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

**FORM 8-K**

CURRENT REPORT

Pursuant to Section 13 or 15(d) of  
The Securities Exchange Act of 1934

Date of Report (Date of earliest event reported): January 9, 2020

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**MATINAS BIOPHARMA HOLDINGS, INC.**  
(Exact name of registrant as specified in its charter)

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Delaware  
(State or other jurisdiction  
of incorporation)

001-38022  
(Commission  
File Number)

46-3011414  
(IRS Employer  
ID Number)

1545 Route 206 South, Suite 302  
Bedminster, New Jersey  
(Address of principal executive offices)

07921  
(Zip Code)

Registrant's telephone number, including area code: (908) 443-1860

Not Applicable  
(Former name or former address, if changed since last report.)

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Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the registrant under any of the following provisions (see General Instruction A.2. below):

- Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)
- Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)
- Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))
- Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

Indicate by check mark whether the registrant is an emerging growth company as defined in Rule 405 of the Securities Act of 1933 (17 CFR §230.405) or Rule 12b-2 of the Securities Exchange Act of 1934 (17 CFR §240.12b-2).

Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

Securities registered pursuant to Section 12(b) of the Act:

Title of Each Class	Trading Symbol	Name of Each Exchange on Which Registered
Common Stock	MTNB	NYSE American

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**Item 1.01. Entry into a Material Definitive Agreement.**

On January 9, 2020, Matinas BioPharma Holdings, Inc. (the “Company”) entered into an underwriting agreement (the “Underwriting Agreement”) with Piper Sandler & Co., as representative of the several underwriters party thereto (the “Underwriters”), relating to the offering, issuance and sale of 32,260,000 shares (the “Shares”) of the Company’s common stock, par value \$0.0001 (the “Common Stock”), at a price to the public of \$1.55 per share (the “Offering”). The net proceeds to the Company from the Offering are expected to be approximately \$46.5 million, after deducting underwriting discounts and commissions and other estimated offering expenses payable by the Company. The Offering is expected to close on or about January 14, 2020, subject to customary closing conditions. Pursuant to the Underwriting Agreement, the Underwriters have a 30-day option to purchase up to 4,839,000 additional shares of Common Stock on the same terms as the Underwriters are purchasing the base number of shares.

The Offering is being made pursuant to the Company’s effective registration statement on Form S-3 (File No. 333-217106) previously filed with and declared effective by the Securities and Exchange Commission (the “SEC”) and a prospectus supplement and accompanying base prospectus filed with the SEC.

The Underwriting Agreement contains customary representations, warranties and agreements by the Company, conditions to closing, indemnification obligations of the Company and the Underwriters, including for liabilities under the Securities Act of 1933, as amended, other obligations of the parties and termination provisions. The representations, warranties and covenants contained in the Underwriting Agreement were made only for purposes of such agreement and as of specific dates, were solely for the benefit of the parties to such agreement, and may be subject to limitations agreed upon by the contracting parties.

The foregoing description of the Underwriting Agreement is not complete and is qualified in its entirety by reference to the full text of the Underwriting Agreement, a copy of which is filed as Exhibit 1.1 to this report and is incorporated by reference herein. A copy of the opinion of Lowenstein Sandler LLP relating to the legality of the issuance and sale of Shares in the Offering is attached as Exhibit 5.1 to this report.

**Item 7.01. Regulation FD Disclosure.**

On January 9, 2020, the Company issued a press release regarding the launch of the Offering. On January 10, 2020, the Company issued a press release announcing that it had priced the Offering. Copies of the press releases are furnished hereto as Exhibits 99.1 and 99.2, respectively, to this report and incorporated herein by reference.

**Item 8.01. Other Events.**

The preliminary prospectus supplement used by the Company in connection with the Offering includes the information in the following paragraph.

At December 31, 2019, the Company had approximately \$28.6 million in cash and cash equivalents, marketable securities and restricted cash. This amount is preliminary, unaudited and subject to the completion of the audit of the Company’s consolidated financial statements as of and for the year ended December 31, 2019 (the “Audited 2019 Financial Statements”). As a result, this amount may differ from the amount that will be reflected in the Audited 2019 Financial Statements. Additional information and disclosures are required for a more complete understanding of the Company’s financial position and results of operations as of December 31, 2019.

Statements contained in this report regarding matters that are not historical facts are “forward-looking statements” within the meaning of the Private Securities Litigation Reform Act of 1995. Such statements may involve risks and uncertainties, such as statements related to the anticipated closing of the Offering and the amount of proceeds expected from the Offering. The risks and uncertainties involved include the Company’s ability to satisfy certain conditions to closing on a timely basis or at all, as well as other risks detailed from time to time in the Company’s SEC filings, including in its annual filing on Form 10-K, as amended filed with the SEC on April 1, 2019, the preliminary prospectus supplement filed with the SEC on January 9, 2020, and the final prospectus supplement to be filed with the SEC.

**Item 9.01 Financial Statements and Exhibits.**

<u>Exhibit No.</u>	<u>Description.</u>
1.1	<a href="#">Underwriting Agreement, dated January 9, 2020, by and between Matinas BioPharma Holdings, Inc. and Piper Sandler &amp; Co., as representative.</a>
5.1	<a href="#">Opinion of Lowenstein Sandler LLP.</a>
23.1	<a href="#">Consent of Lowenstein Sandler LLP (included in the opinion of Lowenstein Sandler LLP filed as Exhibit 5.1 hereto).</a>
99.1	<a href="#">Press Release dated January 9, 2020.</a>
99.2	<a href="#">Press Release dated January 10, 2020.</a>

**SIGNATURES**

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned hereunto duly authorized.

**MATINAS BIOPHARMA HOLDINGS, INC.**

Dated: January 10, 2020

By: /s/ Jerome D. Jabbour  
Name: Jerome D. Jabbour  
Title: Chief Executive Officer

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32,260,000 Shares

MATINAS BIOPHARMA HOLDINGS, INC.

Common Stock

UNDERWRITING AGREEMENT

January 9, 2020

Piper Sandler &amp; Co.

As Representative of the several Underwriters  
800 Nicollet Mall, Suite 800  
Minneapolis, MN 55402

Dear Sirs:

1. *Introductory.* Matinas BioPharma Holdings, Inc., a Delaware corporation (the "Company"), proposes to sell, pursuant to the terms of this Agreement, to the several underwriters named in Schedule I hereto (the "Underwriters," or, each, an Underwriter"), an aggregate of 32,260,000 shares of the Company's common stock, \$0.0001 par value per share (the "Common Stock"). The aggregate of 32,260,000 shares so proposed to be sold is hereinafter referred to as the "Firm Stock". The Company also proposes to sell to the Underwriters, upon the terms and conditions set forth in Section 3 hereof, up to an additional 4,839,000 shares of Common Stock (the "Optional Stock"). The Firm Stock and the Optional Stock are hereinafter collectively referred to as the "Stock". Piper Sandler & Co. is acting as representative of the several Underwriters and in such capacity is hereinafter referred to as the "Representative."

