shares have been duly authorized and reserved for issuance pursuant to the terms of the Warrants, and when issued by the Company upon valid exercise of the Warrants and payment of the exercise price, will be validly issued, fully paid and nonassessable; the Securities and Warrant Shares are not and will not be subject to the preemptive or registration rights of any holders of any security of the Company or similar contractual rights granted by the Company; and all corporate action required to be taken for the authorization, issuance and sale of the Securities has been duly and validly taken. The Securities conform in all material respects to all statements with respect thereto contained in the Registration Statement, the Pricing Disclosure Package and the Prospectus.

2.10 Registration Rights of Third Parties. Except as set forth in the Registration Statement, the Pricing Disclosure Package and the Prospectus, no holders of any securities of the Company or any rights exercisable for or convertible or exchangeable into securities of the Company have the right to require the Company to register any such securities of the Company under the Securities Act or to include any such securities in a registration statement to be filed by the Company.

2.11 Validity and Binding Effect of Agreements. This Agreement has been duly and validly authorized by the Company, and, when executed and delivered, will constitute, the valid and binding agreement of the Company, enforceable against the Company in accordance with its terms, except: (i) as such enforceability may be limited by bankruptcy, insolvency, reorganization or similar laws affecting creditors’ rights generally; (ii) as enforceability of any indemnification or contribution provision may be limited by applicable law and other public policy considerations; and (iii) that the remedy of specific performance and injunctive and other forms of equitable relief may be subject to the equitable defenses and to the discretion of the court before which any proceeding therefor may be brought. The warrant agreement governing the Warrants (the “**Warrant Agreement**”), to be dated as of the Closing Date and entered into by and between the Company and Empire Stock Transfer, Inc. (the “**Warrant Agent**”), has been duly authorized by the Company and, when executed and delivered by the Company and the Warrant Agent, will be a valid and binding agreement of the Company, enforceable against the Company in accordance with its terms, except as such enforceability may be limited by bankruptcy, insolvency, reorganization or similar laws affecting the rights of creditors generally and subject to general principles of equity.

2.12 No Conflicts, etc. The execution, delivery and performance by the Company of this Agreement and the Warrant Agreement and all ancillary documents, the consummation by the Company of the transactions herein and therein contemplated and the compliance by the Company with the terms hereof and thereof do not and will not, with or without the giving of notice or the lapse of time or both: (i) result in a breach of, or conflict with any of the terms and provisions of, or constitute a default under, or result in the creation, modification, termination or imposition of any lien, charge or encumbrance upon any property or assets of the Company or any Subsidiary pursuant to the terms of any agreement or instrument to which the Company is a party; (ii) result in any violation of the provisions of the Company's Articles of Incorporation (as the same may be amended or restated from time to time, the "**Charter**") or the by-laws of the Company; or (iii) violate any existing applicable law, rule, regulation, judgment, order or decree of any Governmental Entity as of the date hereof (including, without limitation, those promulgated by the United States Food and Drug Administration (the "**FDA**") or by any foreign, federal, state or local regulatory authority performing functions similar to those performed by the FDA) except in the case of clauses (i) and (iii) above, as would not result in, individually or in the aggregate, or reasonably be expected to result in a Material Adverse Change.

2.13 No Defaults; Violations. No material default exists in the due performance and observance of any term, covenant or condition of any material license, contract, indenture, mortgage, deed of trust, note, loan or credit agreement, or any other agreement or instrument evidencing an obligation for borrowed money, or any other material agreement or instrument to which the Company or any Subsidiary is a party or by which the Company or any Subsidiary may be bound or to which any of the properties or assets of the Company or any Subsidiary is subject. The Company is not: (i) in violation of any term or provision of its Charter or by-laws, or (ii) in violation of any franchise, license, permit, applicable law, rule, regulation, judgment or decree of any Governmental Entity, except, in the case of clause (ii) of this Section 2.13, for any violation that would not result in, individually or in the aggregate, or would not reasonably be expected to result in, a Material Adverse Change.

2.14 Corporate Power; Licenses; Consents.

2.14.1. Conduct of Business. Except as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, each of the Company and each Subsidiary has all requisite corporate power and authority, and has all necessary authorizations, approvals, orders, licenses, certificates and permits of and from all governmental regulatory officials and bodies that it needs as of the date hereof to conduct its business purpose as described in the Prospectus, the Registration Statement and the Pricing Disclosure Package, except where the failure to have any such authorization, approval, order, license, certificate or permit would not result in or reasonably be expected to result in a Material Adverse Change.

2.14.2. Transactions Contemplated Herein. The Company has all corporate power and authority to enter into this Agreement and the Warrant Agreement and to carry out the provisions and conditions hereof, and all consents, authorizations, approvals and orders required in connection therewith have been obtained. No consent, authorization or order of, and no filing with, any court, government agency or other body is required for the valid issuance, sale and delivery of the Securities and the consummation of the transactions and agreements contemplated by this Agreement (including the issuance and sale of the Securities by the Company and the issuance of the Warrant Shares upon exercise of the Warrants), as contemplated by the Registration Statement, the Pricing Disclosure Package and the Prospectus, except with respect to applicable federal and state securities laws, the rules and regulations of the Financial Industry Regulatory Authority, Inc. ("**FINRA**"), and the necessary filings and approvals from The Nasdaq Capital Market to list the Shares and Warrant Shares upon valid exercise of the Warrants and payment of the exercise price.

2.15 D&O Questionnaires. To the Company's knowledge, all information contained in the questionnaires (the "**Questionnaires**") completed by each of the Company's directors and officers immediately prior to the Offering (the "**Insiders**") as supplemented by all information concerning the Company's directors, officers and principal stockholders as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, as well as in each Lock-Up Agreement (as described in Section 2.25 below), provided to the Underwriter is true and correct in all material respects and the Company has not become aware of any information which would cause the information disclosed in the Questionnaires to become materially inaccurate and incorrect.

2.16 Litigation; Governmental Proceedings. Except as disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus, there is no action, suit, proceeding, inquiry, arbitration, investigation, litigation or governmental proceeding pending or, to the Company's knowledge, threatened against, or involving the Company, any Subsidiary or any property or assets of the Company or its Subsidiaries or, to the Company's knowledge, any executive officer or director which is before or by any court or governmental agency, authority or body, or any arbitrator or mediator.

2.17 Good Standing. The Company has been duly organized and is validly existing as a corporation and is in good standing under the laws of the jurisdiction in which it is organized as of the date hereof, and is duly qualified to do business and is in good standing in each other jurisdiction in which its ownership or lease of property or the conduct of business requires such qualification, except where the failure to qualify, singularly or in the aggregate, would not have or reasonably be expected to result in a Material Adverse Change.

2.18 Insurance. Each of the Company and its Subsidiaries carries or is entitled to the benefits of insurance, with reputable insurers, in such amounts and covering such risks which the Company believes are adequate, and all such insurance is in full force and effect. Neither the Company nor any Subsidiary has reason to believe that it will not be able: (i) to renew its existing insurance coverage as and when such policies expire or (ii) to obtain comparable coverage from similar institutions as may be necessary or appropriate to conduct its business as now conducted and at a cost that would not result in a Material Adverse Change.

2.19 Transactions Affecting Disclosure to FINRA.

2.19.1. Finder's Fees. Except as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, there are no claims, payments, arrangements, agreements or understandings relating to the payment of a finder's, consulting or origination fee by the Company with respect to the sale of the Securities hereunder or any other arrangements, agreements or understandings of the Company or, to the Company's knowledge, any of its stockholders that may affect the Underwriter's compensation, as determined by FINRA.

2.19.2. Payments Within Six (6) Months. Except as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, the Company has not made any direct or indirect payments (in cash, securities or otherwise) to: (i) any person, as a finder's fee, consulting fee or otherwise, in consideration of such person raising capital for the Company or introducing to the Company persons who raised or provided capital to the Company; (ii) any FINRA member; or (iii) any person or entity that has any direct or indirect affiliation or association with any FINRA member, within the six (6) months prior to the Effective Date, other than the payment to the Underwriter as provided hereunder in connection with the Offering.

2.19.3. Use of Proceeds. The Company shall apply the net proceeds of the Offering in the manner described under the caption "Use of Proceeds" in the Registration Statement, the Pricing Disclosure Package and the Prospectus.

2.19.4. FINRA Affiliation. There is no: (i) officer or director of the Company, (ii) beneficial owner of 5% or more of any class of the Company's securities or (iii) to the knowledge of the Company, beneficial owner of the Company's unregistered equity securities which were acquired during the 180-day period immediately preceding the filing of the Registration Statement that is an affiliate or associated person of a FINRA member participating in the Offering (as determined in accordance with the rules and regulations of FINRA).

2.19.5. Information. All information provided by the Company in its FINRA questionnaire to Underwriter's Counsel specifically for use by Underwriter's Counsel in connection with its Public Offering System filings (and related disclosure) with FINRA is true, correct and complete in all material respects.

2.19.6. Right to Act as Underwriter. Other than the Underwriter, no person has the right to act as an underwriter or as a financial advisor to the Company in connection with the transactions contemplated hereby.

2.20 Foreign Corrupt Practices Act. None of the Company and its Subsidiaries or, to the Company's knowledge, any director, officer, agent, employee or affiliate of the Company and its Subsidiaries or any other person acting on behalf of the Company and its Subsidiaries, has, directly or indirectly, given or agreed to give any money, gift or similar benefit (other than legal price concessions to customers in the ordinary course of business) to any customer, supplier, employee or agent of a customer or supplier, or official or employee of any governmental agency or instrumentality of any government (domestic or foreign) or any political party or candidate for office (domestic or foreign) or other person who was, is, or may be in a position to help or hinder the business of the Company (or assist it in connection with any actual or proposed transaction) that: (i) might subject the Company to any damage or penalty in any civil, criminal or governmental litigation or proceeding, (ii) if not given in the past, might have had a Material Adverse Change or (iii) if not continued in the future, might adversely affect the assets, business, operations or prospects of the Company. The Company has taken reasonable steps to ensure that its accounting controls and procedures are sufficient to cause the Company to comply in all material respects with the Foreign Corrupt Practices Act of 1977, as amended.

2.21 Compliance with OFAC. None of the Company and its Subsidiaries or, to the Company's knowledge, any director, officer, agent, employee or affiliate of the Company and its Subsidiaries or any other person acting on behalf of the Company and its Subsidiaries, is currently subject to any U.S. sanctions administered by the Office of Foreign Assets Control of the U.S. Department of the Treasury ("OFAC"), and the Company will not, directly or indirectly, use the proceeds of the Offering hereunder, or lend, contribute or otherwise make available such proceeds to any subsidiary, joint venture partner or other person or entity, for the purpose of financing the activities of any person currently subject to any U.S. sanctions administered by OFAC.

2.22 Money Laundering Laws. The operations of the Company and its Subsidiaries are and have been conducted at all times in compliance with applicable financial recordkeeping and reporting requirements of the Currency and Foreign Transactions Reporting Act of 1970, as amended, the money laundering statutes of all jurisdictions, the rules and regulations thereunder and any related or similar rules, regulations or guidelines, issued, administered or enforced by any Governmental Entity (collectively, the “**Money Laundering Laws**”); and no action, suit or proceeding by or before any Governmental Entity involving the Company with respect to the Money Laundering Laws is pending or, to the best knowledge of the Company, threatened.

2.23 Environmental Matters. Each of the Company and its Subsidiaries is in compliance in all material respects with all rules, laws and regulation relating to the use, treatment, storage and disposal of toxic substances and protection of health or the environment (“**Environmental Law**”) which are applicable to its business, except where non-compliance reasonably expected would not have a Material Adverse Change; (ii) neither the Company nor any Subsidiary has received any notice from any governmental authority or third party of an asserted claim under Environmental Laws; (iii) each of the Company and its Subsidiaries has received all permits, licenses or other approvals required of it under applicable Environmental Laws to conduct its respective business and is in compliance with all terms and conditions of any such permit, license or approval in all material respects, except where non-compliance would not have a Material Adverse Change; (iv) to the Company’s knowledge, no facts currently exist that will require the Company or any Subsidiary to make future material capital expenditures to comply with Environmental Laws; and (v) no property which is or has been owned, leased or occupied by the Company or any Subsidiary has been designated as a Superfund site pursuant to the Comprehensive Environmental Response, Compensation of Liability Act of 1980, as amended (42 U.S.C. Section 9601, et. seq.) (“**CERCLA 1980**”) or otherwise designated as a contaminated site under applicable state or local law. The Company has not been named as a “potentially responsible party” under CERCLA 1980.

2.24 Officers’ Certificate. Any certificate signed by any duly authorized officer of the Company and delivered to you or to Underwriter’s Counsel shall be deemed a representation and warranty by the Company to the Underwriter as to the matters covered thereby.

2.25 Lock-Up Agreements.

2.25.1. Schedule 3 hereto contains a complete and accurate list of the Company’s officers and directors (collectively, the “**Lock-Up Parties**”). The Company has caused each of the Lock-Up Parties to deliver to the Underwriter executed Lock-Up Agreements, in the form attached hereto as Exhibit B, prior to the execution of this Agreement.

2.25.2. The Company, on behalf of itself and any successor entity, agrees that, without the prior written consent of the Underwriter, it will not, for a period of ninety (90) days after the effective date of the Registration Statement (the “**Lock-Up Period**”): (i) offer, pledge, sell, contract to sell, sell any option or contract to purchase, grant, lend, or otherwise transfer or dispose of, directly or indirectly, any shares of capital stock of the Company or any securities convertible into or exercisable or exchangeable for shares of capital stock of the Company; (ii) file or cause to be filed any registration statement with the Commission relating to the offering of any shares of capital stock of the Company or any securities convertible into or exercisable or exchangeable for shares of capital stock of the Company; (iii) enter into any swap or other arrangement that transfers to another, in whole or in part, any of the economic consequences of ownership of capital stock of the Company, whether any such transaction described in clause (i) or (iii) above is to be settled by delivery of shares of capital stock of the Company or such other securities, in cash or otherwise; or (iv) publicly announce the intention to do any of the foregoing.



The restrictions contained in this Section 2.25.2 shall not apply to: (i) the Securities to be sold hereunder, (ii) the issuance by the Company of shares of Common Stock upon the exercise of a stock option or warrant or the conversion of a security outstanding on the date hereof, of which the Underwriter has been advised in writing and as disclosed as outstanding in the Registration Statement (excluding exhibits thereto) or the Prospectus, (iii) the issuance by the Company of stock options not exercisable during the Lock-Up Period or the grant of restricted shares of capital stock of the Company under any equity compensation plan of the Company described in the Registration Statement (excluding exhibits thereto) and the Prospectus, (iv) the issuance of equity securities pursuant to bona fide employee benefit or purchase plans established after the date hereof, or (v) securities to be issued or transferred pursuant to an M&A Transaction or Strategic Partnership Transaction. An “**M&A Transaction**” shall mean, whether effected in one transaction or a series of related transactions: (i) a merger or other business combination between the Company and another unrelated or unaffiliated company or entity (whether or not formed to acquire the Company or to effect the acquisition by the Company of such unrelated party) pursuant to which the Company’s shareholders hold less than a majority of the merged or combined entity’s equity after the M&A Transaction is consummated, or (ii) a sale, liquidation, or other disposition to unrelated or unaffiliated third parties of all or a substantial portion of the assets or stock of the Company, including the sale by the Company or its shareholders of more than 50% of the post-closing outstanding capital stock of the Company to a third party in an M&A Transaction to which the Company or its stockholders are a party. In addition, for purposes of this Agreement, a “**Strategic Partnership Transaction**” shall mean the sale, transfer or other disposition, directly or indirectly and whether in one or a series of related transactions, of a minority portion of the assets or businesses of the Company to a third party, whether negotiated purchase, license, tender or exchange offer, option, leveraged buyout, minority investment or partnership, joint or collaborative venture, divestiture, recapitalization or restructuring or otherwise.

2.26 Subsidiaries. All direct and indirect Subsidiaries of the Company are duly organized and in good standing under the laws of the place of organization or incorporation, and each Subsidiary is in good standing in each jurisdiction in which its ownership or lease of property or the conduct of business requires such qualification, except where the failure to qualify would not have a Material Adverse Change. The Company’s ownership and control of each Subsidiary is as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus. The subsidiaries of the Company listed in Schedule A hereto are the only “significant subsidiaries” (as such term is defined in Rule 1-02 of Regulation S-X promulgated under the Securities Act) of the Company.

2.27 Related Party Transactions. There are no business relationships or related party transactions involving the Company or any other person required to be described in the Registration Statement, the Pricing Disclosure Package and the Prospectus that have not been described as required.

2.28 Board of Directors. The Board of Directors of the Company is comprised of the persons so identified and set forth in the Company’s Prospectus.

2.29 Sarbanes-Oxley Compliance.

2.29.1. Disclosure Controls. The Company has developed and currently maintains disclosure controls and procedures that will comply with Rule 13a-15 or 15d-15 under the Exchange Act, and such controls and procedures are effective to ensure that all material information concerning the Company will be made known on a timely basis to the individuals responsible for the preparation of the Company’s Exchange Act filings and other public disclosure documents.