2. *Representations and Warranties of the Company.* The Company represents and warrants to the several Underwriters, as of the date hereof and as of each Closing Date (as defined below), and agrees with the several Underwriters, that:

(a) A registration statement of the Company on Form S-3 (File No. 333-217106) (including such amendments and supplements thereto as may have been filed before execution of this Agreement, the "Initial Registration Statement") in respect of the Stock has been filed with the Securities and Exchange Commission (the "Commission") pursuant to Rule 415 under the Securities Act of 1933, as amended (the "Securities Act"). The Company meets the requirements for use of Form S-3 under the Securities Act and the rules and regulations of the Commission thereunder (the "Rules and Regulations"). The Initial Registration Statement and any post-effective amendment thereto, excluding exhibits thereto, each in the form heretofore delivered to you as Representative of the other Underwriters, have been declared effective by the Commission in such form and meet the requirements of the Securities Act and the Rules and Regulations. The proposed offering of the Stock may be made pursuant to General Instruction I.B.1. of Form S-3. Other than (i) a registration statement, if any, increasing the size of the offering filed pursuant to Rule 462(b) under the Securities Act and the Rules and Regulations (a "Rule 462(b) Registration Statement") and (ii) the Prospectus (as defined below) contemplated by this Agreement to be filed pursuant to Rule 424(b) of the Rules and Regulations in accordance with Section 4(a) hereof and (iii) any Issuer Free Writing Prospectus (as defined below), no other document with respect to the offer and sale of the Stock has heretofore been filed with the Commission. No stop order suspending the effectiveness of the Initial Registration Statement, any post-effective amendment thereto or the Rule 462(b) Registration Statement, if any, has been issued and no proceeding for that purpose or pursuant to Section 8A of the Securities Act has been initiated or, to the knowledge of the Company, threatened by the Commission (any preliminary prospectus included in the Initial Registration Statement or filed with the Commission pursuant to Rule 424(a) of the Rules and Regulations is hereinafter called a "Preliminary Prospectus"). The various parts of the Initial Registration Statement and the Rule 462(b) Registration Statement, if any, in each case including all exhibits thereto and including the information contained in the Prospectus filed with the Commission pursuant to Rule 424(b) of the Rules and Regulations and deemed by virtue of Rules 430A, 430B and 430C under the Securities Act to be part of the Initial Registration Statement at the time it became effective are hereinafter collectively called the "Registration Statement." The base prospectus included in the Initial Registration Statement at the time of effectiveness thereof (the "Base Prospectus"), as supplemented by the final prospectus supplement relating to the offer and sale of the Stock, in the form to be filed pursuant to and within the time limits described in Rule 424(b) under the Rules and Regulations, is hereinafter called the "Prospectus."

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Any reference herein to any Registration Statement, Base Prospectus, Preliminary Prospectus or the Prospectus shall be deemed to refer to and include the documents incorporated by reference therein. Any reference to any amendment or supplement to any Preliminary Prospectus or the Prospectus shall be deemed to refer to and include any documents filed after the date of such Preliminary Prospectus or the Prospectus under the Securities Exchange Act of 1934, as amended (the "Exchange Act"), and incorporated by reference in such Preliminary Prospectus or Prospectus, as the case may be. Any reference to any amendment to the Registration Statement shall be deemed to refer to and include any annual report of the Company filed pursuant to Section 13(a) or 15(d) of the Exchange Act after the date of this Agreement that is incorporated by reference in the Registration Statement.

(b) As of the Applicable Time (as defined below) and as of the Closing Date or the Option Closing Date (as defined below), as the case may be, neither (i) the General Use Free Writing Prospectus(es) (as defined below) issued at or prior to the Applicable Time, the Pricing Prospectus (as defined below) and the information included on Schedule II hereto, all considered together (collectively, the "General Disclosure Package"), (ii) any individual Limited Use Free Writing Prospectus (as defined below), nor (iii) any bona fide electronic road show (as defined in Rule 433(h)(5) of the Rules and Regulations that has been made available without restriction to any person), when considered together with the General Disclosure Package, included or will include any untrue statement of a material fact or omitted 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 the Company makes no representations or warranties as to information contained in or omitted from the Pricing Prospectus or any Issuer Free Writing Prospectus, in reliance upon, and in conformity with, written information furnished to the Company through the Representative by or on behalf of any Underwriter specifically for inclusion therein, which information the parties hereto agree is limited to the Underwriters' Information as defined in Section 17. As used in this paragraph (b) and elsewhere in this Agreement:

"Applicable Time" means 7:30 p.m., New York time, on the date of this Agreement or such other time as agreed to by the Company and the Representative.

"Pricing Prospectus" means the Preliminary Prospectus, if any, and the Base Prospectus, each as amended and supplemented immediately prior to the Applicable Time, including any document incorporated by reference therein and any prospectus supplement deemed to be a part thereof.

"Issuer Free Writing Prospectus" means any "issuer free writing prospectus," as defined in Rule 433 of the Rules and Regulations relating to the Stock 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) of the Rules and Regulations.

"General Use Free Writing Prospectus" means any Issuer Free Writing Prospectus that is identified on Schedule III to this Agreement.

“Limited Use Free Writing Prospectuses” means any Issuer Free Writing Prospectus that is not a General Use Free Writing Prospectus.

(c) No order preventing or suspending the use of any Preliminary Prospectus, any Issuer Free Writing Prospectus or the Prospectus relating to the proposed offering of the Stock has been issued by the Commission, and no proceeding for that purpose or pursuant to Section 8A of the Securities Act has been instituted or, to the knowledge of the Company, threatened by the Commission, and each Preliminary Prospectus, at the time of filing thereof, conformed in all material respects to the requirements of the Securities Act and the Rules and Regulations, and did not contain 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, in the light of the circumstances under which they were made, not misleading; *provided, however*, that the Company makes no representations or warranties as to information contained in or omitted from any Preliminary Prospectus, in reliance upon, and in conformity with, written information furnished to the Company through the Representative by or on behalf of any Underwriter specifically for inclusion therein, which information the parties hereto agree is limited to the Underwriters’ Information as defined in Section 17.

(d) At the respective time the Registration Statement and any amendments thereto became or become effective as to the Underwriters, at the date of this Agreement and at each Closing Date, each Registration Statement and any amendments thereto conformed and will conform in all material respects to the requirements of the Securities Act and the Rules and Regulations and did not and will not 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 not misleading; and the Prospectus and any amendments or supplements thereto, at the time the Prospectus or any amendment or supplement thereto was issued and at each Closing Date, conformed and will conform in all material respects to the requirements of the Securities Act and the Rules and Regulations and did not and will not contain an untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in light of the circumstances under which they were made, not misleading; *provided, however*, that the foregoing representations and warranties in this paragraph (d) shall not apply to information contained in or omitted from the Registration Statement or the Prospectus, or any amendment or supplement thereto, in reliance upon, and in conformity with, written information furnished to the Company through the Representative by or on behalf of any Underwriter specifically for inclusion therein, which information the parties hereto agree is limited to the Underwriters’ Information (as defined in Section 17).

(e) Each Issuer Free Writing Prospectus, as of its issue date and at all subsequent times through the completion of the public offer and sale of the Stock or until any earlier date that the Company notified or notifies the Representative as described in Section 4(f), did not, does not and will not include any information that conflicted, conflicts or will conflict with the information contained in the Registration Statement, Pricing Prospectus or the Prospectus, including any document incorporated by reference therein and any prospectus supplement deemed to be a part thereof that has not been superseded or modified, or included or would include an untrue statement of a material fact or omitted or would omit to state a material fact required to be stated therein or necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading. The foregoing sentence does not apply to statements in or omissions from any Issuer Free Writing Prospectus in reliance upon, and in conformity with, written information furnished to the Company by the Representative by or on behalf of the Underwriters specifically for inclusion therein, which information the parties hereto agree is limited to the Underwriters’ Information.



(f) The documents incorporated by reference in the Prospectus, when they became effective or were filed with the Commission, as the case may be, conformed in all material respects to the requirements of the Securities Act or the Exchange Act, as applicable, and the rules and regulations of the Commission thereunder and none of such documents contained any untrue statement of a material fact or omitted 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; and any further documents so filed and incorporated by reference in the Prospectus, when such documents are filed with Commission, will conform in all material respects to the requirements of the Securities Act or the Exchange Act, as applicable, and the rules and regulations of the Commission thereunder and will not 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.

(g) The Company has not, directly or indirectly, distributed and will not distribute any offering material in connection with the proposed offering and sale of the Stock other than any Preliminary Prospectus, the Prospectus and other materials, if any, permitted under the Securities Act and consistent with Section 4(b) below. The Company will file with the Commission all Issuer Free Writing Prospectuses (other than a “road show,” as described in Rule 433(d)(8) of the Rules and Regulations) in the time and manner required under Rules 163(b)(2) and 433(d) of the Rules and Regulations.

(h) At the time of filing the Initial Registration Statement and any post-effective amendments thereto, and at the date hereof, the Company was not, and the Company currently is not, an “ineligible issuer,” as defined in Rule 405 of the Rules and Regulations.

(i) Each of the Company and its subsidiaries (as defined in Section 15) has been duly incorporated or organized, as the case may be, and is validly existing as a corporation or other entity, as applicable, in good standing (to the extent such concept is recognized in the applicable jurisdiction) under the laws of their respective jurisdictions of incorporation, are duly qualified to do business and are in good standing (to the extent such concept is recognized in the applicable jurisdiction) as foreign corporations in each jurisdiction in which their respective ownership or lease of property or the conduct of their respective businesses requires such qualification, and have all power and authority necessary to own or hold their respective properties and to conduct the businesses in which they are engaged, except where the failure to so qualify or have such power or authority would not have, singularly or in the aggregate, a material adverse effect on the condition (financial or otherwise), results of operations, assets, business or prospects of the Company and its subsidiaries taken as a whole (a “Material Adverse Effect”). The Company owns or controls, directly or indirectly, only the following corporations, partnerships, limited liability partnerships, limited liability companies, associations or other entities: Matinas BioPharma, Inc. and Matinas BioPharma Nanotechnologies, Inc.

(j) This Agreement has been duly authorized, executed and delivered by the Company.

(k) The Stock to be issued and sold by the Company to the Underwriters hereunder has been duly and validly authorized and, when issued and delivered by the Company against payment therefor as provided herein, will be duly and validly issued, fully paid and nonassessable and free of any preemptive or similar rights and will conform to the description thereof contained in the General Disclosure Package and the Prospectus.

(l) The Company has an authorized capitalization as set forth under the heading “Description of Capital Stock” in the Prospectus, and all of the issued shares of capital stock of the Company have been duly and validly authorized and issued, are fully paid and non-assessable, have been issued in compliance with applicable federal and state securities laws, and conform in all material respects to the description thereof contained in the General Disclosure Package and the Prospectus. All of the Company’s options, warrants and other rights to purchase or exchange any securities for shares of the Company’s capital stock have been duly authorized and validly issued and were issued in compliance with applicable federal and state securities laws. None of the outstanding shares of Common Stock was issued in violation of any preemptive rights, rights of first refusal or other similar rights to subscribe for or purchase securities of the Company. As of the date set forth in the General Disclosure Package, there were no authorized or outstanding shares of capital stock, options, warrants, preemptive rights, rights of first refusal or other rights to purchase, or equity or debt securities convertible into or exchangeable or exercisable for, any capital stock of the Company or its subsidiaries other than those described above or accurately described in the General Disclosure Package. Since such date, except as described in the General Disclosure Package, the Company has not issued any securities other than Common Stock issued pursuant to the exercise of warrants or upon the exercise of stock options or other awards outstanding under the Company’s stock option plans, options or other securities granted or issued pursuant to the Company’s existing equity compensation plans or other plans, and the issuance of Common Stock pursuant to employee stock purchase plans. The description of the Company’s equity compensation plans, employee stock purchase plan and other stock plans or arrangements, and the options or other rights granted thereunder, as described in the General Disclosure Package and the Prospectus, accurately and fairly present in all material respects the information required to be shown with respect to the equity compensation plans, employee stock purchase plan and such other plans and arrangements, and the options and rights granted thereunder.

(m) All the outstanding shares of capital stock of the subsidiaries of the Company have been duly authorized and validly issued, are fully paid and nonassessable and, except to the extent set forth in the General Disclosure Package or the Prospectus, are owned by the Company directly or indirectly through one or more wholly-owned subsidiaries, free and clear of any claim, lien, encumbrance, security interest, restriction upon voting or transfer or any other claim of any third party.

(n) The execution, delivery and performance of this Agreement by the Company, the issuance and sale of the Stock by the Company and the consummation of the transactions contemplated hereby will not (with or without notice or lapse of time or both) (i) conflict with or result in a breach or violation of any of the terms or provisions of, constitute a default or a Debt Repayment Triggering Event (as defined below) under, give rise to any right of termination or other right or the cancellation or acceleration of any right or obligation or loss of a benefit under, or give rise to the creation or imposition of any lien, encumbrance, security interest, claim or charge upon any property or assets of the Company or its subsidiaries pursuant to, any indenture, mortgage, deed of trust, loan agreement or other agreement or instrument to which the Company or any of its subsidiaries is a party or by which the Company or any of its subsidiaries is bound or to which any of the property or assets of the Company or any of its subsidiaries is subject, (ii) result in any violation of the provisions of the certificate of incorporation or by-laws (or analogous governing instruments, as applicable) of the Company or its subsidiaries, or (iii) result in a violation of any law, statute, rule, regulation, judgment, order or decree of any court or governmental agency or body, domestic or foreign, having jurisdiction over the Company or its subsidiaries or any of their properties or assets”). A “Debt Repayment Triggering Event” means any event or condition that gives, or with the giving of notice or lapse of time would give the holder of any note, debenture or other evidence of material indebtedness (or any person acting on such holder’s behalf) the right to require the repurchase, redemption or repayment of all or a portion of such indebtedness by the Company or its subsidiaries.

(o) Except for the registration of the Stock under the Securities Act and such consents, approvals, authorizations, registrations or qualifications as may be required under the Exchange Act and applicable state or foreign securities laws, the Financial Industry Regulatory Authority (“FINRA”) and the NYSE American LLC in connection with the purchase and distribution of the Stock by the Underwriters and the listing of the Stock on the NYSE American LLC or those otherwise obtained, no consent, approval, authorization or order of, or filing, qualification or registration (each an “Authorization”) with, any court, governmental or non-governmental agency or body, foreign or domestic having jurisdiction over the Company or any of its properties or assets which has not been made, obtained or taken and is not in full force and effect, is required for the execution, delivery and performance of this Agreement by the Company, the offer or sale of the Stock or the consummation of the transactions contemplated hereby. All corporate approvals necessary for the Company to consummate the transactions contemplated by this Agreement have been obtained and are in effect.

(p) EisnerAmper LLP, who have audited certain financial statements included or incorporated by reference in the Registration Statement, the General Disclosure Package and the Prospectus, and have audited the Company's internal control over financial reporting, is an independent registered public accounting firm within the meaning of Article 2-01 of Regulation S-X and the Public Company Accounting Oversight Board (United States) (the "PCAOB").

(q) The financial statements, together with the related notes, included or incorporated by reference in the General Disclosure Package, the Prospectus and in each Registration Statement fairly present in all material respects the financial position and the results of operations and changes in financial position of the Company and its consolidated subsidiaries at the respective dates or for the respective periods therein specified. Such statements and related notes have been prepared in accordance with generally accepted accounting principles in the United States ("GAAP") applied on a consistent basis throughout the periods involved except as may be set forth in the related notes included or incorporated by reference in the General Disclosure Package. The financial statements, together with the related notes included or incorporated by reference in the General Disclosure Package and the Prospectus comply as to form in all material respects with Regulation S-X. No other financial statements or exhibits are required by Regulation S-X to be described, included or incorporated by reference in the Registration Statement, the General Disclosure Package or the Prospectus. There is no pro forma or as adjusted financial information which is required to be included in the Registration Statement, the General Disclosure Package, and the Prospectus or a document incorporated by reference therein in accordance with Regulation S-X that is not so included.

(r) Neither the Company nor its subsidiaries has sustained, since the date of the latest audited financial statements included or incorporated by reference in the General Disclosure Package, any material loss or interference with its business from fire, explosion, flood or other calamity, whether or not covered by insurance, or from any labor dispute or court or governmental action, order or decree, otherwise than as set forth or contemplated in the General Disclosure Package; and, since such date, there has not been any change in the capital stock (other than option and other securities grants in the ordinary course of business pursuant to the Company's current plans and stock option and warrant exercises and stock repurchases) or long-term debt of the Company or its subsidiaries, or any material adverse changes, or any development involving a prospective material adverse change, in or affecting the business, assets, management, financial position, prospects, stockholders' equity or results of operations of the Company and its subsidiaries taken as a whole, in each case other than as set forth or contemplated in the General Disclosure Package.