2.29.2. Compliance. The Company is in material compliance with the provisions of the Sarbanes-Oxley Act applicable to it, and has implemented or will implement such programs and taken reasonable steps to ensure the Company’s future compliance (not later than the relevant statutory and regulatory deadlines therefor) with all of the material provisions of the Sarbanes-Oxley Act of 2002 and the rules promulgated thereunder (the “**Sarbanes-Oxley Act**”).

2.30 Accounting Controls. The Company and its Subsidiaries maintain systems of “internal control over financial reporting” (as defined under Rules 13-a15 and 15d-15 under the Exchange Act) that comply with the requirements of the Exchange Act and have been designed by, or under the supervision of, their respective principal executive and principal financial officers, or persons performing similar functions, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with GAAP, including, but not limited to, internal accounting controls sufficient to provide reasonable assurance that: (i) transactions are executed in accordance with management’s general or specific authorizations; (ii) transactions are recorded as necessary to permit preparation of financial statements in conformity with GAAP and to maintain asset accountability; (iii) access to assets is permitted only in accordance with management’s general or specific authorization; and (iv) the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action is taken with respect to any differences. Except as disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus, the Company is not aware of any material weaknesses in its internal controls. The Company’s auditors and the Audit Committee of the Board of Directors of the Company have been advised of: (i) all significant deficiencies and material weaknesses in the design or operation of internal controls over financial reporting which are known to the Company’s management and that have adversely affected or are reasonably likely to adversely affect the Company’s ability to record, process, summarize and report financial information; and (ii) any fraud known to the Company’s management, whether or not material, that involves management or other employees who have a significant role in the Company’s internal controls over financial reporting.

2.31 No Investment Company Status. The Company is not and, after giving effect to the Offering and the application of the proceeds thereof as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, will not be, required to register as an “investment company,” as defined in the Investment Company Act of 1940, as amended.

2.32 No Labor Disputes. No labor dispute with the employees of the Company or any of its Subsidiaries exists or, to the knowledge of the Company, is imminent.

2.33 Property. The Company and its Subsidiaries have good and marketable title to all property (whether real or personal) described in the Registration Statement, the Pricing Disclosure Package and the Prospectus as being owned by them that is material to the business of the Company, in each case free and clear of all liens, claims, security interests, other encumbrances or defects, except those that are not reasonably likely to result in a Material Adverse Change. The property held under lease by the Company and its Subsidiaries is held by them under valid, subsisting and enforceable leases with only such exceptions with respect to any particular lease as do not interfere in any material respect with the conduct of the business of the Company and its Subsidiaries.

**2.34 Intellectual Property Rights.** To the knowledge of the Company, the Company and each of its Subsidiaries owns or possesses or has valid rights to use all patents, patent applications, trademarks, service marks, trade names, trademark registrations, service mark registrations, copyrights, licenses, inventions, trade secrets and similar rights (“**Intellectual Property Rights**”) necessary for the conduct of the business of the Company and its Subsidiaries as currently carried on and as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus. To the knowledge of the Company, no action or use by the Company or any of its Subsidiaries necessary for the conduct of its business as currently carried on and as described in the Registration Statement and the Prospectus will give rise to any infringement of any Intellectual Property Rights of others. Neither the Company nor any of its Subsidiaries has received any written notice alleging any such infringement, fee or conflict with asserted Intellectual Property Rights of others. Except as would not reasonably be expected to result, individually or in the aggregate, in a Material Adverse Change (A) to the knowledge of the Company, there is no infringement, misappropriation or violation by third parties of any of the Intellectual Property Rights owned by the Company; (B) there is no pending or, to the knowledge of the Company, threatened action, suit, proceeding or claim by others challenging the rights of the Company in or to any such Intellectual Property Rights, and the Company is unaware of any facts which would form a reasonable basis for any such claim, that would, individually or in the aggregate, together with any other claims in this Section 2.34, reasonably be expected to result in a Material Adverse Change; (C) the Intellectual Property Rights owned by the Company and, to the knowledge of the Company, the Intellectual Property Rights licensed to the Company have not been adjudged by a court of competent jurisdiction invalid or unenforceable, in whole or in part, and there is no pending or, to the Company’s knowledge, threatened action, suit, proceeding or claim by others challenging the validity or scope of any such Intellectual Property Rights, and the Company is unaware of any facts which would form a reasonable basis for any such claim that would, individually or in the aggregate, together with any other claims in this Section 2.34, reasonably be expected to result in a Material Adverse Change; (D) there is no pending or, to the Company’s knowledge, threatened action, suit, proceeding or claim by others that the Company infringes, misappropriates or otherwise violates any Intellectual Property Rights or other proprietary rights of others, the Company has not received any written notice of such claim and the Company is unaware of any other facts which would form a reasonable basis for any such claim that would, individually or in the aggregate, together with any other claims in this Section 2.34, reasonably be expected to result in a Material Adverse Change; and (E) to the Company’s knowledge, no employee of the Company is in or has ever been in violation in any material respect of any term of any employment contract, patent disclosure agreement, invention assignment agreement, non-competition agreement, non-solicitation agreement, nondisclosure agreement or any restrictive covenant to or with a former employer where the basis of such violation relates to such employee’s employment with the Company, or actions undertaken by the employee while employed with the Company and could reasonably be expected to result, individually or in the aggregate, in a Material Adverse Change. To the Company’s knowledge, all material technical information developed by and belonging to the Company which has not been patented has been kept confidential. The Company is not a party to or bound by any options, licenses or agreements with respect to the Intellectual Property Rights of any other person or entity that are required to be set forth in the Registration Statement, the Pricing Disclosure Package and the Prospectus and are not described therein. The Registration Statement, the Pricing Disclosure Package and the Prospectus contain in all material respects the same description of the matters set forth in the preceding sentence. None of the technology employed by the Company has been obtained or is being used by the Company in violation of any contractual obligation binding on the Company or, to the Company’s knowledge, any of its officers, directors or employees, or otherwise in violation of the rights of any persons.

**2.35 Taxes.** Each of the Company and its Subsidiaries has filed all returns (as hereinafter defined) required to be filed with taxing authorities prior to the date hereof or has duly obtained extensions of time for the filing thereof. Each of the Company and its Subsidiaries has paid all taxes (as hereinafter defined) shown as due on such returns that were filed and has paid all material taxes imposed on or assessed against the Company or such respective Subsidiary. The provisions for taxes payable, if any, shown on the financial statements filed with or as part of the Registration Statement are sufficient for all accrued and unpaid taxes, whether or not disputed, and for all periods to and including the dates of such consolidated financial statements. Except as disclosed in writing to the Underwriter: (i) no issues have been raised (and are currently pending) by any taxing authority in connection with any of the returns or taxes asserted as due from the Company or its Subsidiaries, and (ii) no waivers of statutes of limitation with respect to the returns or collection of taxes have been given by or requested from the Company or its Subsidiaries. The term “**taxes**” means all federal, state, local, foreign and other net income, gross income, gross receipts, sales, use, ad valorem, transfer, franchise, profits, license, lease, service, service use, withholding, payroll, employment, excise, severance, stamp, occupation, premium, property, windfall profits, customs, duties or other taxes, fees, assessments or charges of any kind whatever, together with any interest and any penalties, additions to tax or additional amounts with respect thereto. The term “**returns**” means all returns, declarations, reports, statements and other documents required to be filed in respect to taxes.

2.36 ERISA Compliance. The Company and any “employee benefit plan” (as defined under the Employee Retirement Income Security Act of 1974, as amended, and the regulations and published interpretations thereunder (collectively, “**ERISA**”)) established or maintained by the Company or its “ERISA Affiliates” (as defined below) are in compliance in all material respects with ERISA. “**ERISA Affiliate**” means, with respect to the Company, any member of any group of organizations described in Sections 414(b),(c),(m) or (o) of the Internal Revenue Code of 1986, as amended, and the regulations and published interpretations thereunder (the “**Code**”) of which the Company is a member. No “reportable event” (as defined under ERISA) has occurred or is reasonably expected to occur with respect to any “employee benefit plan” established or maintained by the Company or any of its ERISA Affiliates. No “employee benefit plan” established or maintained by the Company or any of its ERISA Affiliates, if such “employee benefit plan” were terminated, would have any “amount of unfunded benefit liabilities” (as defined under ERISA). Neither the Company nor any of its ERISA Affiliates has incurred or reasonably expects to incur any material liability under: (i) Title IV of ERISA with respect to termination of, or withdrawal from, any “employee benefit plan” or (ii) Sections 412, 4971, 4975 or 4980B of the Code. Each “employee benefit plan” established or maintained by the Company or any of its ERISA Affiliates that is intended to be qualified under Section 401(a) of the Code is so qualified and, to the knowledge of the Company, nothing has occurred, whether by action or failure to act, which would cause the loss of such qualification.

2.37 Compliance with Laws. Each of the Company and its Subsidiaries: (A) is and at all times has been in compliance with all statutes, rules, or regulations applicable to the ownership, testing, development, manufacture, packaging, processing, use, distribution, marketing, labeling, promotion, sale, offer for sale, storage, import, export or disposal of any product manufactured or distributed by the Company (“**Applicable Laws**”), except as could not, individually or in the aggregate, reasonably be expected to have a Material Adverse Change; (B) has not received any FDA Form 483, notice of adverse finding, warning letter, untitled letter or other correspondence or notice from the FDA or any other governmental authority alleging or asserting noncompliance with any Applicable Laws or any licenses, certificates, approvals, clearances, authorizations, permits and supplements or amendments thereto required by any such Applicable Laws (“**Authorizations**”); (C) possesses all material Authorizations and such Authorizations are valid and in full force and effect and are not in material violation of any term of any such Authorizations; (D) has not received notice of any claim, action, suit, proceeding, hearing, enforcement, investigation, arbitration or other action from any governmental authority or third party alleging that any product operation or activity is in violation of any Applicable Laws or Authorizations and has no knowledge that any such governmental authority or third party is considering any such claim, litigation, arbitration, action, suit, investigation or proceeding; (E) has not received notice that any governmental authority has taken, is taking or intends to take action to limit, suspend, modify or revoke any Authorizations and has no knowledge that any such governmental authority is considering such action; (F) has filed, obtained, maintained or submitted all material reports, documents, forms, notices, applications, records, claims, submissions and supplements or amendments as required by any Applicable Laws or Authorizations and that all such reports, documents, forms, notices, applications, records, claims, submissions and supplements or amendments were complete and correct on the date filed (or were corrected or supplemented by a subsequent submission) in all material respects; and (G) has not, either voluntarily or involuntarily, initiated, conducted, or issued or caused to be initiated, conducted or issued, any recall, market withdrawal or replacement, safety alert, post sale warning, “dear doctor” letter, or other notice or action relating to the alleged lack of safety or efficacy of any product or any alleged product defect or violation and, to the Company’s knowledge, no third party has initiated, conducted or intends to initiate any such notice or action.

2.38 Ineligible Issuer. As of the time of filing of the Registration Statement, as of the date of this Agreement and as of the Closing Date, the Company was not, is not, and will not be, an “ineligible issuer” as defined in Rule 405 under the Securities Act or an “excluded issuer” as defined in Rule 164 under the Securities Act.

2.39 Smaller Reporting Company. As of the time of filing of the Registration Statement, the Company was a “smaller reporting company,” as defined in Rule 12b-2 of the Exchange Act.

2.40 Industry Data. The statistical and market-related data included or incorporated by reference in each of the Registration Statement, the Pricing Disclosure Package and the Prospectus are based on or derived from sources that the Company reasonably and in good faith believes are reliable and accurate or represent the Company’s good faith estimates that are made on the basis of data derived from such sources, and the Company has obtained the written consent to the use of such data from such sources, to the extent required.

2.41 Regulatory.

2.41.1. Except as set forth in the Pricing Disclosure Package and the Prospectus, each of the Company and its Subsidiaries has such permits, licenses, certificates, approvals, clearances, authorizations or amendments thereto (the “**Regulatory Permits**”) issued by the appropriate federal, state, local or foreign regulatory agencies or bodies necessary to conduct the business of the Company as described in the Registration Statement, any Preliminary Prospectus, the Pricing Prospectus or the Prospectus and any Issuer Free Writing Prospectus, including, without limitation, any Investigational New Drug Application (“**IND**”), New Drug Application (“**NDA**”), or Biologics License Application (“**BLA**”) as required by the FDA or other authorizations issued by federal, state, local or foreign agencies or bodies engaged in the regulation of pharmaceuticals and biological products such as those being developed by the Company and its Subsidiaries (collectively, “**Governmental Authorities**,” and each, a “**Governmental Authority**”), except for any of the foregoing that would not, individually or in the aggregate, have a Material Adverse Change; each of the Company and its Subsidiaries is in compliance with the requirements of the Regulatory Permits, and all of the Regulatory Permits are valid and in full force and effect, in each case in all material respects; neither the Company nor any Subsidiary has received any notice of proceedings relating to the revocation, termination, modification or impairment of rights of any of the Regulatory Permits that, individually or in the aggregate, if the subject of an unfavorable decision, ruling or finding, could reasonably be expected to result in a Material Adverse Change; neither the Company nor any Subsidiary has failed to file with the FDA or any Governmental Authority any required application, submission, report, document, notice, supplement, or amendment, and all such filings were in material compliance with applicable laws when filed and have been supplemented as necessary to remain in material compliance with applicable laws and no material deficiencies have been asserted by the FDA or any Governmental Authority with respect to any such filings.

2.41.2. To the Company’s knowledge, the research, studies and clinical trials conducted by or on behalf of the Company and its Subsidiaries have been and, if still pending, are being conducted, in all material respects, in accordance with experimental protocols and procedures pursuant to all applicable laws and Regulatory Permits and the results of such research, studies and clinical trials described in the Registration Statement, any Preliminary Prospectus, the Pricing Prospectus or the Prospectus and any Issuer Free Writing Prospectus, are accurate and fairly present, in all material respects, the data derived from such research, studies, and clinical trials; any research, studies and clinical trials conducted by or on behalf of the Company and its Subsidiaries, if still pending, are, to the Company’s knowledge, being conducted in all material respects in accordance with professional and scientific standards and the applicable requirements of the FDA and other Governmental Authorities; neither the Company nor any Subsidiary has received any notice or correspondence from the FDA or any Governmental Authority requiring the termination, suspension or modification of any such study or clinical trial; and except to the extent disclosed in the Registration Statement, any Preliminary Prospectus, the Pricing Prospectus or the Prospectus and any Issuer Free Writing Prospectus, the Company is not aware of any research, study or clinical trial, the results of which the Company believes reasonably call into question the results described or referred to in the Registration Statement, any Preliminary Prospectus, the Pricing Prospectus or the Prospectus and any Issuer Free Writing Prospectus.

2.42 Rate of Business. No supplier, customer, distributor or sales agent of the Company has notified the Company that it intends to discontinue or decrease the rate of business done with the Company, except where such discontinuation or decrease is not reasonably likely to result in a Material Adverse Change.

3. Covenants of the Company. The Company covenants and agrees as follows:

3.1 Amendments to Registration Statement. The Company shall deliver to the Underwriter, prior to filing, any amendment or supplement to the Registration Statement or Prospectus proposed to be filed after the Effective Date and not file any such amendment or supplement to which the Underwriter shall reasonably object in writing.

3.2 Federal Securities Laws.

3.2.1. Compliance. The Company, subject to Section 3.2.2, shall comply with the requirements of Rule 430A of the Regulations, and will notify the Underwriter promptly, and confirm the notice in writing: (i) when any post-effective amendment to the Registration Statement shall become effective or any amendment or supplement to the Prospectus shall have been filed; (ii) of the receipt of any comments from the Commission; (iii) of any request by the Commission for any amendment to the Registration Statement or any amendment or supplement to the Prospectus or for additional information; (iv) of the issuance by the Commission of any stop order suspending the effectiveness of the Registration Statement or any post-effective amendment or of any order preventing or suspending the use of any Preliminary Prospectus or the Prospectus, or of the suspension of the qualification of the Securities for offering or sale in any jurisdiction, or of the initiation or threatening of any proceedings for any of such purposes or of any examination pursuant to Section 8(d) or 8(e) of the Securities Act concerning the Registration Statement and (v) if the Company becomes the subject of a proceeding under Section 8A of the Securities Act in connection with the Offering of the Securities. The Company shall effect all filings required under Rule 424(b) of the Regulations, in the manner and within the time period required by Rule 424(b) (without reliance on Rule 424(b)(8)), and shall take such steps as it deems necessary to ascertain promptly whether the form of prospectus transmitted for filing under Rule 424(b) was received for filing by the Commission and, in the event that it was not, it will promptly file such prospectus. The Company shall use its reasonable best efforts to prevent the issuance of any stop order, prevention or suspension and, if any such order is issued, to obtain the lifting thereof as soon as practicable.

3.2.2. Continued Compliance. The Company shall comply with the Securities Act and the Regulations so as to permit the completion of the distribution of the Securities as contemplated in this Agreement and in the Registration Statement, the Pricing Disclosure Package and the Prospectus. If at any time when a prospectus relating to the Securities is (or, but for the exception afforded by Rule 172 of the Regulations (“**Rule 172**”), would be) required by the Securities Act to be delivered in connection with sales of the Securities, any event shall occur or condition shall exist as a result of which it is necessary, in the opinion of counsel for the Underwriter or for the Company, to: (i) amend the Registration Statement in order that the Registration Statement will not include an untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein not misleading; (ii) amend or supplement the Pricing Disclosure Package or the Prospectus in order that the Pricing Disclosure Package or the Prospectus, as the case may be, will not include any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein not misleading in the light of the circumstances existing at the time it is delivered to a purchaser or (iii) amend the Registration Statement or amend or supplement the Pricing Disclosure Package or the Prospectus, as the case may be, in order to comply with the requirements of the Securities Act or the Regulations, the Company will promptly (A) give the Underwriter notice of such event; (B) prepare any amendment or supplement as may be necessary to correct such statement or omission or to make the Registration Statement, the Pricing Disclosure Package or the Prospectus comply with such requirements and, a reasonable amount of time prior to any proposed filing or use, furnish the Underwriter with copies of any such amendment or supplement and (C) file with the Commission any such amendment or supplement; provided that the Company shall not file or use any such amendment or supplement to which the Underwriter or counsel for the Underwriter shall reasonably object. The Company will furnish to the Underwriter such number of copies of such amendment or supplement as the Underwriter may reasonably request. The Company has given the Underwriter notice of any filings made pursuant to the Exchange Act or the regulations promulgated thereunder within 48 hours prior to the Applicable Time; the Company will give the Underwriter notice of its intention to make any such filing from the Applicable Time to the Closing Date and will furnish the Underwriter with copies of any such documents a reasonable amount of time prior to such proposed filing, as the case may be, and will not file or use any such document to which the Underwriter or counsel for the Underwriter shall reasonably object.

3.2.3. Filing of Final Prospectus. The Company shall file the Prospectus (in form and substance satisfactory to the Underwriter) with the Commission pursuant to the requirements of Rule 424 of the Regulations.

3.2.4. Exchange Act Registration. During the Prospectus Delivery Period (as defined below), the Company shall use its reasonable best efforts to maintain the registration of Securities under the Exchange Act. The Company shall not deregister the Securities under the Exchange Act without the prior written consent of the Underwriter.

3.2.5. Free Writing Prospectuses. The Company agrees that, unless it obtains the prior written consent of the Underwriter, which consent shall not be unreasonably withheld, it shall not make any offer relating to the Securities that would constitute an Issuer Free Writing Prospectus or that would otherwise constitute a “free writing prospectus,” or a portion thereof, required to be filed by the Company with the Commission or retained by the Company under Rule 433; provided that the Underwriter shall be deemed to have given its prior written consent to each Issuer General Use Free Writing Prospectus and any “road show that is a written communication” within the meaning of Rule 433(d)(8)(i). Any such free writing prospectus consented to by the Company and the Underwriter is hereinafter referred to as a “**Permitted Free Writing Prospectus**.” The Company represents that it has treated or agrees that it will treat each Permitted Free Writing Prospectus as an “issuer free writing prospectus,” as defined in Rule 433, and that it has complied and will comply with the requirements of Rule 433 applicable to any Permitted Free Writing Prospectus, including timely filing with the Commission where required, legending and record-keeping. If at any time following issuance of an Issuer Free Writing Prospectus there occurred or occurs an event or development as a result of which such Issuer Free Writing Prospectus conflicted or would conflict with the information contained in the Registration Statement or included or would include an untrue statement of a material fact or omitted or would omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances existing at that subsequent time, not misleading, the Company will promptly notify the Underwriter and will promptly amend or supplement, at its own expense, such Issuer Free Writing Prospectus to eliminate or correct such conflict, untrue statement or omission.

3.3 Delivery to the Underwriter of Registration Statements. At the Underwriter’s request, the Company shall deliver or make available to the Underwriter and counsel for the Underwriter, without charge, signed copies of the Registration Statement as originally filed and each amendment thereto (including exhibits filed therewith) and signed copies of all consents and certificates of experts, and will also deliver to the Underwriter, without charge, a conformed copy of the Registration Statement as originally filed and each amendment thereto (without exhibits) for the Underwriter. The copies of the Registration Statement and each amendment thereto furnished to the Underwriter will be identical to the electronically transmitted copies thereof filed with the Commission pursuant to EDGAR, except to the extent permitted by Regulation S-T.

3.4 Delivery to the Underwriter of Prospectuses. The Company will deliver or make available to the Underwriter, without charge, as many copies of each Preliminary Prospectus as the Underwriter reasonably requests, and the Company hereby consents to the use of such copies for purposes permitted by the Securities Act. The Company will furnish to the Underwriter, without charge, during the period when a prospectus relating to the Securities is (or, but for the exception afforded by Rule 172 of the Regulations, would be) required to be delivered under the Securities Act (the “**Prospectus Delivery Period**”), such number of copies of the Prospectus (as amended or supplemented) as the Underwriter may reasonably request. The Prospectus and any amendments or supplements thereto furnished to the Underwriter will be identical to the electronically transmitted copies thereof filed with the Commission pursuant to EDGAR, except to the extent permitted by Regulation S-T.

3.5 Effectiveness and Events Requiring Notice to the Underwriter. The Company shall use its best efforts to cause the Registration Statement to remain effective with a current prospectus during the Prospectus Delivery Period and shall notify the Underwriter immediately and confirm the notice in writing: (i) of the effectiveness of the Registration Statement and any amendment thereto; (ii) of the issuance by the Commission of any stop order suspending the effectiveness of the Registration Statement or of any order preventing or suspending its use or the use of the Pricing Disclosure Package or any Issuer Free Writing Prospectus, or of any proceedings to remove, suspend or terminate from listing or quotation the Common Stock (including the Securities) from any securities exchange upon which it is listed for trading or included or designated for quotation, or of the initiation, or the threatening, of any proceeding for that purpose; (iii) of the issuance by any state securities commission of any proceedings for the suspension of the qualification of the Securities for offering or sale in any jurisdiction or of the initiation, or the threatening, of any proceeding for that purpose; (iv) of the mailing and delivery to the Commission for filing of any amendment or supplement to the Registration Statement or Prospectus; (v) of the receipt of any comments or request for any additional information from the Commission with respect to the Registration Statement, Preliminary Prospectus or Prospectus; and (vi) of the happening of any event during the period described in this Section 3.5 that, in the judgment of the Company, makes any statement of a material fact made in the Registration Statement, the Pricing Disclosure Package or the Prospectus untrue or that requires the making of any changes in (a) the Registration Statement in order to make the statements therein not misleading, or (b) in the Pricing Disclosure Package or the Prospectus in order to make the statements therein, in light of the circumstances under which they were made, not misleading. If the Commission or any state securities commission shall enter a stop order or suspend such qualification at any time, the Company shall make every reasonable effort to obtain promptly the lifting of such order.

3.6 Review of Financial Statements. For a period of five (5) years after the Effective Date, the Company, at its expense, shall cause its regularly engaged independent registered public accounting firm to review (but not audit) the Company’s financial statements for each of the three fiscal quarters immediately preceding the announcement of any quarterly financial information.

3.7 Listing. The Company shall use its commercially reasonable efforts to maintain the listing of the shares of its Common Stock (including the Securities) on The Nasdaq Capital Market for at least three (3) years from the date of this Agreement.



### 3.8 Reports to the Underwriter.

3.8.1. Periodic Reports, etc. For a period of three (3) years after the Effective Date, the Company shall furnish to the Underwriter copies of such financial statements and other periodic and special reports as the Company from time to time furnishes generally to holders of any class of its securities and also promptly furnish to the Underwriter: (i) a copy of each periodic report the Company shall be required to file with the Commission; (ii) a copy of every press release and every news item and article with respect to the Company or its affairs which was released by the Company; (iii) a copy of each Form 8-K prepared and filed by the Company; (iv) five copies of each registration statement filed by the Company under the Securities Act; and (v) such additional documents and information with respect to the Company and the affairs of any future subsidiaries of the Company as the Underwriter may from time to time reasonably request; provided the Underwriter shall sign, if requested by the Company, a Regulation FD compliant confidentiality agreement which is reasonably acceptable to the Underwriter and Underwriter's Counsel in connection with the Underwriter's receipt of such information. Documents filed with the Commission pursuant to its EDGAR system shall be deemed to have been delivered to the Underwriter pursuant to this Section 3.8.1.

3.8.2. Transfer Agent; Transfer Sheets. During the Prospectus Delivery Period, the Company shall retain a transfer agent and registrar acceptable to the Underwriter (the "**Transfer Agent**") and shall furnish to the Underwriter at the Company's sole cost and expense such transfer sheets of the Company's securities as the Underwriter may reasonably request, including the daily and monthly consolidated transfer sheets of the Transfer Agent and DTC. Empire Stock Transfer, Inc. is acceptable to the Underwriter to act as Transfer Agent for the shares of Common Stock.

3.8.3. Warrant Agent; Transfer Sheets. The Company shall maintain a Warrant Agent acceptable to the Underwriter and shall furnish to the Underwriter at the Company's sole cost and expense such transfer sheets of the Company's securities as the Underwriter may reasonably request, including the daily and monthly consolidated transfer sheets of the Warrant Agent and DTC. Empire Stock Transfer, Inc. is acceptable to the Underwriter to act as Warrant Agent for the Warrant Shares.

3.9 General Expenses Related to the Offering. The Company hereby agrees to pay on the Closing Date, to the extent not paid at the Closing Date, all expenses incident to the performance of the obligations of the Company under this Agreement, including, but not limited to: (a) all filing fees and communication expenses relating to the registration of the Securities with the Commission; (b) all Public Filing System filing fees associated with the review of the Offering by FINRA (and the reasonable fees of FINRA counsel, but only up to \$20,000); (c) all fees, expenses and disbursements relating to the registration or qualification of such Securities under the "blue sky" securities laws of such states and other jurisdictions as the Underwriter may reasonably designate (including, without limitation, all filing and registration fees); (d) all fees, expenses and disbursements relating to the registration, qualification or exemption of such shares under the securities laws of such foreign jurisdictions as the Underwriter may reasonably designate; (e) the costs of all mailing and printing of the underwriting documents (including, without limitation, the Underwriting Agreement, any Blue Sky Surveys and, if appropriate, any Selected Dealers' Agreement, Underwriter's Questionnaire and Power of Attorney), registration statements, prospectuses and all amendments, supplements and exhibits thereto and as many preliminary and final Prospectuses as the Underwriter may reasonably deem necessary; (f) the costs and expenses of the public relations firm retained by the Company; (g) fees and expenses of the transfer agent for the shares of Common Stock and warrant agent for the Warrants; (h) stock transfer and/or stamp taxes, if any, payable upon the transfer of securities from the Company to the Underwriter; (i) the costs associated with post-Closing advertising the Offering in the national editions of the Wall Street Journal and New York Times; (l) the fees and expenses of the Company's accountants; (j) the fees and expenses of the Company's legal counsel and other agents and representatives; (l) the cost associated with the use of Ipreo's book building, prospectus tracking and compliance software for the Offering (limited to the costs associated with the Offering); and (m) the actual accountable "road show" expenses for the Offering of the officers, employees, agents and other representatives of the Company (but not officers, employees, agents or other representatives of the Underwriter) and fifty (50%) of the cost of any aircraft and other transportation chartered in connection with the road show; provided however that use and pricing of the aircraft shall be subject to the consent of the Company, not to be unreasonably withheld. The Underwriter may deduct from the net proceeds of the Offering payable to the Company on the Closing Date the expenses set forth herein to be paid by the Company to the Underwriter.

3.10 Application of Net Proceeds. The Company shall apply the net proceeds from the Offering received by it in a manner consistent with the application thereof described under the caption “Use of Proceeds” in the Prospectus.

3.11 Delivery of Earnings Statements to Security Holders. The Company shall make generally available to its security holders as soon as practicable, but not later than the first day of the fifteenth (15<sup>th</sup>) full calendar month following the Effective Date, an earnings statement (which need not be certified by independent registered public accounting firm unless required by the Securities Act or the Regulations, but which shall satisfy the provisions of Rule 158(a) of the Regulations and Section 11(a) of the Securities Act) covering a period of at least twelve (12) consecutive months beginning after the Effective Date.

3.12 Stabilization. Neither the Company nor, to its knowledge, any of its employees, directors or stockholders (without the consent of the Underwriter) has taken or shall take, directly or indirectly, any action designed to or that has constituted or that might reasonably be expected to cause or result in, under Regulation M of the Exchange Act, or otherwise, the stabilization or manipulation of the price of any security of the Company to facilitate the sale or resale of the Securities.

3.13 Internal Controls. The Company shall maintain a system of internal accounting controls sufficient to provide reasonable assurances that: (i) transactions are executed in accordance with management’s general or specific authorization; (ii) transactions are recorded as necessary in order to permit preparation of financial statements in accordance with GAAP and to maintain accountability for assets; (iii) access to assets is permitted only in accordance with management’s general or specific authorization; and (iv) the recorded accountability for assets is compared with existing assets at reasonable intervals and appropriate action is taken with respect to any differences.

3.14 Accountants. As of the Effective Date, the Company shall retain an independent registered public accounting firm reasonably acceptable to the Underwriter, and the Company shall continue to retain a nationally recognized independent registered public accounting firm for a period of at least three (3) years after the Effective Date. The Underwriter acknowledges that the Auditor is acceptable to the Underwriter.

3.15 FINRA. The Company shall advise the Underwriter (who shall make an appropriate filing with FINRA) if it is or becomes aware that: (i) any officer or director of the Company, (ii) any beneficial owner of 5% or more of any class of the Company's securities or (iii) any beneficial owner of the Company's unregistered equity securities which were acquired during the 180 days immediately preceding the filing of the Registration Statement is or becomes an affiliate or associated person of a FINRA member participating in the Offering (as determined in accordance with the rules and regulations of FINRA).

3.16 No Fiduciary Duties. The Company acknowledges and agrees that the Underwriter’s responsibility to the Company is solely contractual in nature and that none of the Underwriter or its affiliates or any selling agent shall be deemed to be acting in a fiduciary capacity, or otherwise owes any fiduciary duty to the Company or any of its affiliates in connection with the Offering and the other transactions contemplated by this Agreement.

3.17 Release of D&O Lock-up Period. If the Underwriter, in its sole discretion, agrees to release or waive the restrictions set forth in the Lock-Up Agreement described in Section 2.25.1 hereof for an officer or director of the Company and provide the Company with notice of the impending release or waiver at least three (3) Business Days before the effective date of the release or waiver, the Company agrees to announce the impending release or waiver by a press release through a major news service at least two (2) Business Days before the effective date of the release or waiver.

3.18 Blue Sky Qualifications. The Company shall use its reasonable best efforts, in cooperation with the Underwriter, if necessary, to qualify the Securities for offering and sale under the applicable securities laws of such states and other jurisdictions (domestic or foreign) as the Underwriter may designate and to maintain such qualifications in effect so long as required to complete the distribution of the Securities; provided, however, that the Company shall not be obligated to file any general consent to service of process or to qualify as a foreign corporation or as a dealer in securities in any jurisdiction in which it is not so qualified or to subject itself to taxation in respect of doing business in any jurisdiction in which it is not otherwise so subject.

3.19 Warrant Share Reserve. The Company shall, at all times while any Warrants are outstanding, reserve and keep available out of the aggregate of its authorized but unissued and otherwise unreserved shares of Common Stock, solely for the purpose of enabling it to issue Warrant Shares upon exercise of such Warrants, the number of Warrant Shares that are issuable and deliverable upon the exercise of the then-outstanding Warrants from time to time.

4. Conditions of Underwriter's Obligations. The obligations of the Underwriter to purchase and pay for the Securities, as provided herein, shall be subject to: (i) the continuing accuracy of the representations and warranties of the Company as of the date hereof and as of the Closing Date; (ii) the accuracy of the statements of officers of the Company made pursuant to the provisions hereof; (iii) the performance by the Company of its obligations hereunder; and (iv) the following conditions:

#### 4.1 Regulatory Matters.

4.1.1. Effectiveness of Registration Statement; Rule 430A Information. The Registration Statement has become effective not later than 5:00 p.m., Eastern time, on the date of this Agreement or such later date and time as shall be consented to in writing by you, and, at the Closing Date, no stop order suspending the effectiveness of the Registration Statement or any post-effective amendment thereto has been issued under the Securities Act, no order preventing or suspending the use of any Preliminary Prospectus or the Prospectus has been issued and no proceedings for any of those purposes have been instituted or are pending or, to the Company's knowledge, contemplated by the Commission. The Company has complied with each request (if any) from the Commission for additional information. A prospectus containing the Rule 430A Information shall have been filed with the Commission in the manner and within the time frame required by Rule 424(b) under the Regulations (without reliance on Rule 424(b)(8)) or a post-effective amendment providing such information shall have been filed with, and declared effective by, the Commission in accordance with the requirements of Rule 430A under the Regulations.

4.1.2. FINRA Clearance. By the Effective Date, FINRA shall have raised no objections as to the fairness and reasonableness of the amount of compensation allowable or payable to the Underwriter as described in the Registration Statement.

#### 4.2 Company Counsel Matters.

4.2.1. Closing Date Opinion of Counsel. On the Closing Date, the Underwriter shall have received the favorable opinion and negative assurance letter of Taft Stettinius & Hollister LLP, counsel to the Company, and Laxague Law, Inc., Nevada counsel to the Company, dated the Closing Date and addressed to the Underwriter each in a form reasonably acceptable to the Underwriter.

4.2.2. Opinion of Special Intellectual Property Counsel for the Company. On the Closing Date, the Underwriter shall have received the opinion of One<sup>3</sup> IP Management, P.C, special intellectual property counsel for the Company, dated the Closing Date, addressed to the Underwriter in a form reasonably acceptable to the Underwriter.