(s) Except as set forth in the General Disclosure Package, there is no legal or governmental proceeding to which the Company or any of its subsidiaries is a party or of which any property or assets of the Company or any of its subsidiaries is the subject, including any proceeding before the United States Food and Drug Administration of the U.S. Department of Health and Human Services (“FDA”) or comparable federal, state, local or foreign governmental bodies (it being understood that the interactions between the Company and the FDA and such comparable governmental bodies relating to the testing, clinical development, manufacture and product approval process for its products shall not be deemed proceedings for purposes of this representation), which is required to be described in the Registration Statement, the General Disclosure Package or the Prospectus or a document incorporated by reference therein and is not described therein, or which, singularly or in the aggregate, if determined adversely to the Company or its subsidiaries, would reasonably be expected to have a Material Adverse Effect; and to the Company’s knowledge, no such proceedings are threatened or contemplated by governmental authorities or threatened by others. The Company is in compliance with all applicable federal, state, local and foreign laws, regulations, orders and decrees governing its business as currently conducted, or any other federal, state or foreign agencies or bodies engaged in the regulation of medical devices, except where noncompliance would not, singly or in the aggregate, reasonably be expected to have a Material Adverse Effect. All preclinical and clinical studies conducted by or on behalf of the Company and submitted to regulatory authorities to support approval for commercialization of the Company’s products have been conducted by the Company, or to the Company’s knowledge by third parties, in compliance with all applicable federal, state or foreign laws, rules, orders and regulations, except for such failure or failures to be in compliance as would not reasonably be expected to have, singly or in the aggregate, a Material Adverse Effect.

(t) Neither the Company nor any of its subsidiaries is in (i) violation of its charter or by-laws (or analogous governing instrument, as applicable), (ii) default in any respect, and no event has occurred which, with notice or lapse of time or both, would constitute such a default, in the due performance or observance of any term, covenant or condition contained in any indenture, mortgage, deed of trust, loan agreement, lease or other agreement or instrument to which it is a party or by which it is bound or to which any of its property or assets is subject or (iii) violation in any respect of any law, ordinance, governmental rule, regulation or court order, decree or judgment to which it or its property or assets may be subject (including, without limitation, those administered by the FDA or by any foreign, federal, state or local governmental or regulatory authority performing functions similar to those performed by the FDA) except, in the case of clauses (ii) and (iii) of this paragraph (t), for any violations or defaults which, singularly or in the aggregate, would not reasonably be expected to have a Material Adverse Effect.

(u) The Company and its subsidiaries possess all licenses, certificates, authorizations and permits issued by, and have made all declarations and filings with, the appropriate local, state, federal or foreign regulatory agencies or bodies (including, without limitation, those administered by the FDA or by any foreign, federal, state or local governmental or regulatory authority performing functions similar to those performed by the FDA) which are required for the ownership of their respective properties or the conduct of their respective businesses as described in the General Disclosure Package and the Prospectus (collectively, the “Governmental Permits”) except where any failures to possess or make the same, singularly or in the aggregate, would not reasonably be expected to have a Material Adverse Effect. The Company and its subsidiaries are in compliance with all such Governmental Permits; all such Governmental Permits are valid and in full force and effect, except where the validity or failure to be in full force and effect would not, singularly or in the aggregate, reasonably be expected to have a Material Adverse Effect. Neither the Company nor its subsidiaries has received written notification of any revocation, suspension, termination or invalidation (or proceedings related thereto) of any such Governmental Permit and to the knowledge of the Company, no event has occurred that allows or results in, or after notice or lapse of time or both would allow or result in, revocation, suspension, termination or invalidation (or proceedings related thereto) of any such Governmental Permit. The studies, tests and preclinical or clinical trials conducted by or on behalf of the Company that are described in the General Disclosure Package and the Prospectus (the “Company Studies and Trials”) were and, if still pending, are being, conducted in all material respects in accordance with experimental protocols, procedures and controls pursuant to, where applicable, accepted professional scientific standards; the descriptions of the results of the Company Studies and Trials contained in the General Disclosure Package and Prospectus are accurate in all material respects; and the Company has not received any written notices or correspondence from the FDA or any foreign, state or local governmental body exercising comparable authority requiring the termination or suspension of any Company Studies or Trials which termination or suspension would reasonably be expected to have a Material Adverse Effect.

(v) Neither the Company nor any of its subsidiaries is, and, after giving effect to the proposed offering of the Stock and the application of the proceeds thereof as described in the General Disclosure Package and the Prospectus, will be required to register as an “investment company” within the meaning of the Investment Company Act of 1940, as amended, and the rules and regulations of the Commission thereunder.

(w) Neither the Company nor, to the knowledge of the Company, any of its officers, directors or affiliates has taken or will take, directly or indirectly, any action designed or intended to stabilize or manipulate the price of any security of the Company, or which caused or resulted in, or which might in the future reasonably be expected to cause or result in, stabilization or manipulation of the price of any security of the Company.

(x) Except as described in the General Disclosure Package and the Prospectus, the Company and its subsidiaries own or possess the right to use, or has a reasonable basis to believe that it can acquire on reasonable terms the right to use, all (i) patents, trademarks, service marks, service mark registrations, Internet domain name registrations, copyrights, licenses, trade secret rights (“Intellectual Property Rights”) and (ii) inventions, software, works of authorships, trade marks, service marks, trade names, databases, formulae, know how, Internet domain names and other intellectual property (including trade secrets and other unpatented and/or unpatentable proprietary confidential information, systems, or procedures) (collectively, “Intellectual Property Assets”) necessary to conduct its businesses as currently conducted and described in the General Disclosure Package and the Prospectus, and which the failure to own or have such rights would, individually or in the aggregate, reasonably be expected to result in a Material Adverse Effect. Neither the Company nor any of its subsidiaries has received any opinion from its legal counsel concluding that any activities of their respective businesses infringe, misappropriate, or otherwise violate, valid and enforceable Intellectual Property Rights of any other person, and except as described in the General Disclosure Package and the Prospectus, have not received written notice of any challenge, which is to their knowledge still pending, by any other person to the rights of the Company and its subsidiaries with respect to any Intellectual Property Rights or Intellectual Property Assets owned or used by the Company and its subsidiaries, which if determined adversely against the Company would, individually or in the aggregate, reasonably be expected to result in a Material Adverse Effect. Except as described in the General Disclosure Package and the Prospectus, to the knowledge of the Company, the business of the Company and its subsidiaries as now conducted does not give rise to any infringement of, any misappropriation of, or other violation of, any valid and enforceable Intellectual Property Rights of any other person. To the knowledge of the Company, all licenses for the use of the Intellectual Property Rights described in the General Disclosure Package and the Prospectus are valid, binding upon, and enforceable by or against the parties thereto in accordance to its terms. The Company and its subsidiaries have complied in all material respects with, and are not in breach nor have received any written notice of any asserted or threatened claim of breach of any Intellectual Property license, and the Company has no knowledge of any breach by any other person to any Intellectual Property license. Except as described in the General Disclosure Package, no claim has been made against the Company nor its subsidiaries alleging the infringement by the Company or its subsidiaries of any patent, trademark, service mark, trade name, copyright, trade secret, license in or other intellectual property right or franchise right of any person, except as would not, individually or in the aggregate, reasonably be expected to result in a Material Adverse Effect. The Company and its subsidiaries have taken reasonable steps to protect, maintain and safeguard its Intellectual Property Rights, including the execution of appropriate nondisclosure and confidentiality agreements. The consummation of the transactions contemplated by this Agreement will not result in the loss or impairment of or payment of any additional amounts with respect to, nor require any further consent of any other person in respect of, the right of the Company and its subsidiaries to own, use, or hold for use any of the Intellectual Property Rights as owned, used or held for use in the conduct of the business as currently conducted. The Company and its subsidiaries have taken reasonable actions to obtain ownership of works of authorship and inventions made by its employees, consultants and contractors during the time they were employed by or under contract with the Company and its subsidiaries and which relate to the business of the Company, or licenses to use such works of authorship or inventions.