4.2.3. Reliance. In rendering such opinions, such counsel may rely: (i) as to matters involving the application of laws other than the laws of the United States and jurisdictions in which they are admitted, to the extent such counsel deems proper and to the extent specified in such opinion, if at all, upon an opinion or opinions (in form and substance reasonably satisfactory to the Underwriter) of other counsel reasonably acceptable to the Underwriter, familiar with the applicable laws; and (ii) as to matters of fact, to the extent they deem proper, on certificates or other written statements of officers of the Company and officers of departments of various jurisdictions having custody of documents respecting the corporate existence or good standing of the Company, provided that copies of any such statements or certificates shall be delivered to Underwriter's Counsel if requested. The opinions of Taft Stettinius & Hollister LLP, Laxague Law, Inc., and One<sup>3</sup> IP Management, P.C. and any opinion relied upon by Taft Stettinius & Hollister LLP, Laxague Law, Inc. and One<sup>3</sup> IP Management, P.C. include a statement to the effect that it may be relied upon by Underwriter's Counsel in its opinion delivered to the Underwriter.

#### 4.3 Comfort Letters.

4.3.1. Cold Comfort Letter. At the time this Agreement is executed, the Underwriter shall have received a cold comfort letter containing statements and information of the type customarily included in accountants' comfort letters with respect to the financial statements and certain financial information contained in or incorporated by reference in the Registration Statement, the Pricing Disclosure Package and the Prospectus, addressed to the Underwriter and in form and substance satisfactory in all respects to you and to the Auditor, dated as of the date of this Agreement.

4.3.2. Bring-down Comfort Letter. At the Closing Date, the Underwriter shall have received from the Auditor a letter, dated as of the Closing Date, to the effect that the Auditor reaffirms the statements made in the letter furnished pursuant to Section 4.3.1, except that the specified date referred to shall be a date not more than three (3) business days prior to the Closing Date.

#### 4.4 Officers' Certificates.

4.4.1. Officers' Certificate. The Company shall have furnished to the Underwriter a certificate, dated the Closing Date, of its Chief Executive Officer, and its Chief Financial Officer stating that: (i) such officers have carefully examined the Registration Statement, the Pricing Disclosure Package, any Issuer Free Writing Prospectus and the Prospectus and, in their opinion, the Registration Statement and each amendment thereto, as of the Applicable Time and as of the date of this Agreement and as of the Closing Date did not include any untrue statement of a material fact and did not omit to state a material fact required to be stated therein or necessary to make the statements therein not misleading, and the Pricing Disclosure Package, as of the Applicable Time and as of the Closing Date, any Issuer Free Writing Prospectus as of its date and as of the Closing Date, the Prospectus and each amendment or supplement thereto, as of the respective date thereof and as of the Closing Date, did not include any untrue statement of a material fact and did not omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances in which they were made, not misleading, (ii) since the effective date of the Registration Statement, no event has occurred which should have been set forth in a supplement or amendment to the Registration Statement, the Pricing Disclosure Package or the Prospectus, (iii) to the best of their knowledge after reasonable investigation, as of the Closing Date, the representations and warranties of the Company in this Agreement are true and correct and the Company has complied with all agreements and satisfied all conditions on its part to be performed or satisfied hereunder at or prior to the Closing Date, (iv) there has not been, subsequent to the date of the most recent audited financial statements included or incorporated by reference in the Pricing Disclosure Package, any Material Adverse Change in the financial position or results of operations of the Company, or any change or development that, singularly or in the aggregate, would involve a Material Adverse Change or a prospective Material Adverse Change, in or affecting the condition (financial or otherwise), results of operations, business, assets or prospects of the Company, except as set forth in the Prospectus, and (v) no stop order or other order (A) suspending the effectiveness of the Registration Statement or any part thereof or any amendment thereof, (B) suspending the qualification of the Securities for offering or sale, or (C) suspending or preventing the use of the Pricing Disclosure Package, the Prospectus or any Issuer Free Writing Prospectus, has been issued, and no proceeding for that purpose has been instituted or, to their knowledge, is contemplated by the Commission or any state or regulatory body.

4.4.2. Secretary's Certificate. At the Closing Date, the Underwriter shall have received a certificate of the Company signed by the Secretary of the Company, dated the Closing Date, certifying: (i) that each of the Charter and Bylaws is true and complete, has not been modified and is in full force and effect; (ii) that the resolutions of the Company's Board of Directors and any committee thereof relating to the Offering are in full force and effect and have not been modified; (iii) as to the accuracy and completeness of all correspondence between the Company or its counsel and the Commission; and (iv) as to the incumbency of the officers of the Company. The documents referred to in such certificate shall be attached to such certificate.

4.4.3. Chief Financial Officer's Certificate. At the Closing Date, the Underwriter shall have received a certificate of the Company signed by the Chief Financial Officer of the Company, dated the Closing Date, and addressed to the Underwriter, in form and substance satisfactory to the Underwriter.

4.5 No Material Changes. Prior to and on the Closing Date: (i) there shall have been no Material Adverse Change or development involving a prospective Material Adverse Change in the condition or prospects or the business activities, financial or otherwise, of the Company from the latest dates as of which such condition is set forth in the Registration Statement, the Pricing Disclosure Package and the Prospectus; (ii) no action, suit or proceeding, at law or in equity, shall have been pending or threatened against the Company or any Insider before or by any court or federal or state commission, board or other administrative agency wherein an unfavorable decision, ruling or finding which could reasonably be expected to cause a Material Adverse Change, except as set forth in the Registration Statement, the Pricing Disclosure Package and the Prospectus; (iii) no stop order shall have been issued under the Securities Act and no proceedings therefor shall have been initiated or threatened by the Commission; and (iv) the Registration Statement, the Pricing Disclosure Package and the Prospectus and any amendments or supplements thereto shall contain all material statements which are required to be stated therein in accordance with the Securities Act and the Regulations and shall conform in all material respects to the requirements of the Securities Act and the Regulations, and neither the Registration Statement, the Pricing Disclosure Package nor the Prospectus nor any amendment or supplement thereto shall contain any untrue statement of a material fact or omit to state any material fact required to be stated therein or necessary to make the statements therein, in light of the circumstances under which they were made, not misleading.

4.6 No Misstatements or Omissions. The Underwriter shall not have reasonably determined, and advised the Company, that the Registration Statement, the Pricing Disclosure Package or the Prospectus, or any amendment thereof or supplement thereto, or any Issuer Free Writing Prospectus, contains an untrue statement of fact which, in the Underwriter's reasonable opinion, is material, or omits to state a fact which, in the Underwriter's reasonable opinion, is material and is required to be stated therein or necessary to make the statements therein not misleading.

4.7 Delivery of Agreements. On the Effective Date, the Company shall have delivered to the Underwriter executed copies of the Lock-Up Agreements from each of the persons listed in Schedule 3 hereto.

4.8 Nasdaq Listing. The Securities shall have been listed and admitted and authorized for trading on The Nasdaq Capital Market.

4.9 Warrant Agreement. The Underwriter shall have received copies of the Warrant Agreement, duly executed by the Company and the Warrant Agent.

4.10 Additional Documents. At the Closing Date, Underwriter's Counsel shall have been furnished with such documents and opinions as they may reasonably require for the purpose of enabling Underwriter's Counsel to deliver an opinion to the Underwriter, or in order to evidence the accuracy of any of the representations or warranties, or the fulfillment of any of the conditions, herein contained; and all proceedings taken by the Company in connection with the issuance and sale of the Securities as herein contemplated shall be satisfactory in form and substance to the Underwriter and Underwriter's Counsel.

If any condition specified in this Section 4 shall not have been fulfilled when and as required to be fulfilled, this Agreement may be terminated by the Underwriter by notice to the Company at any time at or prior to the Closing Date, and such termination shall be without liability of any party to any other party, except that Section 3.9, Section 5 and Section 8.5 shall survive any such termination and remain in full force and effect.

5. Indemnification.

5.1 Indemnification of the Underwriter.

5.1.1. General. Subject to the conditions set forth below, the Company agrees to indemnify and hold harmless the Underwriter, and each dealer selected by the Underwriter that participates in the offer and sale of the Securities (each a "**Selected Dealer**") and each of their respective directors, officers and employees and each person, if any, who controls the Underwriter ("**Controlling Person**") within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act, against any and all loss, liability, claim, damage and expense whatsoever (including but not limited to any and all legal or other expenses reasonably incurred in investigating, preparing or defending against any litigation, commenced or threatened, or any claim whatsoever, whether arising out of any action between the Underwriter and the Company or between the Underwriter and any third party, or otherwise) to which they or any of them may become subject under the Securities Act, the Exchange Act or any other statute or at common law or otherwise or under the laws of foreign countries, arising out of or based upon any untrue statement or alleged untrue statement of a material fact contained in: (i) the Registration Statement, the Pricing Disclosure Package, the Preliminary Prospectus, the Prospectus or in any Issuer Free Writing Prospectus (as from time to time each may be amended and supplemented); (ii) any materials or information provided to investors by, or with the approval of, the Company in connection with the marketing of the Offering, including any "road show" or investor presentations made to investors by the Company (whether in person or electronically); or (iii) any application or other document or written communication (in this Section 5, collectively called "**application**") executed by the Company or based upon written information furnished by the Company in any jurisdiction in order to qualify the Securities under the securities laws thereof or filed with the Commission, any state securities commission or agency or any other national securities exchange; or the omission or alleged omission therefrom of a material fact required to be stated therein or necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading, unless such statement or omission was made in reliance upon, and in conformity with, the Underwriter's Information. With respect to any untrue statement or omission or alleged untrue statement or omission made in the Pricing Disclosure Package, the indemnity agreement contained in this Section 5.1.1 shall not inure to the benefit of the Underwriter to the extent that any loss, liability, claim, damage or expense of the Underwriter results from the fact that a copy of the Prospectus was not given or sent to the person asserting any such loss, liability, claim or damage at or prior to the written confirmation of sale of the Securities to such person as required by the Securities Act and the Regulations, and if the untrue statement or omission has been corrected in the Prospectus, unless such failure to deliver the Prospectus was a result of non-compliance by the Company with its obligations under Section 3.3 hereof. The Company agrees promptly to notify the Underwriter of the commencement of any litigation or proceedings against the Company or any of its officers, directors or Controlling Persons in connection with the issuance and sale of the Securities or in connection with the Registration Statement, the Pricing Disclosure Package, the Prospectus or any Issuer Free Writing Prospectus.

5.1.2. Procedure. If any action is brought against the Underwriter, a Selected Dealer or a Controlling Person in respect of which indemnity may be sought against the Company pursuant to Section 5.1.1, the Underwriter or such Selected Dealer or Controlling Person, as the case may be, shall promptly notify the Company in writing of the institution of such action and the Company shall assume the defense of such action, including the employment and fees of counsel (subject to the reasonable approval of the Underwriter or such Selected Dealer or Controlling Person, as the case may be) and payment of actual expenses. The Underwriter or such Selected Dealer or Controlling Person shall have the right to employ its or their own counsel in any such case, but the fees and expenses of such counsel shall be at the expense of the Underwriter or such Selected Dealer or Controlling Person unless: (i) the employment of such counsel at the expense of the Company shall have been authorized in writing by the Company in connection with the defense of such action, or (ii) the Company shall not have employed counsel to have charge of the defense of such action, or (iii) such indemnified party or parties shall have reasonably concluded that there may be defenses available to it or them which are different from or additional to those available to the Company (in which case the Company shall not have the right to direct the defense of such action on behalf of the indemnified party or parties), in any of which events the reasonable fees and expenses of not more than one additional firm of attorneys selected by the Underwriter (in addition to local counsel) or such Selected Dealer and/or Controlling Person shall be borne by the Company. Notwithstanding anything to the contrary contained herein, if the Underwriter or any Selected Dealer or Controlling Person shall assume the defense of such action as provided above, the Company shall have the right to approve the terms of any settlement of such action, which approval shall not be unreasonably withheld.

5.2 Indemnification of the Company. The Underwriter agrees to indemnify and hold harmless the Company, its directors, its officers who signed the Registration Statement and persons who control the Company within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act against any and all loss, liability, claim, damage and expense described in the foregoing indemnity from the Company to the Underwriter, as incurred, but only with respect to untrue statements or omissions, or alleged untrue statements or omissions made in the Registration Statement, any Preliminary Prospectus, the Pricing Disclosure Package or Prospectus or any amendment or supplement thereto or in any application, in reliance upon, and in strict conformity with, the Underwriter's Information. In case any action shall be brought against the Company or any other person so indemnified based on any Preliminary Prospectus, the Registration Statement, the Pricing Disclosure Package or Prospectus or any amendment or supplement thereto or any application, and in respect of which indemnity may be sought against the Underwriter, the Underwriter shall have the rights and duties given to the Company, and the Company and each other person so indemnified shall have the rights and duties given to the Underwriter by the provisions of Section 5.1.2.

### 5.3 Contribution.

5.3.1. Contribution Rights. If the indemnification provided for in this Section 5 shall for any reason be unavailable to or insufficient to hold harmless an indemnified party under Section 5.1 or 5.2 in respect of any loss, claim, damage or liability, or any action in respect thereof, referred to therein, then each indemnifying party shall, in lieu of indemnifying such indemnified party, contribute to the amount paid or payable by such indemnified party as a result of such loss, claim, damage or liability, or action in respect thereof: (i) in such proportion as shall be appropriate to reflect the relative benefits received by the Company, on the one hand, and the Underwriter, on the other, from the Offering of the Securities, or (ii) if the allocation provided by clause (i) above is not permitted by applicable law, in such proportion as is appropriate to reflect not only the relative benefits referred to in clause (i) above but also the relative fault of the Company, on the one hand, and the Underwriter, on the other, with respect to the statements or omissions that resulted in such loss, claim, damage or liability, or action in respect thereof, as well as any other relevant equitable considerations. The relative benefits received by the Company, on the one hand, and the Underwriter, on the other, with respect to such Offering shall be deemed to be in the same proportion as the total net proceeds from the Offering of the Securities purchased under this Agreement (before deducting expenses) received by the Company, as set forth in the table on the cover page of the Prospectus, on the one hand, and the total underwriting discounts and commissions received by the Underwriter with respect to the Securities purchased under this Agreement, as set forth in the table on the cover page of the Prospectus, on the other hand. The relative fault shall be determined by reference to whether the untrue or alleged untrue statement of a material fact or omission or alleged omission to state a material fact relates to information supplied by the Company or the Underwriter, the intent of the parties and their relative knowledge, access to information and opportunity to correct or prevent such statement or omission. The Company and the Underwriter agree that it would not be just and equitable if contributions pursuant to this Section 5.3.1 were to be determined by pro rata allocation or by any other method of allocation that does not take into account the equitable considerations referred to herein. The amount paid or payable by an indemnified party as a result of the loss, claim, damage or liability, or action in respect thereof, referred to above in this Section 5.3.1 shall be deemed to include, for purposes of this Section 5.3.1, any legal or other expenses reasonably incurred by such indemnified party in connection with investigating or defending any such action or claim. Notwithstanding the provisions of this Section 5.3.1 in no event shall the Underwriter be required to contribute any amount in excess of the amount by which the total underwriting discounts and commissions received by the Underwriter with respect to the Offering of the Securities exceeds the amount of any damages that the Underwriter has otherwise been required to pay by reason of such untrue or alleged untrue statement or omission or alleged omission. No person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) shall be entitled to contribution from any person who was not guilty of such fraudulent misrepresentation.

5.3.2. Contribution Procedure. Within fifteen (15) days after receipt by any party to this Agreement (or its representative) of notice of the commencement of any action, suit or proceeding, such party will, if a claim for contribution in respect thereof is to be made against another party ("**contributing party**"), notify the contributing party of the commencement thereof, but the failure to so notify the contributing party will not relieve it from any liability which it may have to any other party other than for contribution hereunder. In case any such action, suit or proceeding is brought against any party, and such party notifies a contributing party or its representative of the commencement thereof within the aforesaid fifteen (15) days, the contributing party will be entitled to participate therein with the notifying party and any other contributing party similarly notified. Any such contributing party shall not be liable to any party seeking contribution on account of any settlement of any claim, action or proceeding affected by such party seeking contribution on account of any settlement of any claim, action or proceeding affected by such party seeking contribution without the written consent of such contributing party. The contribution provisions contained in this Section 5.3.2 are intended to supersede, to the extent permitted by law, any right to contribution under the Securities Act, the Exchange Act or otherwise available.



6. Intentionally Omitted.

7. Additional Covenants.

7.1 Board Composition and Board Designations. The Company shall ensure that the qualifications of the persons serving as members of the Board of Directors and the overall composition of the Board comply with the Sarbanes-Oxley Act and with the listing rules of the NASDAQ Capital Market.

7.2 Prohibition on Press Releases and Public Announcements. The Company will not issue press releases or engage in any other publicity, without the Underwriter's prior written consent, for a period ending at 5:00 p.m., Eastern time, on the first (1<sup>st</sup>) Business Day following the forty-fifth (45<sup>th</sup>) day after the Closing Date, other than normal and customary releases issued in the ordinary course of the Company's business or in the reasonable judgment of the Company and its counsel, after notification to the Underwriter, such press release or communication is required by law.

8. Effective Date of this Agreement and Termination Thereof.

8.1 Effective Date. This Agreement shall become effective when both the Company and the Underwriter have executed the same and delivered counterparts of such signatures to the other party.

8.2 Termination. The Underwriter shall have the right to terminate this Agreement at any time prior to any Closing Date: (i) if any domestic or international event or act or occurrence has materially disrupted, or in Underwriter's reasonable and good faith opinion will in the immediate future materially disrupt, general securities markets in the United States; or (ii) if trading on the New York Stock Exchange or the NASDAQ Stock Market LLC shall have been suspended or materially limited, or minimum or maximum prices for trading shall have been fixed, or maximum ranges for prices for securities shall have been required by FINRA or by order of the Commission or any other government authority having jurisdiction; or (iii) if the United States shall have become involved in a new war or an increase in major hostilities; or (iv) if a banking moratorium has been declared by a New York State or federal authority; or (v) if a moratorium on foreign exchange trading has been declared which materially adversely impacts the United States securities markets; or (vi) if the Company shall have sustained a material loss by fire, flood, accident, hurricane, earthquake, theft, sabotage or other calamity or malicious act which, whether or not such loss shall have been insured, will, in Underwriter's reasonable and good faith opinion, make it inadvisable to proceed with the delivery of the Securities; or (vii) if the Company is in material breach of any of its representations, warranties or covenants hereunder; or (viii) if the Underwriter shall have become aware after the date hereof of such a Material Adverse Change in the conditions or prospects of the Company, or such adverse material change in general market conditions as in the Underwriter's reasonable and good faith judgment would make it impracticable to proceed with the offering, sale and/or delivery of the Public Securities or to enforce contracts made by the Underwriter for the sale of the Public Securities.

8.3 Expenses. Notwithstanding anything to the contrary in this Agreement, in the event that this Agreement shall not be carried out for any reason whatsoever, within the time specified herein or any extensions thereof pursuant to the terms herein, the Company shall be obligated to pay to the Underwriter its actual and accountable out-of-pocket expenses related to the transactions contemplated herein then due and payable, but subject to, and in compliance with FINRA Rule 5110(f)(2)(C) (including the fees and disbursements of Underwriter's Counsel and "road show" expenses (but excluding travel and lodging expenses of the Underwriter and one-half of the cost of aircraft and other transportation chartered in connection with the "road show")) up to \$200,000, and upon demand the Company shall pay the full amount thereof to the Underwriter; provided, however, that such expense cap in no way limits or impairs the indemnification and contribution provisions of this Agreement. Notwithstanding the foregoing, any advance received by the Underwriter will be reimbursed to the Company to the extent not actually incurred in compliance with FINRA Rule 5110(f)(2)(C).

8.4 Indemnification. Notwithstanding any contrary provision contained in this Agreement, any election hereunder or any termination of this Agreement, and whether or not this Agreement is otherwise carried out, the provisions of Section 5 shall remain in full force and effect and shall not be in any way affected by, such election or termination or failure to carry out the terms of this Agreement or any part hereof.

8.5 Representations, Warranties, Agreements to Survive. All representations, warranties and agreements contained in this Agreement or in certificates of officers of the Company submitted pursuant hereto, shall remain operative and in full force and effect regardless of: (i) any investigation made by or on behalf of the Underwriter or its Affiliates or selling agents, any person controlling the Underwriter, its officers or directors or any person controlling the Company or (ii) delivery of and payment for the Public Securities.

9. Miscellaneous.

9.1 Notices. All communications hereunder, except as herein otherwise specifically provided, shall be in writing and shall be mailed (registered or certified mail, return receipt requested), personally delivered or sent by facsimile transmission and confirmed and shall be deemed given when so delivered or faxed and confirmed or if mailed, two (2) days after such mailing.

If to the Underwriter:

Ladenburg Thalmann & Co. Inc.  
570 Lexington Avenue  
11<sup>th</sup> Floor  
New York, New York 10022  
Attn: General Counsel  
Fax No.: (212) 308-2203

with a copy (which shall not constitute notice) to:

Goodwin Procter LLP  
620 8<sup>th</sup> Avenue  
New York, NY 10018  
Attn: Michael Maline, Esq.  
Fax No.: (212) 355-3333

If to the Company:

Xenetic Biosciences, Inc.  
99 Hayden Avenue, Suite 230  
Lexington, MA 02421  
Attention: Scott Maguire, Chief Executive Officer  
Fax No.: (781) 538-4327

with a copy (which shall not constitute notice) to:

Taft Stettinius & Hollister LLP  
111 East Wacker, Suite 2800  
Chicago, IL 60601  
Attention: Mitchell Goldsmith, Esq.  
Fax No.: (312) 966-8479

9.2 Headings. The headings contained herein are for the sole purpose of convenience of reference, and shall not in any way limit or affect the meaning or interpretation of any of the terms or provisions of this Agreement.

9.3 Amendment. This Agreement may only be amended by a written instrument executed by each of the parties hereto.

9.4 Entire Agreement. This Agreement (together with the other agreements and documents being delivered pursuant to or in connection with this Agreement) constitutes the entire agreement of the parties hereto with respect to the subject matter hereof and thereof, and supersedes all prior agreements and understandings of the parties, oral and written, with respect to the subject matter hereof.

9.5 Binding Effect. This Agreement shall inure solely to the benefit of and shall be binding upon the Underwriter, the Company and the Controlling Persons, directors and officers referred to in Section 5 hereof, and their respective successors, legal representatives and assigns, and no other person shall have or be construed to have any legal or equitable right, remedy or claim under or in respect of or by virtue of this Agreement or any provisions herein contained. The term "successors and assigns" shall not include a purchaser, in its capacity as such, of securities from the Underwriter.

9.6 Governing Law; Consent to Jurisdiction; Trial by Jury. This Agreement shall be governed by and construed and enforced in accordance with the laws of the State of New York, without giving effect to conflict of laws principles thereof. The Company hereby agrees that any action, proceeding or claim against it arising out of, or relating in any way to this Agreement shall be brought and enforced in the New York Supreme Court, County of New York, or in the United States District Court for the Southern District of New York, and irrevocably submits to such jurisdiction, which jurisdiction shall be exclusive. The Company hereby waives any objection to such exclusive jurisdiction and that such courts represent an inconvenient forum. Any such process or summons to be served upon the Company may be served by transmitting a copy thereof by registered or certified mail, return receipt requested, postage prepaid, addressed to it at the address set forth in Section 9.1 hereof. Such mailing shall be deemed personal service and shall be legal and binding upon the Company in any action, proceeding or claim. The Company agrees that the prevailing party(ies) in any such action shall be entitled to recover from the other party(ies) all of its reasonable attorneys' fees and expenses relating to such action or proceeding and/or incurred in connection with the preparation therefor. The Company (on its behalf and, to the extent permitted by applicable law, on behalf of its stockholders and affiliates) and the Underwriter hereby irrevocably waives, to the fullest extent permitted by applicable law, any and all right to trial by jury in any legal proceeding arising out of or relating to this Agreement or the transactions contemplated hereby.

9.7 Execution in Counterparts. This Agreement may be executed in one or more counterparts, and by the different parties hereto in separate counterparts, each of which shall be deemed to be an original, but all of which taken together shall constitute one and the same agreement, and shall become effective when one or more counterparts has been signed by each of the parties hereto and delivered to each of the other parties hereto. Delivery of a signed counterpart of this Agreement by facsimile or email/pdf transmission shall constitute valid and sufficient delivery thereof.

9.8 Waiver, etc. The failure of any of the parties hereto to at any time enforce any of the provisions of this Agreement shall not be deemed or construed to be a waiver of any such provision, nor to in any way effect the validity of this Agreement or any provision hereof or the right of any of the parties hereto to thereafter enforce each and every provision of this Agreement. No waiver of any breach, non-compliance or non-fulfillment of any of the provisions of this Agreement shall be effective unless set forth in a written instrument executed by the party or parties against whom or which enforcement of such waiver is sought; and no waiver of any such breach, non-compliance or non-fulfillment shall be construed or deemed to be a waiver of any other or subsequent breach, non-compliance or non-fulfillment.

***[Signature Page Follows]***

If the foregoing correctly sets forth the understanding between the Underwriter and the Company, please so indicate in the space provided below for that purpose, whereupon this letter shall constitute a binding agreement between us.

Very truly yours,

XENETIC BIOSCIENCES, INC.

By: \_\_\_\_\_

Name:

Title:

Confirmed as of the date first written above mentioned, on behalf of itself as the Underwriter:

LADENBURG THALMANN & CO. INC.

By: \_\_\_\_\_

Name: David Strupp

Title: Managing Director

[Signature Page]

Xenetic Biosciences, Inc. – Underwriting Agreement

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**SCHEDULE 1**

	<b>Underwriter</b>	<b>Total Number of Shares</b>	<b>Total Number of Shares Underlying Warrants</b>
	Ladenburg Thalmann & Co. Inc.	<input type="text"/>	<input type="text"/>
<b>TOTAL</b>		<input type="text"/>	<input type="text"/>

**SCHEDULE 2-A**

**Pricing Information**

Number of Shares: [ ]

Number of Warrant: [ ]

Public Offering Price per share: \$[ ]

Underwriting Discount per share: \$[ ]

Sch. 2-1

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**SCHEDULE 2-B**

**Issuer General Use Free Writing Prospectuses**

None.

Sch. 2-2

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### **SCHEDULE 3**

#### **List of Lock-Up Parties**

- M. Scott Maguire
- Firdaus Jal Dastoor, FCS
- Roman Knyazev
- Darlene Deptula-Hicks
- PJSC Pharmsynthez
- SynBio LLC
- Baxalta, Incorporated (its successor-in-interest, Shire plc)
- Serum Institute of India Limited
- Kirill Surkov

## Form of Warrant

## XENETIC BIOSCIENCES, INC.

## Warrant To Purchase Common Stock

Warrant No.:

Number of Shares of Common Stock: \_\_\_\_\_

Date of Issuance: July [ ], 2016 ("Issuance Date")

Xenetic Biosciences, Inc., a Nevada corporation (the "**Company**"), hereby certifies that, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, [Name of Holder], the registered holder hereof or its permitted assigns (the "**Holder**"), is entitled, subject to the terms set forth below, to purchase from the Company, at the Exercise Price (as defined below) then in effect, upon surrender of this Warrant to Purchase Common Stock (including any Warrants to Purchase Common Stock issued in exchange, transfer or replacement hereof, the "**Warrant**"), at any time or times on or after the date hereof (the "**Exercisability Date**"), but not after 11:59 p.m., New York time, on the Expiration Date (as defined below), \_\_\_\_\_ (\_\_\_\_\_) <sup>1</sup> fully paid nonassessable shares of Common Stock (as defined below) (the "**Warrant Shares**"). Except as otherwise defined herein, capitalized terms in this Warrant shall have the meanings set forth in Section 15. This Warrant is the Warrant to purchase Common Stock (this "**Warrant**") issued pursuant to Section [ ] of that certain Underwriting Agreement (the "**Underwriting Agreement**"), dated as of July \_\_, 2016 (the "**Issuance Date**"), by and between the Company and the underwriters named therein.

1. EXERCISE OF WARRANT.

(a) Mechanics of Exercise. Subject to the terms and conditions hereof, this Warrant may be exercised by the Holder on any day on or after the Exercisability Date, in whole or in part, by delivery of a written notice, in the form attached hereto as Exhibit A (the "**Exercise Notice**"), of the Holder's election to exercise this Warrant. Within two (2) days following the Exercise Notice, the Holder shall make payment to the Company of an amount equal to the applicable Exercise Price multiplied by the number of Warrant Shares as to which this Warrant is being exercised (the "**Aggregate Exercise Price**") in cash or by wire transfer of immediately available funds, or provided the conditions for cashless exercise set forth in Section 1(d) are satisfied, by notifying the Company that this Warrant is being exercised pursuant to a Cashless Exercise (as defined in Section 1(d)). The Holder shall not be required to deliver the original Warrant in order to effect an exercise hereunder. Execution and delivery of the Exercise Notice with respect to less than all of the Warrant Shares shall have the same effect as cancellation of the original Warrant and issuance of a new Warrant evidencing the right to purchase the remaining number of Warrant Shares. On or before the first (1<sup>st</sup>) Business Day following the date on which the Company has received the Exercise Notice, the Company shall transmit by facsimile an acknowledgment of confirmation of receipt of the Exercise Notice to the Holder and the Company's transfer agent (the "**Transfer Agent**"). On or before the third (3<sup>rd</sup>) Business Day following the date on which the Company has received the Exercise Notice (the "**Share Delivery Date**"), the Company shall (X) provided that the Transfer Agent is participating in The Depository Trust Company ("**DTC**") Fast Automated Securities Transfer Program, upon the request of the Holder, credit such aggregate number of Warrant Shares to which the Holder is entitled pursuant to such exercise to the Holder's or its designee's balance account with DTC through its Deposit Withdrawal Agent Commission system, or (Y) if the Transfer Agent is not participating in the DTC Fast Automated Securities Transfer Program, issue and dispatch by overnight courier to the address as specified in the Exercise Notice, a certificate, registered in the Company's share register in the name of the Holder or its designee, for the number of shares of Common Stock to which the Holder is entitled pursuant to such exercise. Upon delivery of the Exercise Notice, the Holder shall be deemed for all corporate purposes to have become the holder of record of the Warrant Shares with respect to which this Warrant has been exercised, irrespective of the date such Warrant Shares are credited to the Holder's DTC account or the date of delivery of the certificates evidencing such Warrant Shares, as the case may be. If this Warrant is submitted in connection with any exercise pursuant to this Section 1(a) and the number of Warrant Shares represented by this Warrant submitted for exercise is greater than the number of Warrant Shares being acquired upon an exercise, then the Company shall as soon as practicable and in no event later than three Business Days after any exercise and at its own expense, issue a new Warrant (in accordance with Section 7(d)) representing the right to purchase the number of Warrant Shares purchasable immediately prior to such exercise under this Warrant, less the number of Warrant Shares with respect to which this Warrant is exercised. No fractional shares of Common Stock are to be issued upon the exercise of this Warrant, but rather the number of shares of Common Stock to be issued shall be rounded up to the nearest whole number. The Company shall pay any and all taxes which may be payable with respect to the issuance and delivery of Warrant Shares upon exercise of this Warrant.

<sup>1</sup> Insert a number of shares equal to \_\_\_\_% of the number of Common Shares purchased in the transaction.

(b) Exercise Price. For purposes of this Warrant, “**Exercise Price**” means \$\_\_\_\_\_, subject to adjustment as provided herein.

(c) Company’s Failure to Timely Deliver Securities. If the Company shall fail for any reason or for no reason to issue to the Holder within three (3) Business Days of receipt of the Exercise Notice in compliance with the terms of this Section 1, a certificate for the number of shares of Common Stock to which the Holder is entitled and register such shares of Common Stock on the Company’s share register or to credit the Holder’s balance account with DTC for such number of shares of Common Stock to which the Holder is entitled upon the Holder’s exercise of this Warrant, and if on or after such Trading Day the Holder purchases (in an open market transaction or otherwise) shares of Common Stock to deliver in satisfaction of a sale by the Holder of shares of Common Stock issuable upon such exercise that the Holder anticipated receiving from the Company (a “**Buy-In**”), then the Company shall, within three (3) Business Days after the Holder’s request and in the Holder’s discretion, either (i) pay cash to the Holder in an amount equal to the Holder’s total purchase price (including brokerage commissions, if any) for the shares of Common Stock so purchased (the “**Buy-In Price**”), at which point the Company’s obligation to deliver such certificate (and to issue such Warrant Shares) shall terminate, or (ii) promptly honor its obligation to deliver to the Holder a certificate or certificates representing such Warrant Shares and pay cash to the Holder in an amount equal to the excess (if any) of the Buy-In Price over the product of (A) such number of shares of Common Stock, times (B) the Closing Bid Price on the date of exercise.

(d) Cashless Exercise. Notwithstanding anything contained herein to the contrary, if a registration statement covering the Warrant Shares that are the subject of the Exercise Notice (the “**Unavailable Warrant Shares**”), or an exemption from registration, is not available for the resale of such Unavailable Warrant Shares, the Holder may, in its sole discretion, exercise this Warrant in whole or in part and, in lieu of making the cash payment otherwise contemplated to be made to the Company upon such exercise in payment of the Aggregate Exercise Price, elect instead to receive upon such exercise the “Net Number” of shares of Common Stock determined according to the following formula (a “**Cashless Exercise**”):

$$\text{Net Number} = \frac{(A \times B) - (A \times C)}{B}$$

For purposes of the foregoing formula:

A= the total number of shares with respect to which this Warrant is then being exercised.

B= the arithmetic average of the Closing Sale Prices of the shares of Common Stock for the five (5) consecutive Trading Days ending on the date immediately preceding the date of the Exercise Notice.

C= the Exercise Price then in effect for the applicable Warrant Shares at the time of such exercise.

(e) Rule 144. For purposes of Rule 144(d) promulgated under the Securities Act, as in effect on the date hereof, it is intended that the Warrant Shares issued in a Cashless Exercise shall be deemed to have been acquired by the Holder, and the holding period for the Warrant Shares shall be deemed to have commenced, on the date this Warrant was originally issued.