(y) The Company and its subsidiaries have valid title to, or have valid rights to lease or otherwise use, all items of real or personal property which are material to the business of the Company and its subsidiaries taken as a whole, in each case free and clear of all liens, encumbrances, security interests, claims and defects that do not, singularly or in the aggregate, materially affect the value of such property and do not materially interfere with the use made of such property by the Company and its subsidiaries; and all of the leases and subleases material to the business of the Company and its subsidiaries, considered as one enterprise, and under which the Company or its subsidiaries holds properties described in the General Disclosure Package and the Prospectus, are in full force and effect, and neither the Company nor its subsidiaries has received any written notice of any claim (i) adverse to the rights of the Company or any of its subsidiaries under any of the leases or subleases mentioned above, or (ii) affecting or questioning the rights of the Company or its subsidiaries to the continued possession of the leased or subleased premises under any such lease or sublease, which in each of clauses (i) and (ii) would reasonably be expected to result in a Material Adverse Effect.

(z) There is (A) no significant unfair labor practice complaint pending against the Company or its subsidiaries, nor to the knowledge of the Company, threatened against it or its subsidiaries, before the National Labor Relations Board, any state or local labor relation board or any foreign labor relations board, and no significant grievance or significant arbitration proceeding arising out of or under any collective bargaining agreement is so pending against the Company or its subsidiaries, or, to the knowledge of the Company, threatened against the Company and (B) no labor disturbance by the employees of the Company or its subsidiaries exists or, to the Company's knowledge, is imminent, and the Company is not aware of any existing or imminent labor disturbance by the employees of any of its or its subsidiaries's principal suppliers, manufacturers, customers or contractors, that would reasonably be expected, singularly or in the aggregate, to have a Material Adverse Effect. The Company is not aware that any key employee or significant group of employees of the Company or any subsidiaries plans to terminate employment with the Company or any such subsidiaries.

(aa) No "prohibited transaction" (as defined in Section 406 of the Employee Retirement Income Security Act of 1974, as amended, including the regulations and published interpretations thereunder ("ERISA"), or Section 4975 of the Internal Revenue Code of 1986, as amended from time to time (the "Code")) or "accumulated funding deficiency" (as defined in Section 302 of ERISA) or any of the events set forth in Section 4043(b) of ERISA (other than events with respect to which the thirty (30)-day notice requirement under Section 4043 of ERISA has been waived) has occurred or could reasonably be expected to occur with respect to any employee benefit plan of the Company or its subsidiaries which would, singularly or in the aggregate, reasonably be expected to have a Material Adverse Effect. Each employee benefit plan of the Company or its subsidiaries is in compliance in all material respects with applicable law, including ERISA and the Code. The Company and its subsidiaries have not incurred and would not reasonably be expected to incur liability under Title IV of ERISA with respect to the termination of, or withdrawal from, any pension plan (as defined in ERISA). Each pension plan for which the Company or its subsidiaries would have any liability that is intended to be qualified under Section 401(a) of the Code is so qualified in all material respects, and nothing has occurred, whether by action or by failure to act, which could, singularly or in the aggregate, cause the loss of such qualification.

(bb) The Company and its subsidiaries are in compliance with all foreign, federal, state and local rules, laws and regulations relating to the use, treatment, storage and disposal of hazardous or toxic substances or waste and protection of health and safety or the environment which are applicable to the Company's business ("Environmental Laws"), except where the failure to comply would not, singularly or in the aggregate, have a Material Adverse Effect. There has been no storage, generation, transportation, handling, treatment, disposal, discharge, emission, or other release of any kind of toxic or other wastes or other hazardous substances by, due to, or caused by the Company or its subsidiaries (or, to the Company's knowledge, any other entity for whose acts or omissions the Company or any of its subsidiaries is or may otherwise be liable) upon any of the property now or previously owned or leased by the Company or its subsidiaries, or upon any other property, in violation of any law, statute, ordinance, rule, regulation, order, judgment, decree or permit or which would, under any law, statute, ordinance, rule (including rule of common law), regulation, order, judgment, decree or permit, give rise to any liability except for any violation or liability which would not reasonably be expected to have, singularly or in the aggregate with all such violations and liabilities, a Material Adverse Effect; and there has been no disposal, discharge, emission or other release of any kind onto such property or into the environment surrounding such property of any toxic or other wastes or other hazardous substances with respect to which the Company or its subsidiaries has knowledge, except for any such disposal, discharge, emission, or other release of any kind that would not reasonably be expected to have, singularly or in the aggregate with all such discharges and other releases, a Material Adverse Effect.

(cc) The Company and its subsidiaries each (i) have timely filed all necessary federal, state, local and foreign tax returns (or timely filed applicable extensions therefor) that have been required to be filed, (ii) have paid all federal, state, local and foreign taxes, assessments, governmental or other charges due and payable for which it is liable, including, without limitation, all sales and use taxes and all taxes which the Company or its any of its subsidiaries is obligated to withhold from amounts owing to employees, creditors and third parties, and (iii) do not have any tax deficiency or claims outstanding or assessed or, to its knowledge, proposed against any of them, except those, in each of the cases described in clauses (i), (ii) and (iii) of this paragraph (cc), that would not, singularly or in the aggregate, reasonably be expected to have a Material Adverse Effect.

(dd) The Company and its subsidiaries carry, or are covered by, insurance in such amounts and covering such risks as is customary for companies engaged in similar businesses in similar industries. Neither the Company nor its subsidiaries has any reason to believe that it will not be able to renew its existing insurance coverage as and when such coverage expires or to obtain similar coverage from similar insurers as may be necessary to continue its business at a cost that would not reasonably be expected to have a Material Adverse Effect. All policies of insurance owned by the Company or its subsidiaries are, to the Company's knowledge, in full force and effect and the Company and its subsidiaries are in compliance in all material respects with the terms of such policies. Neither the Company nor its subsidiaries has received written notice from any insurer, agent of such insurer or the broker of the Company or its subsidiaries that any material capital improvements or any other material expenditures (other than premium payments) are required or necessary to be made in order to continue such insurance.

(ee) The Company maintains a system of internal control over financial reporting (as such term is defined in Rule 13a-15 of the General Rules and Regulations under the Exchange Act (the “Exchange Act Rules”)) that complies with the requirements of the Exchange Act and has been designed by the Company’s principal executive officer and principal financial officer, or under their supervision, to provide reasonable assurances 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 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. The Company maintains effective internal control over financial reporting (as such term is defined in Rule 13a-15 of the Exchange Act Rules). Except as described in the General Disclosure Package, since the end of the Company’s most recent audited fiscal year, there has been (A) no material weakness in the Company’s internal control over financial reporting (whether or not remediated) and (B) no change in the Company’s internal control over financial reporting that has materially affected, or is reasonably likely to materially affect, the Company’s internal control over financial reporting. The Company’s internal control over financial reporting is, or upon consummation of the offering of the Stock will be, overseen by the Audit Committee of the Board of Directors of the Company (the “Audit Committee”) in accordance with the applicable Exchange Act Rules. The Company maintains disclosure controls and procedures (as such is defined in Rule 13a-15 of the Exchange Act Rules) that comply with the applicable requirements of the Exchange Act; such disclosure controls and procedures have been designed to ensure that information required to be disclosed by the Company and its subsidiaries is accumulated and communicated to the Company’s management, including the Company’s principal executive officer and principal financial officer by others within those entities, and such disclosure controls and procedures are effective in all material respects to perform the functions for which they were established.

(ff) The minute books of the Company and its subsidiaries that would be a “significant subsidiaries” within the meaning of Rule 1-02(w) of Regulation S-X have been made available to the Underwriters and counsel for the Underwriters, and such books (i) contain a summary of all meetings and actions of the board of directors (including each board committee) and stockholders of the Company and its subsidiaries (or analogous governing bodies and interest holders, as applicable) since January 1, 2017 through the date of the latest meeting and action, and (ii) accurately in all material respects reflect all transactions authorized in such minutes.