(f) Disputes. In the case of a dispute as to the determination of the Exercise Price or the arithmetic calculation of the Warrant Shares, the Company shall promptly issue to the Holder the number of Warrant Shares that are not disputed.

(g) Beneficial Ownership. The Company shall not effect the exercise of this Warrant, and the Holder shall not have the right to exercise this Warrant, to the extent that after giving effect to such exercise, such Person (together with such Person's affiliates) would beneficially own in excess of 4.99% (the "**Maximum Percentage**") of the shares of Common Stock outstanding immediately after giving effect to such exercise. For purposes of the foregoing sentence, the aggregate number of shares of Common Stock beneficially owned by such Person and its affiliates shall include the number of shares of Common Stock issuable upon exercise of this Warrant with respect to which the determination of such sentence is being made, but shall exclude shares of Common Stock which would be issuable upon (i) exercise of the remaining, unexercised portion of this Warrant beneficially owned by such Person and its affiliates and (ii) exercise or conversion of the unexercised or unconverted portion of any other securities of the Company beneficially owned by such Person and its affiliates (including, without limitation, any convertible notes or convertible preferred stock or warrants) subject to a limitation on conversion or exercise analogous to the limitation contained herein. Except as set forth in the preceding sentence, for purposes of this paragraph, beneficial ownership shall be calculated in accordance with Section 13(d) of the Securities Exchange Act of 1934, as amended. For purposes of this Warrant, in determining the number of outstanding shares of Common Stock, the Holder may rely on the number of outstanding shares of Common Stock as reflected in (1) the Company's most recent Form 10-K, Form 10-Q, Current Report on Form 8-K or other public filing with the Securities and Exchange Commission, as the case may be, (2) a more recent public announcement by the Company or (3) any other notice by the Company or the Transfer Agent setting forth the number of shares of Common Stock outstanding. For any reason at any time, upon the written request of the Holder, the Company shall within three (3) Business Days confirm orally and in writing to the Holder the number of shares of Common Stock then outstanding. In any case, the number of outstanding shares of Common Stock shall be determined after giving effect to the conversion or exercise of securities of the Company, including this Warrant, by the Holder and its affiliates since the date as of which such number of outstanding shares of Common Stock was reported. By written notice to the Company, the Holder may from time to time increase or decrease the Maximum Percentage to any other percentage not in excess of 9.99% specified in such notice; *provided* that (i) any such increase will not be effective until the sixty-first (61<sup>st</sup>) day after such notice is delivered to the Company, and (ii) any such increase or decrease will apply only to the Holder. The provisions of this paragraph shall be construed and implemented in a manner otherwise than in strict conformity with the terms of this Section 1(h) to correct this paragraph (or any portion hereof) which may be defective or inconsistent with the intended beneficial ownership limitation herein contained or to make changes or supplements necessary or desirable to properly give effect to such limitation.

2. ADJUSTMENT OF EXERCISE PRICE AND NUMBER OF WARRANT SHARES. The Exercise Price and the number of Warrant Shares shall be adjusted from time to time as follows:

(a) Adjustment upon Issuance of Shares of Common Stock. If and whenever on or after the date hereof and on or prior to the Expiration Date, the Company issues or sells, or in accordance with this Section 2 is deemed to have issued or sold, any shares of Common Stock (including the issuance or sale of shares of Common Stock owned or held by or for the account of the Company, but excluding shares of Common Stock deemed to have been issued by the Company in connection with any Excluded Securities, for a consideration per share (the “**New Issuance Price**”) less than a price (the “**Applicable Price**”) equal to the Exercise Price in effect immediately prior to such issue or sale or deemed issuance or sale (the foregoing a “**Dilutive Issuance**”), then immediately after such Dilutive Issuance, the Exercise Price then in effect shall be reduced to an amount equal to the product of (A) the Exercise Price in effect immediately prior to such Dilutive Issuance and (B) the quotient determined by dividing (1) the sum of (I) the product derived by multiplying the Exercise Price in effect immediately prior to such Dilutive Issuance and the number of shares of Common Stock Deemed Outstanding immediately prior to such Dilutive Issuance plus (II) the consideration, if any, received by the Company upon such Dilutive Issuance, by (2) the product derived by multiplying (I) the Exercise Price in effect immediately prior to such Dilutive Issuance by (II) the number of shares of Common Stock Deemed Outstanding immediately after such Dilutive Issuance. Upon each such adjustment of the Exercise Price hereunder, the number of Warrant Shares shall be adjusted to the number of shares of Common Stock determined by multiplying the Exercise Price in effect immediately prior to such adjustment by the number of Warrant Shares acquirable upon exercise of this Warrant immediately prior to such adjustment and dividing the product thereof by the Exercise Price resulting from such adjustment. For purposes of determining the adjusted Exercise Price under this Section 2(a), the following shall be applicable:

(i) Issuance of Options. If the Company in any manner grants any Options and the lowest price per share for which one share of Common Stock is issuable upon the exercise of any such Option or upon conversion, exercise or exchange of any Convertible Securities issuable upon exercise of any such Option is less than the Applicable Price, then such share of Common Stock shall be deemed to be outstanding and to have been issued and sold by the Company at the time of the granting or sale of such Option for such price per share. For purposes of this Section 2(a)(i), the “lowest price per share for which one share of Common Stock is issuable upon exercise of such Options or upon conversion, exercise or exchange of such Convertible Securities issuable upon exercise of any such Option” shall be equal to the sum of the lowest amounts of consideration (if any) received or receivable by the Company with respect to any one share of Common Stock upon the granting or sale of the Option, upon exercise of the Option and upon conversion, exercise or exchange of any Convertible Security issuable upon exercise of such Option. No further adjustment of the Exercise Price or number of Warrant Shares shall be made upon the actual issuance of such shares of Common Stock or of such Convertible Securities upon the exercise of such Options or upon the actual issuance of such shares of Common Stock upon conversion, exercise or exchange of such Convertible Securities.

(ii) Issuance of Convertible Securities. If the Company in any manner issues or sells any Convertible Securities and the lowest price per share for which one share of Common Stock is issuable upon the conversion, exercise or exchange thereof is less than the Applicable Price, then such share of Common Stock shall be deemed to be outstanding and to have been issued and sold by the Company at the time of the issuance or sale of such Convertible Securities for such price per share. For the purposes of this Section 2(a)(ii), the “lowest price per share for which one share of Common Stock is issuable upon the conversion, exercise or exchange thereof” shall be equal to the sum of the lowest amounts of consideration (if any) received or receivable by the Company with respect to one share of Common Stock upon the issuance or sale of the Convertible Security and upon conversion, exercise or exchange of such Convertible Security. No further adjustment of the Exercise Price or number of Warrant Shares shall be made upon the actual issuance of such shares of Common Stock upon conversion, exercise or exchange of such Convertible Securities, and if any such issue or sale of such Convertible Securities is made upon exercise of any Options for which adjustment of this Warrant has been or is to be made pursuant to other provisions of this Section 2(a), no further adjustment of the Exercise Price or number of Warrant Shares shall be made by reason of such issue or sale.

(iii) Change in Option Price or Rate of Conversion. If the purchase price provided for in any Options, the additional consideration, if any, payable upon the issue, conversion, exercise or exchange of any Convertible Securities, or the rate at which any Convertible Securities are convertible into or exercisable or exchangeable for shares of Common Stock increases or decreases at any time, then the Exercise Price and the number of Warrant Shares in effect at the time of such increase or decrease shall be adjusted to the Exercise Price and the number of Warrant Shares which would have been in effect at such time had such Options or Convertible Securities provided for such increased or decreased purchase price, additional consideration or increased or decreased conversion rate, as the case may be, at the time initially granted, issued or sold. For purposes of this Section 2(a)(iii), if the terms of any Option or Convertible Security that was outstanding as of the date of issuance of this Warrant are increased or decreased in the manner described in the immediately preceding sentence, then such Option or Convertible Security and the shares of Common Stock deemed issuable upon exercise, conversion or exchange thereof shall be deemed to have been issued as of the date of such increase or decrease. No adjustment pursuant to this Section 2(a) shall be made if such adjustment would result in an increase of the Exercise Price then in effect or a decrease in the number of Warrant Shares.

(iv) Calculation of Consideration Received. In case any Option is issued in connection with the issue or sale of other securities of the Company, together comprising one integrated transaction, (x) the Options will be deemed to have been issued for a value determined by use of the Black Scholes Option Pricing Model using a volatility equal to the greater of 100% and the 30-day volatility obtained from the HVT function on Bloomberg determined as of the Trading Day next following the public announcement of the applicable Dilutive Issuance (the “**Option Value**”) and (y) the other securities issued or sold in such integrated transaction shall be deemed to have been issued for the difference of (I) the aggregate consideration received by the Company, less (II) the Option Value. If any shares of Common Stock, Options or Convertible Securities are issued or sold or deemed to have been issued or sold for cash, the consideration received therefor will be deemed to be the net amount received or receivable by the Company therefor. If any shares of Common Stock, Options or Convertible Securities are issued or sold for a consideration other than cash, the amount of such consideration received by the Company will be the fair value of such consideration, except where such consideration consists of securities, in which case the amount of consideration received by the Company will be the Weighted Average Price of such security on the date of receipt. If any shares of Common Stock, Options or Convertible Securities are issued to the owners of the non-surviving entity in connection with any merger in which the Company is the surviving entity, the amount of consideration therefor will be deemed to be the fair value of such portion of the net assets and business of the non-surviving entity as is attributable to such shares of Common Stock, Options or Convertible Securities, as the case may be. The fair value of any consideration other than cash or securities will be determined jointly by the Company and the Holder. If such parties are unable to reach agreement within ten (10) days after the occurrence of an event requiring valuation (the “**Valuation Event**”), the fair value of such consideration will be determined within five (5) Business Days after the tenth (10<sup>th</sup>) day following the Valuation Event by an independent, reputable appraiser jointly selected by the Company and the Holder. The determination of such appraiser shall be final and binding upon all parties absent manifest error and the fees and expenses of such appraiser shall be borne by the Company.

(v) Exercise Floor Price. Unless and until such time as the Company receives any stockholder approval that may be required under any applicable stockholder approval provisions in order to allow the Exercise Price to be less than the Exercise Floor Price (as defined below), including, without limitation, under the rules and regulations of any exchange or automated quotation system on which any of the securities of the Company are listed or designated (the “**Required Stockholder Approval**”), no adjustment pursuant to Sections 2(a) shall cause the Exercise Price to be less than \$[ ]<sup>2</sup>, as adjusted for any stock dividend, stock split, stock combination, reclassification or similar transaction (the “**Exercise Floor Price**”). The Company shall not effect a Dilutive Issuance that would cause the Exercise Price to be less than the Exercise Floor Price without first obtaining the Required Stockholder Approval.

(vi) Record Date. If the Company takes a record of the holders of shares of Common Stock for the purpose of entitling them (A) to receive a dividend or other distribution payable in shares of Common Stock, Options or in Convertible Securities or (B) to subscribe for or purchase shares of Common Stock, Options or Convertible Securities, then such record date will be deemed to be the date of the issue or sale of the shares of Common Stock deemed to have been issued or sold upon the declaration of such dividend or the making of such other distribution or the date of the granting of such right of subscription or purchase, as the case may be.

(vii) Voluntary Adjustment By Company. The Company may at any time during the term of this Warrant reduce the then current Exercise Price to any amount and for any period of time deemed appropriate by the Board of Directors of the Company.

(b) Adjustment upon Subdivision or Combination of Common Stock. If the Company at any time on or after the date hereof subdivides (by any stock split, stock dividend, recapitalization, reorganization, scheme, arrangement or otherwise) one or more classes of its outstanding shares of Common Stock into a greater number of shares, the Exercise Price in effect immediately prior to such subdivision will be proportionately reduced and the number of Warrant Shares will be proportionately increased. If the Company at any time on or after the date hereof combines (by any stock split, stock dividend, recapitalization, reorganization, scheme, arrangement or otherwise) one or more classes of its outstanding shares of Common Stock into a smaller number of shares, the Exercise Price in effect immediately prior to such combination will be proportionately increased and the number of Warrant Shares will be proportionately decreased. Any adjustment under this Section 2(b) shall become effective at the close of business on the date the subdivision or combination becomes effective.

(c) Other Events. If any event occurs of the type contemplated by the provisions of this Section 2 but not expressly provided for by such provisions (including, without limitation, the granting of stock appreciation rights, phantom stock rights or other rights with equity features), then the Company’s Board of Directors will make an appropriate adjustment in the Exercise Price and the number of Warrant Shares so as to protect the rights of the Holder; provided that no such adjustment pursuant to this Section 2(c) will increase the Exercise Price or decrease the number of Warrant Shares as otherwise determined pursuant to this Section 2.

3. RIGHTS UPON DISTRIBUTION OF ASSETS. If the Company shall declare or make any dividend or other distribution of its assets (or rights to acquire its assets) to holders of shares of Common Stock, by way of return of capital or otherwise (including, without limitation, any distribution of cash, stock or other securities, property or options by way of a dividend, spin off, reclassification, corporate rearrangement, scheme of arrangement or other similar transaction) (a “**Distribution**”), the Holder shall be entitled to receive the dividend or distribution of assets that would have been payable to the Holder pursuant to the Distribution had the Holder exercised this Warrant (or, if this Warrant has been partially exercised prior to the Distribution, any unexercised portion thereof) immediately prior to such record date; provided, however, that the Holder shall only be permitted to take delivery of such Distribution if and to the extent the Holder exercises some or all of this Warrant (the portion of delivery of the Distribution shall be based on the pro-rata portion of the Warrant Shares issuable upon the portion of the Warrant exercised as compared to the maximum number of Warrant Shares issuable upon complete exercise of the Warrant (without regard to any limitations or restrictions on exercise of this Warrant, including without limitation, the Maximum Percentage)), provided that, to the extent that the Warrant has not been partially or completely exercised at the time of such Distribution, such portion of the Distribution shall be held in abeyance for the benefit of the Holder until the Holder has exercised the Warrant, at which time the Company shall issue to the Holder the pro-rata portion of such Distribution equivalent to that portion of this Warrant then exercised. Notwithstanding anything to the contrary contained herein, to the extent that the Holder’s right to participate in any such Distribution would result in the Holder and its affiliates exceeding the Maximum Percentage, then the Holder shall not be entitled to participate in such Distribution to the extent of the Maximum Percentage (and shall not be entitled to beneficial ownership of such shares of Common Stock as a result of such Distribution (and beneficial ownership) to the extent of any such excess) and the portion of such Distribution shall be held in abeyance for the benefit of the Holder until such time or times prior to the Expiration Date, if ever, as its right thereto would not result in the Holder and its affiliates exceeding the Maximum Percentage, at which time or times the Holder shall be granted such Distribution (and any Distributions declared or made on such initial Distribution or on any subsequent Distribution held similarly in abeyance) to the same extent as if there had been no such limitation).

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<sup>2</sup> Insert number equal to the closing bid price for the day immediately preceding the Time of Sale.

#### 4. PURCHASE RIGHTS; FUNDAMENTAL TRANSACTIONS.

(a) Purchase Rights. In addition to any adjustments pursuant to Section 2 above, if at any time prior to the Expiration Date the Company grants, issues or sells any Options, Convertible Securities or rights to purchase stock, warrants, securities or other property pro rata to the record holders of any class of shares of Common Stock (the “**Purchase Rights**”), then the Holder will be entitled to acquire, upon the terms applicable to such Purchase Rights, the aggregate Purchase Rights which the Holder could have acquired if the Holder had held the number of shares of Common Stock acquirable upon complete exercise of this Warrant (without regard to any limitations on the exercise of this Warrant) immediately before the date on which a record is taken for the grant, issuance or sale of such Purchase Rights, or, if no such record is taken, the date as of which the record holders of shares of Common Stock are to be determined for the grant, issue or sale of such Purchase Rights (provided, however, that to the extent that the Holder’s right to participate in any such Purchase Right would result in the Holder and its affiliates exceeding the Maximum Percentage, then the Holder shall not be entitled to participate in such Purchase Right to the extent of the Maximum Percentage (and shall not be entitled to beneficial ownership of such shares of Common Stock as a result of such Purchase Right (and beneficial ownership) to the extent of any such excess) and such Purchase Right to such extent shall be held in abeyance for the benefit of the Holder until such time or times prior to the Expiration Date, if ever, as its right thereto would not result in the Holder and its affiliates exceeding the Maximum Percentage, at which time or times the Holder shall be granted such right (and any Purchase Right granted, issued or sold on such initial Purchase Right or on any subsequent Purchase Right held similarly in abeyance) to the same extent as if there had been no such limitation).

(b) Fundamental Transactions. The Company shall not enter into or be party to a Fundamental Transaction unless the Successor Entity assumes this Warrant in accordance with the provisions of this Section (4)(b), including agreements to deliver to each holder of Warrants in exchange for such Warrants a security of the Successor Entity evidenced by a written instrument substantially similar in form and substance to this Warrant, including, without limitation, an adjusted exercise price equal to the value for the shares of Common Stock reflected by the terms of such Fundamental Transaction, and exercisable for a corresponding number of shares of capital stock equivalent to the shares of Common Stock acquirable and receivable upon exercise of this Warrant (without regard to any limitations on the exercise of this Warrant) prior to such Fundamental Transaction, and satisfactory to the Holder. Upon the occurrence of any Fundamental Transaction, the Successor Entity shall succeed to, and be substituted for (so that from and after the date of such Fundamental Transaction, the provisions of this Warrant referring to the “Company” shall refer instead to the Successor Entity), and may exercise every right and power of the Company and shall assume all of the obligations of the Company under this Warrant with the same effect as if such Successor Entity had been named as the Company herein. In addition to and not in substitution for any other rights hereunder, prior to the consummation of any Fundamental Transaction pursuant to which holders of shares of Common Stock are entitled to receive securities or other assets with respect to or in exchange for shares of Common Stock (a “**Corporate Event**”), the Company shall make appropriate provision to insure that the Holder will thereafter have the right to receive upon an exercise of this Warrant at any time after the consummation of the Fundamental Transaction but prior to the Expiration Date, in lieu of the shares of the Common Stock (or other securities, cash, assets or other property) purchasable upon the exercise of the Warrant prior to such Fundamental Transaction, such shares of stock, securities, cash, assets or any other property whatsoever (including warrants or other purchase or subscription rights) which the Holder would have been entitled to receive upon the happening of such Fundamental Transaction had the Warrant been exercised immediately prior to such Fundamental Transaction. If holders of Common Stock are given any choice as to the securities, cash or property to be received in a Fundamental Transaction, then the Holder shall be given the same choice as to the consideration it receives upon any exercise of this Warrant following such Fundamental Transaction. The provisions of this Section shall apply similarly and equally to successive Fundamental Transactions and Corporate Events and shall be applied without regard to any limitations on the exercise of this Warrant. Notwithstanding the foregoing, in the event of a Fundamental Transaction, at the request of the Holder delivered on the earliest to occur of (x) the public disclosure of any Fundamental Transaction, (y) the consummation of any Fundamental Transaction and (z) the Holder first becoming aware of any Fundamental Transaction (including, without limitation, a Fundamental Transaction that is publicly disclosed through the date that is thirty (30) days after the public disclosure of the consummation of such Fundamental Transaction by the Company pursuant to a Current Report on Form 8-K filed with the SEC, the Company (or the Successor Entity) shall purchase this Warrant from the Holder by paying to the Holder, within five (5) Business Days after such request (or, if later, on the effective date of the Fundamental Transaction), cash in an amount equal to the Black Scholes Value of the remaining unexercised portion of this Warrant on the date of such Fundamental Transaction.



5. NONCIRCUMVENTION. The Company hereby covenants and agrees that the Company will not, by amendment of its Certificate of Incorporation, Bylaws or through any reorganization, transfer of assets, consolidation, merger, scheme of arrangement, dissolution, issue or sale of securities, or any other voluntary action, avoid or seek to avoid the observance or performance of any of the terms of this Warrant, and will at all times in good faith carry out all the provisions of this Warrant and take all action as may be required to protect the rights of the Holder. Without limiting the generality of the foregoing, the Company (i) shall not increase the par value of any shares of Common Stock receivable upon the exercise of this Warrant above the Exercise Price then in effect, (ii) shall take all such actions as may be necessary or appropriate in order that the Company may validly and legally issue fully paid and nonassessable shares of Common Stock upon the exercise of this Warrant, and (iii) shall, so long as this Warrant is outstanding, take all action necessary to reserve and keep available out of its authorized and unissued shares of Common Stock, solely for the purpose of effecting the exercise of this Warrant, 100% of the number of shares of Common Stock issuable upon exercise of this Warrant then outstanding (without regard to any limitations on exercise).

6. WARRANT HOLDER NOT DEEMED A STOCKHOLDER. Except as otherwise specifically provided herein, the Holder, solely in such Person's capacity as a holder of this Warrant, shall not be entitled to vote or receive dividends or be deemed the holder of share capital of the Company for any purpose, nor shall anything contained in this Warrant be construed to confer upon the Holder, solely in such Person's capacity as the Holder of this Warrant, any of the rights of a stockholder of the Company or any right to vote, give or withhold consent to any corporate action (whether any reorganization, issue of stock, reclassification of stock, consolidation, merger, conveyance or otherwise), receive notice of meetings, receive dividends or subscription rights, or otherwise, prior to the issuance to the Holder of the Warrant Shares which such Person is then entitled to receive upon the due exercise of this Warrant. In addition, nothing contained in this Warrant shall be construed as imposing any liabilities on the Holder to purchase any securities (upon exercise of this Warrant or otherwise) or as a stockholder of the Company, whether such liabilities are asserted by the Company or by creditors of the Company.

7. REISSUANCE OF WARRANTS.

(a) Transfer of Warrant. If this Warrant is to be transferred, the Holder shall surrender this Warrant to the Company, whereupon the Company will forthwith issue and deliver upon the order of the Holder a new Warrant (in accordance with Section 7(d)), registered as the Holder may request, representing the right to purchase the number of Warrant Shares being transferred by the Holder and, if less than the total number of Warrant Shares then underlying this Warrant is being transferred, a new Warrant (in accordance with Section 7(d)) to the Holder representing the right to purchase the number of Warrant Shares not being transferred.

(b) Lost, Stolen or Mutilated Warrant. Upon receipt by the Company of evidence reasonably satisfactory to the Company of the loss, theft, destruction or mutilation of this Warrant, and, in the case of loss, theft or destruction, of any indemnification undertaking by the Holder to the Company in customary form and, in the case of mutilation, upon surrender and cancellation of this Warrant, the Company shall execute and deliver to the Holder a new Warrant (in accordance with Section 7(d)) representing the right to purchase the Warrant Shares then underlying this Warrant.

(c) Exchangeable for Multiple Warrants. This Warrant is exchangeable, upon the surrender hereof by the Holder at the principal office of the Company, for a new Warrant or Warrants (in accordance with Section 7(d)) representing in the aggregate the right to purchase the number of Warrant Shares then underlying this Warrant, and each such new Warrant will represent the right to purchase such portion of such Warrant Shares as is designated by the Holder at the time of such surrender; provided, however, that no Warrants for fractional shares of Common Stock shall be given.

(d) Issuance of New Warrants. Whenever the Company is required to issue a new Warrant pursuant to the terms of this Warrant, such new Warrant (i) shall be of like tenor with this Warrant, (ii) shall represent, as indicated on the face of such new Warrant, the right to purchase the Warrant Shares then underlying this Warrant (or in the case of a new Warrant being issued pursuant to Section 7(a) or Section 7(c), the Warrant Shares designated by the Holder which, when added to the number of shares of Common Stock underlying the other new Warrants issued in connection with such issuance, does not exceed the number of Warrant Shares then underlying this Warrant), (iii) shall have an issuance date, as indicated on the face of such new Warrant which is the same as the Issuance Date, and (iv) shall have the same rights and conditions as this Warrant.

8. NOTICES. The Company shall provide the Holder with prompt written notice of all actions taken pursuant to this Warrant, including in reasonable detail a description of such action and the reason therefore.

9. AMENDMENT AND WAIVER. Except as otherwise provided herein, the provisions of this Warrant may be amended and the Company may take any action herein prohibited, or omit to perform any act herein required to be performed by it, only if the Company has obtained the written consent of the Holder.

10. GOVERNING LAW. This Warrant shall be governed by and construed and enforced in accordance with, and all questions concerning the construction, validity, interpretation and performance of this Warrant shall be governed by, the internal laws of the State of New York, without giving effect to any choice of law or conflict of law provision or rule (whether of the State of New York or any other jurisdictions) that would cause the application of the laws of any jurisdictions other than the State of New York.

11. CONSTRUCTION; HEADINGS. This Warrant shall be deemed to be jointly drafted by the Company and the Holder and shall not be construed against any person as the drafter hereof. The headings of this Warrant are for convenience of reference and shall not form part of, or affect the interpretation of, this Warrant.

12. DISPUTE RESOLUTION. In the case of a dispute as to the determination of the Exercise Price or the arithmetic calculation of the Warrant Shares, the Company shall submit the disputed determinations or arithmetic calculations via facsimile within two (2) Business Days of receipt of the Exercise Notice giving rise to such dispute, as the case may be, to the Holder. If the Holder and the Company are unable to agree upon such determination or calculation of the Exercise Price or the Warrant Shares within three Business Days of such disputed determination or arithmetic calculation being submitted to the Holder, then the Company shall, within two (2) Business Days submit via facsimile (a) the disputed determination of the Exercise Price to an independent, reputable investment bank selected by the Company and approved by the Holder or (b) the disputed arithmetic calculation of the Warrant Shares to the Company's independent, outside accountant. The Company shall cause at its expense the investment bank or the accountant, as the case may be, to perform the determinations or calculations and notify the Company and the Holder of the results no later than ten Business Days from the time it receives the disputed determinations or calculations. Such investment bank's or accountant's determination or calculation, as the case may be, shall be binding upon all parties absent demonstrable error.

13. REMEDIES, OTHER OBLIGATIONS, BREACHES AND INJUNCTIVE RELIEF. The remedies provided in this Warrant shall be cumulative and in addition to all other remedies available under this Warrant, at law or in equity (including a decree of specific performance and/or other injunctive relief), and nothing herein shall limit the right of the Holder to pursue actual damages for any failure by the Company to comply with the terms of this Warrant.

14. TRANSFER. This Warrant may be offered for sale, sold, transferred or assigned without the consent of the Company.

15. CERTAIN DEFINITIONS. For purposes of this Warrant, the following terms shall have the following meanings:

(a) **“Black Scholes Value”** means the value of this Warrant based on the Black and Scholes Option Pricing Model obtained from the “OV” function on Bloomberg using (i) a price per share of Common Stock equal to the Weighted Average Price of the Common Stock for the Trading Day immediately preceding the date of consummation of the applicable Fundamental Transaction, (ii) a risk-free interest rate corresponding to the U.S. Treasury rate for a period equal to the remaining term of this Warrant as of the date of consummation of the applicable Fundamental Transaction and (iii) an expected volatility equal to the greater of 100% and the 30-day volatility obtained from the HVT function on Bloomberg determined as of the Trading Day next following the public announcement of the applicable Fundamental Transaction.

(b) **“Bloomberg”** means Bloomberg Financial Markets.

(c) **“Business Day”** means any day other than Saturday, Sunday or other day on which commercial banks in The City of New York are authorized or required by law to remain closed.

(d) RESERVED.

(e) **“Closing Bid Price”** and **“Closing Sale Price”** means, for any security as of any date, the last closing bid price and last closing trade price, respectively, for such security on the Principal Market, as reported by Bloomberg, or, if the Principal Market begins to operate on an extended hours basis and does not designate the closing bid price or the closing trade price, as the case may be, then the last bid price or the last trade price, respectively, of such security prior to 4:00:00 p.m., New York time, as reported by Bloomberg, or, if the Principal Market is not the principal securities exchange or trading market for such security, the last closing bid price or last trade price, respectively, of such security on the principal securities exchange or trading market where such security is listed or traded as reported by Bloomberg, or if the foregoing do not apply, the last closing bid price or last trade price, respectively, of such security in the over-the-counter market on the electronic bulletin board for such security as reported by Bloomberg, or, if no closing bid price or last trade price, respectively, is reported for such security by Bloomberg, the average of the bid prices, or the ask prices, respectively, of any market makers for such security as reported in the “pink sheets” by Pink Sheets LLC (formerly the National Quotation Bureau, Inc.). If the Closing Bid Price or the Closing Sale Price cannot be calculated for a security on a particular date on any of the foregoing bases, the Closing Bid Price or the Closing Sale Price, as the case may be, of such security on such date shall be the fair market value as mutually determined by the Company and the Holder. All such determinations to be appropriately adjusted for any stock dividend, stock split, stock combination or other similar transaction during the applicable calculation period.

(f) **“Common Stock”** means (i) the Company’s shares of Common Stock, par value \$0.01 per share, and (ii) any share capital into which such Common Stock shall have been changed or any share capital resulting from a reclassification of such Common Stock.

(g) **“Common Stock Deemed Outstanding”** means, at any given time, the number of shares of Common Stock actually outstanding at such time, plus the number of shares of Common Stock deemed to be outstanding pursuant to Sections 2(a)(i) and 2(a)(ii) hereof regardless of whether the Options or Convertible Securities are actually exercisable at such time, but excluding any shares of Common Stock owned or held by or for the account of the Company or issuable upon exercise of this Warrant.

(h) **“Convertible Securities”** means any stock or securities (other than Options) directly or indirectly convertible into or exercisable or exchangeable for shares of Common Stock.

(i) **“Eligible Market”** means the Principal Market, The New York Stock Exchange, Inc., The American Stock Exchange, The NASDAQ Global Select Market or The NASDAQ Capital Market.

(j) **“Excluded Securities”** means the issuance of (a) shares of Common Stock or options to employees, officers or directors of the Company in their capacity as such pursuant to any stock or option plan or employment agreement duly adopted for such purpose, by a majority of the non-employee members of the Board of Directors or a majority of the members of a committee of non-employee directors established for such purpose, (b) securities upon the exercise or exchange of or conversion of the securities issued hereunder and/or other securities exercisable or exchangeable for or convertible into shares of Common Stock issued and outstanding on the date of this Agreement, provided that such securities have not been amended since the date of this Agreement to increase the number of such securities or to decrease the exercise price, exchange price or conversion price of such securities, and (c) securities issued pursuant to acquisitions or strategic transactions approved by a majority of the disinterested directors of the Company, provided that any such issuance shall only be to a Person (or to the equity holders of a Person) which is, itself or through its subsidiaries, an operating company or an owner of an asset in a business synergistic with the business of the Company and shall provide to the Company additional benefits in addition to the investment of funds, but shall not include a transaction in which the Company is issuing securities primarily for the purpose of raising capital or to an entity whose primary business is investing in securities.

(k) **“Expiration Date”** means the date \_\_\_\_\_ (\_\_\_\_) months after the Exercisability Date or, if such date falls on a day other than a Business Day or on which trading does not take place on the Principal Market (a **“Holiday”**), the next date that is not a Holiday.

(l) **“Fundamental Transaction”** means that the Company shall, directly or indirectly, in one or more related transactions, (i) consolidate or merge with or into (whether or not the Company is the surviving corporation) another Person, or (ii) sell, assign, transfer, convey or otherwise dispose of all or substantially all of the properties or assets of the Company to another Person, or (iii) allow another Person to make a purchase, tender or exchange offer that is accepted by the holders of more than the 50% of the outstanding shares of Common Stock (not including any shares of Common Stock held by the Person or Persons making or party to, or associated or affiliated with the Persons making or party to, such purchase, tender or exchange offer), or (iv) consummate a stock purchase agreement or other business combination (including, without limitation, a reorganization, recapitalization, spin-off or scheme of arrangement) with another Person whereby such other Person acquires more than the 50% of the outstanding shares of Common Stock (not including any shares of Common Stock held by the other Person or other Persons making or party to, or associated or affiliated with the other Persons making or party to, such stock purchase agreement or other business combination) [NTD – may need to tweak this provision, Xenetic may be close to the 50% threshold from the get go], (v) reorganize, recapitalize or reclassify its Common Stock, or (vi) any “person” or “group” (as these terms are used for purposes of Sections 13(d) and 14(d) of the Exchange Act) is or shall become the “beneficial owner” (as defined in Rule 13d-3 under the Exchange Act), directly or indirectly, of 50% of the aggregate ordinary voting power represented by issued and outstanding Common Stock [same comment as in (iv)].

(m) **“Market Price”** means the arithmetic average of the volume weighted average price for the common stock on each of the five (5) Trading Days ending on and including the applicable date, but in no event greater than the volume weighted average price of Common Stock on the applicable date.

(n) “**Options**” means any rights, warrants or options to subscribe for or purchase shares of Common Stock or Convertible Securities.

(o) “**Parent Entity**” of a Person means an entity that, directly or indirectly, controls the applicable Person and whose common stock or equivalent equity security is quoted or listed on an Eligible Market, or, if there is more than one such Person or Parent Entity, the Person or Parent Entity with the largest public market capitalization as of the date of consummation of the Fundamental Transaction.

(p) “**Person**” means an individual, a limited liability company, a partnership, a joint venture, a corporation, a trust, an unincorporated organization, any other entity and a government or any department or agency thereof.

(q) “**Principal Market**” means The NASDAQ Global Market.

(r) RESERVED

(s) RESERVED

(t) “**Successor Entity**” means the Person (or, if so elected by the Holder, the Parent Entity) formed by, resulting from or surviving any Fundamental Transaction or the Person (or, if so elected by the Holder, the Parent Entity) with which such Fundamental Transaction shall have been entered into.

(u) “**Trading Day**” means any day on which the Common Stock are traded on the Principal Market, or, if the Principal Market is not the principal trading market for the Common Stock, then on the principal securities exchange or securities market on which the Common Stock are then traded; *provided* that “Trading Day” shall not include any day on which the Common Stock are scheduled to trade on such exchange or market for less than 4.5 hours or any day that the Common Stock are suspended from trading during the final hour of trading on such exchange or market (or if such exchange or market does not designate in advance the closing time of trading on such exchange or market, then during the hour ending at 4:00:00 p.m., New York time).