(gg) There is no franchise agreement, lease, contract, or other agreement or document required by the Securities Act or by the Rules and Regulations to be described in the General Disclosure Package and in the Prospectus or any document incorporated by reference therein or to be filed as an exhibit to the Registration Statement or a document incorporated by reference therein which is not so described or filed therein as required, except where the failure to timely file any such franchise, agreement, lease, contract, or other agreement or document as an exhibit to the Registration Statement or a document incorporated by reference therein would not reasonably be expected to result in a Material Adverse Effect; and all descriptions of any such franchise agreements, leases, contracts, or other agreements or documents contained in the General Disclosure Package and in the Prospectus or in a document incorporated by reference therein are accurate and complete descriptions of such documents in all material respects to the extent required by the Securities Act and by the Rules and Regulations. Other than as described in the General Disclosure Package and the Prospectus, no such franchise agreement, lease, contract or other agreement has been suspended or terminated for convenience or default by the Company, its subsidiaries or any of the other parties thereto, and neither the Company nor its subsidiaries has received notice of and the Company does not have knowledge of any such pending or threatened suspension or termination except for such suspensions or terminations or pending or threatened suspensions or terminations that would not reasonably be expected to, singularly or in the aggregate, have a Material Adverse Effect.

(hh) No relationship, direct or indirect, exists between or among the Company or its subsidiaries on the one hand, and the directors, officers, stockholders (or analogous interest holders), customers or suppliers of the Company and its subsidiaries or any of their affiliates on the other hand, which is required to be described in the General Disclosure Package and the Prospectus or a document incorporated by reference therein and which is not so described.



(ii) No person or entity has the right to require registration of shares of Common Stock or other securities of the Company or its subsidiaries because of the filing or effectiveness of the Registration Statement or otherwise, except for persons and entities who have expressly waived such right in writing or who have been given timely and proper written notice and have failed to exercise such right within the time or times required under the terms and conditions of such right.

(jj) The Company does not own any “margin securities” as that term is defined in Regulation U of the Board of Governors of the Federal Reserve System (the Federal Reserve Board”), and none of the proceeds of the sale of the Stock will be used, directly or indirectly, for the purpose of purchasing or carrying any margin security, for the purpose of reducing or retiring any indebtedness which was originally incurred to purchase or carry any margin security or for any other purpose which might cause any of the Stock to be considered a “purpose credit” within the meanings of Regulation T, U or X of the Federal Reserve Board.

(kk) The Company is not a party to any contract, agreement or understanding with any person that would give rise to a valid claim against the Company or the Underwriters for a brokerage commission, finder’s fee or like payment in connection with the offering and sale of the Stock or any transaction contemplated by this Agreement, the Registration Statement, the General Disclosure Package or the Prospectus, other than any fee due to any financial advisor retained by the Company in connection with the transactions contemplated by this Agreement.

(ll) No forward-looking statement (within the meaning of Section 27A of the Securities Act and Section 21E of the Exchange Act) contained in either the General Disclosure Package or the Prospectus has been made or reaffirmed without a reasonable basis or has been disclosed other than in good faith.

(mm) The Company is subject to and in compliance in all material respects with the reporting requirements of Section 13 or Section 15(d) of the Exchange Act. The Common Stock is registered pursuant to Section 12(b) or 12(g) of the Exchange Act and is listed on the NYSE American LLC, and except as described in the General Disclosure Package, the Company has taken no action designed to, or reasonably likely to have the effect of, terminating the registration of the Common Stock under the Exchange Act or delisting the Common Stock from the NYSE American LLC, nor has the Company received any notification that the Commission or FINRA is contemplating terminating such registration or listing. The Company has filed with the NYSE American LLC a notification of the listing of the Stock on the NYSE American LLC.

(nn) The Company is in compliance in all material respects with all applicable provisions of the Sarbanes-Oxley Act of 2002 and all rules and regulations promulgated thereunder or implementing the provisions thereof (the “Sarbanes-Oxley Act”).

(oo) The Company is in compliance in all material respects with all applicable corporate governance requirements set forth in the rules and regulations of the NYSE American LLC.

(pp) Neither the Company nor its subsidiaries nor, to the Company’s knowledge, any employee or agent of the Company or its subsidiaries, has (i) used any corporate funds for unlawful contributions, gifts, entertainment or other unlawful expenses relating to political activity, (ii) made any unlawful payment to foreign or domestic government officials or employees or to foreign or domestic political parties or campaigns from corporate funds, (iii) violated any provision of the Foreign Corrupt Practices Act of 1977, as amended or (iv) made any other unlawful payment.

(qq) There are no transactions, arrangements or other relationships between and/or among the Company, any of its affiliates (as such term is defined in Rule 405 of the Rules and Regulations) and any unconsolidated entity, including, but not limited to, any structured finance, special purpose or limited purpose entity that could reasonably be expected to materially affect the Company’s liquidity or the availability of or requirements for its capital resources, which transaction, arrangement or other relationship is required to be described in the General Disclosure Package and the Prospectus or a document incorporated by reference therein and that has not been described as required.

(rr) There are no outstanding loans, advances (except normal advances for business expenses in the ordinary course of business) or guarantees of indebtedness by the Company to or for the benefit of any of the officers or directors of the Company or any of their respective immediate family members, except as disclosed in the Registration Statement, the General Disclosure Package and the Prospectus.

(ss) The statistical and market related data included in the Registration Statement, the General Disclosure Package and the Prospectus, if any, are based on or derived from sources that the Company believes to be reliable and accurate in all material respects, and such data agree in all material respects with the sources from which they are derived.

(tt) The operations of the Company and its subsidiaries are and have been conducted at all times in compliance in all material respects with applicable financial recordkeeping and reporting requirements of the Currency and Foreign Transactions Reporting Act of 1970, as amended, applicable money laundering statutes and applicable rules and regulations thereunder (collectively, the "Money Laundering Laws"), and no action, suit or proceeding by or before any court or governmental agency, authority or body or any arbitrator involving the Company or its subsidiaries with respect to the Money Laundering Laws is pending, or to the Company's knowledge, threatened.

(uu) Neither the Company nor its subsidiaries nor, to the Company's knowledge, any director, officer, agent, employee or affiliate of the Company or any of its subsidiaries is currently subject to any U.S. sanctions administered by the Office of Foreign Assets Control of the U.S. Treasury Department ("OFAC"); and, to the Company's knowledge, the Company will not directly or indirectly use the proceeds of the offering, or lend, contribute or otherwise make available such proceeds to any subsidiaries, 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.

(vv) Neither the Company nor, to the Company's knowledge, any of its affiliates (within the meaning of FINRA Rule 5121(f) directly or indirectly controls, is controlled by, or is under common control with, or is an associated person (within the meaning of Article I, Section 1(ee) of the By-laws of FINRA) of, any member firm of FINRA.

3. *Purchase, Sale and Delivery of Offered Securities.* On the basis of the representations, warranties and agreements herein contained, but subject to the terms and conditions herein set forth, the Company agrees to sell to the Underwriters, and the Underwriters agree, severally and not jointly, to purchase from the Company the respective number of shares of Firm Stock set forth opposite the names of the Underwriters in Schedule I hereto.

The purchase price per share to be paid by the Underwriters to the Company for the Firm Stock will be \$1.457 per share (the "Purchase Price").