(v) “**Weighted Average Price**” means, for any security as of any date, the dollar volume-weighted average price for such security on the Principal Market during the period beginning at 9:30:01 a.m., New York City time, and ending at 4:00:00 p.m., New York City time, as reported by Bloomberg through its “Volume at Price” function or, if the foregoing does not apply, the dollar volume-weighted average price of such security in the over-the-counter market on the electronic bulletin board for such security during the period beginning at 9:30:01 a.m., New York City time, and ending at 4:00:00 p.m., New York City time, as reported by Bloomberg, or, if no dollar volume-weighted average price is reported for such security by Bloomberg for such hours, the average of the highest closing bid price and the lowest closing ask price of any of the market makers for such security as reported in the “pink sheets” by Pink Sheets LLC (formerly the National Quotation Bureau, Inc.). If the Weighted Average Price cannot be calculated for such security on such date on any of the foregoing bases, the Weighted Average Price of such security on such date shall be the fair market value as mutually determined by the Company and the Holder. If the Company and the Holder are unable to agree upon the fair market value of such security, then such dispute shall be resolved pursuant to Section 12 with the term “Weighted Average Price” being substituted for the term “Exercise Price.” All such determinations shall be appropriately adjusted for any share dividend, share split or other similar transaction during such period.

[Signature Page Follows]

**IN WITNESS WHEREOF**, the Company has caused this Warrant to Purchase Common Stock to be duly executed as of the Issuance Date set out above.

**[NAME OF COMPANY]**

By: \_\_\_\_\_

Name:

Title:

## EXERCISE NOTICE

TO BE EXECUTED BY THE REGISTERED HOLDER TO EXERCISE THIS  
WARRANT TO PURCHASE COMMON STOCK

[NAME OF COMPANY]

The undersigned holder hereby exercises the right to purchase \_\_\_\_\_ of the shares of Common Stock (“**Warrant Shares**”) of [NAME OF COMPANY], a Nevada corporation (the “**Company**”), evidenced by the attached Warrant to Purchase Common Stock (the “**Warrant**”). Capitalized terms used herein and not otherwise defined shall have the respective meanings set forth in the Warrant.

1. Form of Exercise Price. The Holder intends that payment of the Exercise Price shall be made as:

\_\_\_\_\_ a “Cash Exercise” with respect to \_\_\_\_\_ Warrant Shares; and/or

\_\_\_\_\_ a “Cashless Exercise” with respect to \_\_\_\_\_ Warrant Shares.

2. Payment of Exercise Price. In the event that the holder has elected a Cash Exercise with respect to some or all of the Warrant Shares to be issued pursuant hereto, the holder shall pay the Aggregate Exercise Price in the sum of \$\_\_\_\_\_ to the Company in accordance with the terms of the Warrant.

3. Delivery of Warrant Shares. The Company shall deliver to the holder \_\_\_\_\_ Warrant Shares in accordance with the terms of the Warrant.

Date: \_\_\_\_\_, \_\_\_\_\_

\_\_\_\_\_  
Name of Registered Holder

By: \_\_\_\_\_

Name:

Title:

## **ACKNOWLEDGMENT**

The Company hereby acknowledges this Exercise Notice and hereby directs [INSERT NAME OF TRANSFER AGENT] to issue the above indicated number of shares of Common Stock in accordance with the Transfer Agent Instructions dated July \_\_\_\_, 2016 from the Company and acknowledged and agreed to by [INSERT NAME OF TRANSFER AGENT].

**NAME OF COMPANY]**

By: \_\_\_\_\_  
Name:  
Title:



**Form of Lock-Up Agreement**

\_\_\_\_\_, 2016

Ladenburg Thalmann & Co. Inc.  
570 Lexington Avenue  
11<sup>th</sup> Floor  
New York, New York 10022

Re: Public Offering of Xenetic Biosciences, Inc.

Ladies and Gentlemen:

The undersigned, an officer, director or holder of common stock, par value \$0.01 per share ("Common Stock"), or rights to acquire Common Stock, of Xenetic Biosciences, Inc. (the "Company"), understands that you, as the underwriter, propose to enter into an Underwriting Agreement (the "Underwriting Agreement") with the Company, providing for the public offering (the "Offering") by you of shares of Common Stock and warrants to purchase shares of Common Stock (together, the "Securities"), pursuant to a registration statement on Form S-1 (as amended, the "Registration Statement") filed with the Securities and Exchange Commission (the "SEC"). Capitalized terms used herein and not otherwise defined shall have the meanings set forth in the Underwriting Agreement.

In consideration of your agreement to enter into the Underwriting Agreement and to proceed with the Offering of the Securities, and for other good and valuable consideration, receipt of which is hereby acknowledged, the undersigned hereby agrees for the benefit of the Company and you that, without your prior written consent, the undersigned will not, during the period commencing on the date hereof and ending ninety (90) days (the "Lock-Up Period") after the date of the final prospectus relating to the Offering (the "Prospectus"), directly or indirectly: (1) offer, pledge, assign, encumber, announce the intention to sell, 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, or otherwise transfer or dispose of, any shares of Common Stock or any securities convertible into or exercisable or exchangeable for Common Stock owned either of record or beneficially or may be deemed to be beneficially owned (as defined in the Securities Exchange Act of 1934, as amended, and the rules and regulations of the SEC promulgated thereunder (the "Exchange Act")) by the undersigned on the date hereof or hereafter acquired or (2) enter into any swap or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of the Common Stock, whether any such transaction described in clause (1) or (2) above is to be settled by delivery of Common Stock or such other securities, in cash or otherwise, or (3) make any demand for or exercise any right with respect to, the registration of any shares of Common Stock or any security convertible into or exercisable or exchangeable for Common Stock, or (4) publicly announce an intention to do any of the foregoing.

The restrictions in the immediately preceding paragraph shall not apply to:

- (a) the sale of the Common Stock to be sold pursuant to the Underwriting Agreement;
- (b) transfers of shares of Common Stock or any security convertible into or exercisable or exchangeable for Common Stock (i) as a bona fide gift, or gifts, (ii) to an immediate family member or a trust for the direct or indirect benefit of the undersigned or such immediate family member of the undersigned, or (iii) by will or intestacy;
- (c) equity securities issued pursuant to the Company's equity incentive plans in effect as of the date hereof or pursuant to bona fide equity incentive plans hereafter established, and the exercise of options granted under the Company's equity incentive plans; *provided* that the shares of Common Stock delivered upon such exercise are subject to the restrictions set forth in the immediately preceding paragraph;
- (d) transfers of shares of Common Stock to the Company (i) as forfeitures to satisfy tax withholding and remittance obligations of the undersigned in connection with the vesting or exercise of equity awards granted pursuant to the Company's equity incentive plans, or (ii) pursuant to a net exercise or cashless exercise by the stockholder of outstanding equity awards pursuant to the Company's equity incentive plans;
- (e) the establishment of a trading plan that complies with Rule 10b5-1 under the Exchange Act; *provided, however*, that (i) the restrictions shall apply in full force to sales or other dispositions pursuant to such Rule 10b5-1 plan during the Lock-Up Period and (ii) no public announcement or disclosure of entry into such Rule 10b5-1 plan is made or required to be made, including any filing with the SEC under Section 13 or Section 16 of the Exchange Act;
- (f) transfers of shares of Common Stock to a charity or education institution;
- (g) if the undersigned is or, directly or indirectly, controls a corporation, partnership, limited liability company or other business entity, any transfers of Common Stock to any shareholder, partner or member of, or owner of similar equity interests in, the undersigned, as the case may be; and
- (h) transactions relating to the Common Stock acquired in open market transactions after the completion of the Offering;

*provided that*, in the case of clauses (b), (f), (g) and (h), no filing under Section 13 or Section 16(a) of the Exchange Act reporting a reduction in beneficial ownership of shares of Common Stock or other public announcement shall be required or voluntarily made by the undersigned or the recipient during the Lock-Up Period (other than a filing on Form 5 and any required Schedule 13G (or 13G/A) or Form 13F filing); *provided further* that, in the case of any transfer or distribution pursuant to clauses (b), (f) and (g), (1) the recipient agrees to be bound in writing by the same restrictions set forth herein for the duration of the Lock-Up Period and (2) any such transfer shall not involve a disposition for value.

In furtherance of the foregoing, the Company, and any duly appointed transfer agent for the registration or transfer of the securities described herein, are hereby authorized to decline to make any transfer of securities if such transfer would constitute a violation or breach of this Lock-Up Agreement.

The undersigned hereby represents and warrants that the undersigned has full power and authority to enter into this Lock-Up Agreement. All authority herein conferred or agreed to be conferred and any obligations of the undersigned shall be binding upon the successors, assigns, heirs or personal representatives of the undersigned.

The undersigned understands that the undersigned shall be released from all obligations under this Lock-Up Agreement upon the earlier to occur of: (i) the Registration Statement does not become effective and the Company files with the SEC a notice of withdrawal of the Registration Statement pursuant to Rule 477 of the Securities Act of 1933, as amended, (ii) the Underwriting Agreement does not become effective by December 31, 2016, or, if after becoming effective, the Underwriting Agreement (other than the provisions thereof which survive termination) shall terminate or be terminated prior to payment for and delivery of the Common Stock to be sold thereunder, or (iii) the Company provides written notice to you that the Company does not intend to proceed with the Offering.

The undersigned, whether or not participating in the Offering, understands that you are entering into the Underwriting Agreement and proceeding with the Offering in reliance upon this Lock-Up Agreement.

This Lock-Up Agreement shall be governed by and construed in accordance with the laws of the State of New York, without regard to the conflict of laws principles thereof.

Very truly yours,

Signature: \_\_\_\_\_

Print Name: \_\_\_\_\_

Exhibit 3.7

BARBARA K. CEGAVSKE  
Secretary of State  
204 North Carson Street, Suite 4  
Carson City, Nevada 89701-4520  
(775) 684-5706  
Website: www.nvsos.gov

**Certificate of Change Pursuant  
to NRS 78.209**

Filed in the office of	Document Number
/s/ Barbara K. Cegavske	20160220678-94
Barbara K. Cegavske	Filing Date and Time
Secretary of State	05/16/2016 1:40 PM
State of Nevada	Entity Number
	E0450492011-8

**Certificate of Change filed Pursuant to NRS 78.209**  
**For Nevada Profit Corporations**

1. Name of Corporation:

Xenetic Biosciences, Inc.

2. The board of directors have adopted a resolution pursuant to NRS 78.209 and have obtained any required approval of the stockholders.

3. The current number of authorized shares and the par value, if any, of each class or series, if any, of shares before the change:

1,500,000,000 common shares, par value \$0.001  
10,000,000 common shares, par value \$0.001

4. The number of authorized shares and the par value, if any, of each class or series, if any, of shares after the change:

45,454,546 common shares, par value \$0.001  
10,000,000 common shares, par value \$0.001

5. The number of shares of each affected class or series, if any, to be issued after the change in exchange for each issued shares of the same class or series:

1 share issued for every 33 shares of common shares issued and outstanding on the effective date.

6. The provisions, if any, for the issuance of fractional shares, or for the payment of money or the issuance of scrip to stockholders otherwise entitled to a fraction of a share and the percentage of outstanding shares affected thereby:

fractional shares will be rounded to the nearest whole number

7. Effective date and time of filing: (optional)      Date: May 16 2016      Time: 10:00am

8. Signature:

/s/ signature  
Signature of Officer

President and CEO  
Title

**NUMBER**  
1234567

**COMMON STOCK**

**SHARES**  
\*\*\*99,999\*\*\*

**COMMON STOCK**  
CUSIP 084015206

**Xenetic**  
BIOSCIENCES  
INCORPORATED UNDER THE LAWS OF THE STATE OF NEVADA

SEE REVERSE FOR CERTAIN DEFINITIONS

THIS CERTIFICATE IS VALID ONLY WHEN SIGNED BY THE PRESIDENT OR A VICE PRESIDENT OF THE CORPORATION OR A SECRETARY OF THE CORPORATION. IT IS VOID WITHOUT THESE SIGNATURES. IT IS VOID WITHOUT THESE SIGNATURES. IT IS VOID WITHOUT THESE SIGNATURES. IT IS VOID WITHOUT THESE SIGNATURES. IT IS VOID WITHOUT THESE SIGNATURES.

\*\*\*Shareholder Name 1XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX\*\*\*  
 \*\*\*Shareholder Name 2XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX\*\*\*  
 \*\*\*Shareholder Name 3XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX\*\*\*  
 Reg descript if applicable

Is the Owner of \*\*\* Ninety-Nine Thousand Nine Hundred Ninety-Nine \*\*\*

FULLY PAID AND NON-ASSESSABLE SHARES OF COMMON STOCK OF  
XENETIC BIOSCIENCES, INC.

transferable on the books of the Corporation by the holder hereof, in person or by duly authorized attorney, upon surrender of this Certificate properly  
endorsed. This Certificate is not valid until countersigned by the Transfer Agent and registered by the Registrar.

Witness this facsimile seal of said Corporation and the facsimile signatures of its duly authorized officers.

Dated: July 11, 2016

COUNTERSIGNED AND REGISTERS:  
EMPIRE STOCK TRANSFER INC.  
Transfer Agent and Registrar

By PRESIDENT

CORPORATE SEAL

PRESIDENT

B 71448

SPECIMEN

The following abbreviations, when used in the inscription of the face of this certificate, shall be construed as though they were written out in full according to applicable laws or regulations:

TEN COM — as tenants in common

UNIF GIFT MIN ACT — \_\_\_\_\_ Custodian \_\_\_\_\_  
(Cust) (Minor)  
under Uniform Gifts to Minors Act

TEN ENT — as tenants by the entireties

JT TEN — as joint tenants with right  
of survivorship and not as  
tenants in common

\_\_\_\_\_  
(State)

Additional abbreviations may also be used though not in the above list.

*For Value Received, \_\_\_\_\_ hereby sells, assigns and transfers unto*

PLEASE INSERT SOCIAL SECURITY  
OR OTHER IDENTIFYING NUMBER

\_\_\_\_\_  
(PLEASE PRINT OR TYPE NAME AND ADDRESS INCLUDING POSTAL ZIP CODE OF ASSIGNEE)

\_\_\_\_\_  
*Shares  
of the Capital Stock represented by this Certificate and hereby  
irrevocably constitutes and appoints*

\_\_\_\_\_  
*Attorney  
to transfer the said stock on the books of the within-named Corporation  
with full power of substitution in the premises.*

*Dated* \_\_\_\_\_

NOTICE THE SIGNATURE(S) TO THIS ASSIGNMENT MUST CORRESPOND  
WITH THE NAME(S) AS WRITTEN UPON THE FACE OF THIS  
CERTIFICATE IN EVERY PARTICULAR WITHOUT ALTERATION OR  
ENLARGEMENT OR ANY CHANGE WHATSOEVER.

SIGNATURE(S) GUARANTEED

NOTICE THE SIGNATURE(S) SHOULD BE GUARANTEED BY AN ELIGIBLE  
GUARANTOR INSTITUTION (BANKS, STOCKBROKERS, SAVINGS  
AND LOAN ASSOCIATION AND CREDIT UNIONS) WITH MEMBERSHIP  
IN AN APPROVED SIGNATURE GUARANTEE MEDALLION PROGRAM  
PURSUANT TO S.E.C. RULE 17AD-15.

# LAXAGUE LAW, INC.

1 East Liberty, Suite 600  
Reno, NV 89501  
(775) 234-5221  
Email: joe@laxaguelaw.com

July 13, 2016

Xenetic Biosciences, Inc.  
99 Hayden Ave, Suite 230  
Lexington, Massachusetts 02421

Dear Sirs:

We have acted as counsel to Xenetic Biosciences, Inc., a Nevada corporation (the “Company”), in connection with limited matters relating to the Company’s submission to the Securities and Exchange Commission of a registration statement on Form S-1 (the “Registration Statement”) under the Securities Act of 1933, relating to the offering for sale of up to: (i) 2,970,297 Units (the “*Units*”) of the Company, with each Unit consisting of one share of common stock, par value \$0.001 per share, of the Company (the “*Shares*”), and one warrant to purchase one share of common stock of the Company (the “*Warrants*”); and (ii) 2,970,297 shares of common stock of the Company issuable upon exercise of the Warrants (the “*Warrant Shares*”).

In this connection, we have (i) examined and relied upon the originals or copies, certified or otherwise identified to our satisfaction, of (a) the Registration Statement, (b) the Company’s Articles of Incorporation and Bylaws, each as amended and currently in effect, and (c) the originals or copies certified to our satisfaction of such records, documents, certificates, memoranda and other instruments as in our judgment are necessary or appropriate to enable us to render the opinion expressed below, and (ii) assumed that the sale of the Units by the Company will be authorized, and at a price established, by the Board of Directors of the Company in accordance with Nevada law. We have undertaken no independent verification with respect to such matters.

On the basis of the foregoing, we are of the opinion that:

1. The Units and the Warrants, when sold and issued against payment therefor as described in the Registration Statement, will constitute valid and binding obligations of the Company, subject to applicable bankruptcy, insolvency and similar laws affecting creditors’ rights generally and to equitable principles of general applicability.
2. The Shares, when sold and issued against payment therefor as described in the Registration Statement, will be validly issued, fully paid and non-assessable.
3. The Warrant Shares, when issued and sold by the Company in accordance with the terms of the Warrants, will be validly issued, fully paid and non-assessable.

We hereby consent to the reference to our firm under the caption “Legal Matters” in the prospectus included in the Registration Statement and to the filing of this opinion as an exhibit to the Registration Statement.

Very truly yours,

Laxague Law, Inc.

By: /s/ Joe Laxague  
Joe Laxague, Esq.