The Company will deliver the Firm Stock to the Representative for the respective accounts of the several Underwriters through the facilities of The Depository Trust Company, issued in such names and in such denominations as the Representative may direct by notice in writing to the Company given at or prior to 12:00 Noon, New York time, on the second (2<sup>nd</sup>) full business day preceding the Closing Date, against payment of the aggregate purchase price therefor, as determined pursuant to the immediately preceding paragraph, by wire transfer in federal (same day) funds to an account at a bank acceptable to the Representative payable to the order of the Company at the offices of Goodwin Procter LLP, The New York Times Building, 620 Eighth Avenue, New York, New York. Time shall be of the essence, and delivery at the time and place specified pursuant to this Agreement is a further condition of the obligations of each Underwriter hereunder. The time and date of the delivery and closing shall be at 10:00 A.M., New York time, on January 14, 2020, in accordance with Rule 15c6-1 of the Exchange Act. The time and date of such payment and delivery are herein referred to as the “Closing Date”. The Closing Date and the location of delivery of, and the form of payment for, the Firm Stock may be varied by agreement between the Company and the Representative. In the event that the Firm Stock (and Optional Stock, if elected by the Representative) are not delivered to the Representative by 2:30 p.m., New York City time, on the Closing Date (and the Option Closing Date, if elected by the Representative), the Company will return payment of the full purchase price to the Representative’s agent, Pershing LLC, via same day funds by 4:30 p.m., New York City time. The Company shall remain liable to Pershing LLC for the full amount of the purchase price and any costs associated with recovering the purchase price until the full amount has been received by Pershing LLC

For the purpose of covering any over-allotments in connection with the distribution and sale of the Firm Stock as contemplated by the Prospectus, the Underwriters may purchase all or less than all of the Optional Stock, provided that such shares of Optional Stock shall be purchased from the Company for the account of each Underwriter in the same proportion as the number of shares of Firm Stock set forth opposite such Underwriter’s name on Schedule I bears to the total number of shares of Firm Stock (subject to adjustment by the Representative to eliminate fractions). The price per share to be paid for the Optional Stock shall be the Purchase Price. The Company agrees to sell to the Underwriters the number of shares of Optional Stock specified in the written notice delivered by the Representative to the Company described below and the Underwriters agree, severally and not jointly, to purchase such shares of Optional Stock. The option granted hereby may be exercised as to all or any part of the Optional Stock (subject to the proviso in the first sentence of this paragraph) at any time, and from time to time, not more than thirty (30) days subsequent to the date of this Agreement. No Optional Stock shall be sold and delivered unless the Firm Stock previously has been, or simultaneously is, sold and delivered. The right to purchase the Optional Stock or any portion thereof may be surrendered and terminated at any time prior to the exercise of such right upon notice by the Representative to the Company.

The option granted hereby may be exercised by written notice being given to the Company by the Representative setting forth the number of shares of the Optional Stock to be purchased by the Underwriters and the date and time for delivery of and payment for the Optional Stock. Each date and time for delivery of and payment for the Optional Stock (which may be the Closing Date, but not earlier) is herein called the “Option Closing Date” and, with respect to any Optional Stock delivered pursuant to a written notice given after the Closing Date, shall in no event be earlier than three (3) business days nor later than five (5) business days after such written notice is given. The Option Closing Date and the Closing Date are herein called the “Closing Dates.”

The Company will deliver the Optional Stock to the Representative for the respective accounts of the several Underwriters through the facilities of The Depository Trust Company or, at the election of the Representative, issued in such names and in such denominations as the Representative may direct by notice in writing to the Company given at or prior to 6:00 P.M., New York time, on the second (2<sup>nd</sup>) full business day preceding the Option Closing Date against payment of the aggregate Purchase Price therefor by wire transfer in federal (same day) funds to an account at a bank acceptable to the Representative payable to the order of the Company at the offices of Goodwin Procter LLP, The New York Times Building, 620 Eighth Avenue, New York, New York. Time shall be of the essence, and delivery at the time and place specified pursuant to this Agreement is a further condition of the obligations of each Underwriter hereunder. The Option Closing Date and the location of delivery of, and the form of payment for, the Optional Stock may be varied by agreement between the Company and the Representative.

The several Underwriters propose to offer the Stock for sale upon the terms and conditions set forth in the Prospectus.

4. Further Agreements Of The Company. The Company agrees with the several Underwriters:

(a) To prepare the Rule 462(b) Registration Statement, if necessary, in a form approved by the Representative and file such Rule 462(b) Registration Statement with the Commission by 10:00 P.M., New York time, on the date hereof, and the Company shall at the time of filing either pay to the Commission the filing fee for the Rule 462(b) Registration Statement or give irrevocable instructions for the payment of such fee pursuant to Rule 111(b) under the Rules and Regulations; to prepare the Prospectus in a form approved by the Representative containing information previously omitted at the time of effectiveness of the Registration Statement in reliance on Rules 430A, 430B or 430C of the Rules and Regulations and to file such Prospectus pursuant to Rule 424(b) of the Rules and Regulations not later than the second business (2<sup>nd</sup>) day following the execution and delivery of this Agreement or, if applicable, such earlier time as may be required by Rule 430A of the Rules and Regulations; to notify the Representative promptly of the Company's intention to file or prepare any supplement or amendment to any Registration Statement or to the Prospectus and to make no amendment or supplement to the Registration Statement, the General Disclosure Package or to the Prospectus to which the Representative shall reasonably object by notice to the Company after a reasonable period to review; to advise the Representative, promptly after it receives notice thereof, of the time when any amendment to any Registration Statement has been filed or becomes effective or any supplement to the General Disclosure Package or the Prospectus or any amended Prospectus has been filed and to furnish the Representative with copies thereof; to file promptly all material required to be filed by the Company with the Commission pursuant to Rules 433(d) or 163(b)(2) of the Rules and Regulations, as the case may be; to file promptly all reports and any definitive proxy or information statements required to be filed by the Company with the Commission pursuant to Section 13(a), 13(c), 14 or 15(d) of the Exchange Act subsequent to the date of the Prospectus and for so long as the delivery of a prospectus (or in lieu thereof, the notice referred to in Rule 173(a) of the Rules and Regulations) is required in connection with the offering or sale of the Stock; to advise the Representative, promptly after it receives notice thereof, of the issuance by the Commission of any stop order or of any order preventing or suspending the use of any Preliminary Prospectus, any Issuer Free Writing Prospectus or the Prospectus, of the suspension of the qualification of the Stock for offering or sale in any jurisdiction, of the initiation or threatening of any proceeding for any such purpose, or of any request by the Commission for the amending or supplementing of the Registration Statement, the General Disclosure Package or the Prospectus or for additional information; and, in the event of the issuance of any stop order or of any order preventing or suspending the use of any Preliminary Prospectus, any Issuer Free Writing Prospectus or the Prospectus or suspending any such qualification, and promptly to use its best efforts to obtain the withdrawal of such order.

(b) The Company represents and agrees that, unless it obtains the prior written consent of the Representative, and each Underwriter represents and agrees that, unless it obtains the prior written consent of the Company and the Representative, it has not made and will not, other than the Final Term Sheet (defined below), if any, prepared and filed pursuant to Section 4(c) hereof, make any offer relating to the Stock that would constitute a "free writing prospectus" as defined in Rule 405 of the Rules and Regulations (each, a "Permitted Free Writing Prospectus"); *provided* that the prior written consent of the Representative hereto shall be deemed to have been given in respect of the Issuer Free Writing Prospectuses included in Schedule III hereto. The Company represents that it has treated and agrees that it will treat each Permitted Free Writing Prospectus as an Issuer Free Writing Prospectus, comply with the requirements of Rules 164 and 433 of the Rules and Regulations applicable to any Issuer Free Writing Prospectus, including the requirements relating to timely filing with the Commission, legending and record keeping and will not take any action that would result in an Underwriter or the Company being required to file with the Commission pursuant to Rule 433(d) of the Rules and Regulations a free writing prospectus prepared by or on behalf of such Underwriter that such Underwriter otherwise would not have been required to file thereunder. The Company consents to the use by any Underwriter of a free writing prospectus that (a) is not an "issuer free writing prospectus" as defined in Rule 433 of the Rules and Regulations, and (b) contains only (i) information describing the preliminary terms of the Stock or its offering and (ii) information that described the final terms of the Stock or its offering and that is included in the Final Term Sheet, if any, contemplated in Section 4(c) below.

(c) At the request of the Representative, the Company will prepare a final term sheet (the "Final Term Sheet") reflecting the final terms of the Stock, in form and substance reasonably satisfactory to the Representative, and shall file such Final Term Sheet as an Issuer Free Writing Prospectus pursuant to Rule 433 of the Rules and Regulations prior to the close of business two (2) business days after the date hereof; *provided* that the Company shall provide the Representative with copies of any such Final Term Sheet within a reasonable amount of time prior to such proposed filing and will not use or file any such document to which the Representative or counsel to the Underwriters shall reasonably object.

(d) If at any time prior to the date when a prospectus relating to the Stock is required to be delivered (or in lieu thereof, the notice referred to in Rule 173(a) of the Rules and Regulations) any event occurs or condition exists as a result of which the Prospectus as then amended or supplemented would include any untrue statement of a material fact, or omit to state any material fact necessary to make the statements therein, in light of the circumstances under which they were made when the Prospectus is delivered (or in lieu thereof, the notice referred to in Rule 173(a) of the Rules and Regulations), not misleading, or if it is necessary at any time to amend or supplement any Registration Statement or the Prospectus or to file under the Exchange Act any document incorporated by reference in the Prospectus to comply with the Securities Act or the Exchange Act, the Company will promptly notify the Representative thereof and upon its request will prepare an appropriate amendment or supplement or upon its request make an appropriate filing pursuant to Section 13 or 14 of the Exchange Act in form and substance reasonably satisfactory to the Representative which will correct such statement or omission or effect such compliance and will use its reasonable best efforts to have any amendment to any Registration Statement promptly declared effective. The Company will furnish without charge to each Underwriter and to any dealer in securities as many copies as the Representative may from time to time reasonably request of such amendment or supplement. In case any Underwriter is required to deliver a prospectus (or in lieu thereof, the notice referred to in Rule 173(a) of the Rules and Regulations) relating to the Stock, the Company upon the request of the Representative and at the expense of such Underwriter will prepare promptly an amended or supplemented Prospectus as may be necessary to permit compliance with the requirements of Section 10(a)(3) of the Securities Act and deliver to such Underwriter as many copies as such Underwriter may reasonably request of such amended or supplemented Prospectus complying with Section 10(a)(3) of the Securities Act.

(e) If the General Disclosure Package is being used to solicit offers to buy the Stock at a time when the Prospectus is not yet available to prospective purchasers and any event shall occur as a result of which, in the judgment of the Company or in the reasonable opinion of the Underwriters, it becomes necessary to amend or supplement the General Disclosure Package in order to make the statements therein, in the light of the circumstances under which they were made, not misleading, or to make the statements therein not conflict with the information contained or incorporated by reference in the Registration Statement then on file and not superseded or modified, or if it is necessary at any time to amend or supplement the General Disclosure Package to comply with any law, the Company promptly will either (i) prepare, file with the Commission (if required) and furnish to the Underwriters and any dealers an appropriate amendment or supplement to the General Disclosure Package or (ii) prepare and file with the Commission an appropriate filing under the Exchange Act which shall be incorporated by reference in the General Disclosure Package so that the General Disclosure Package as so amended or supplemented will not, in the light of the circumstances under which they were made, be misleading or conflict with the Registration Statement then on file, or so that the General Disclosure Package will comply with law.

(f) If at any time following issuance of an Issuer Free Writing Prospectus in connection with the proposed offering there occurred or occurs an event or development as a result of which such Issuer Free Writing Prospectus conflicted or will conflict with the information contained in the Registration Statement, Pricing Prospectus or Prospectus, including any document incorporated by reference therein and any prospectus supplement deemed to be a part thereof and not superseded or modified or included or would include an untrue statement of a material fact or omitted or would omit to state a material fact required to be stated therein or necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading, the Company has promptly notified or will promptly notify the Representative so that any use of the Issuer Free Writing Prospectus may cease until it is amended or supplemented and has promptly amended or will promptly amend or supplement, at its own expense, such Issuer Free Writing Prospectus to eliminate or correct such conflict, untrue statement or omission. The foregoing sentence does not apply to statement in or omissions from any free writing prospectus in reliance upon, and in conformity with, written information furnished to the Company through the Representative by or on behalf of any Underwriter specifically for inclusion therein, which information the parties hereto agree is limited to the Underwriters' Information (as defined in Section 17).

(g) To the extent not available on the Commission's Electronic Data Gathering, Analysis and Retrieval system or any successor system ("EDGAR"), upon the request of the Representative, to furnish promptly to the Representative and to counsel for the Underwriters a signed copy of each of the Registration Statement as originally filed with the Commission, and of each amendment thereto filed with the Commission, including all consents and exhibits filed therewith.

(h) Upon the request of the Representative, to the extent not available on EDGAR, to deliver promptly to the Representative in New York City such number of the following documents as the Representative shall reasonably request: (i) conformed copies of the Registration Statement as originally filed with the Commission (in each case excluding exhibits), (ii) each Preliminary Prospectus, (iii) any Issuer Free Writing Prospectus, (iv) the Prospectus (the delivery of the documents referred to in clauses (i), (ii), (iii) and (iv) of this paragraph (h) to be made not later than 10:00 A.M., New York time, on the business day following the execution and delivery of this Agreement), (v) conformed copies of any amendment to the Registration Statement (excluding exhibits), (vi) any amendment or supplement to the General Disclosure Package or the Prospectus (the delivery of the documents referred to in clauses (v) and (vi) of this paragraph (h) to be made not later than 10:00 A.M., New York City time, on the business day following the date of such amendment or supplement) and (vii) any document incorporated by reference in the General Disclosure Package or the Prospectus (excluding exhibits thereto) (the delivery of the documents referred to in clause (vii) of this paragraph (h) to be made not later than 10:00 A.M., New York City time, on the business day following the date of such document).

(i) To make generally available to its stockholders as soon as practicable, but in any event not later than sixteen (16) months after the effective date of the Registration Statement (as defined in Rule 158(c) of the Rules and Regulations), an earnings statement of the Company and its subsidiaries (which need not be audited) complying with Section 11(a) of the Securities Act and the Rules and Regulations (including, at the option of the Company, Rule 158).

(j) To take promptly from time to time such actions as the Representative may reasonably request to qualify the Stock for offering and sale under the securities or Blue Sky laws of such jurisdictions (domestic or foreign) as the Representative may designate and to continue such qualifications in effect, and to comply with such laws, for so long as required to permit the offer and sale of Stock in such jurisdictions; *provided* that the Company and its subsidiaries shall not be obligated to qualify as foreign corporations in any jurisdiction in which they are not so qualified or to file a general consent to service of process in any jurisdiction.

(k) Upon request, during the period of three (3) years from the date hereof, to the extent not available on EDGAR, to deliver to each of the Underwriters, (i) as soon as they are available, copies of all reports or other communications furnished to stockholders generally, and (ii) as soon as they are available, copies of any reports and financial statements furnished or filed with the Commission or any national securities exchange on which the Common Stock is listed. However, so long as the Company is subject to the reporting requirements of either Section 13 or Section 15(d) of the Exchange Act and is timely filing reports with the Commission on EDGAR, it is not required to furnish such reports or statements to the Underwriters.

(l) That the Company will not, for a period of ninety (90) days from the date of this Agreement, (the "Lock-Up Period") without the prior written consent of the Representative, directly or indirectly offer, sell, assign, transfer, pledge, contract to sell, or otherwise dispose of, or announce the intention to otherwise dispose of, any shares of Common Stock or any securities convertible into or exercisable or exchangeable for Common Stock, other than the Company's sale of the Stock hereunder or pursuant to or in connection with (i) employee benefit plans, equity compensation plans or other compensation plans as in existence on the date hereof and as described in the General Disclosure Package, (ii) currently outstanding shares of preferred stock, options, warrants or rights, and (iii) the consummation by the Company of a strategic partnership, joint venture, collaboration or acquisition or license of any business products or technology, provided that (A) the aggregate number of shares of Common Stock that may be issued pursuant to this clause (iii) shall not exceed five percent (5%) of the number of shares of Common Stock outstanding immediately after the closing of the sale of the Stock to the Underwriters pursuant to this Agreement, and (B) this clause (iii) shall not be available unless each recipient of such Common Stock shall have, prior to, or concurrently with, the entry of a definitive agreement in connection with the applicable partnership, joint venture, collaboration, acquisition or license, agreed in writing not to sell, offer, dispose of or otherwise transfer any such Common Stock (or engage in any short sales of Common Stock prior to the issuance of such Common Stock) during the remainder, if any, of the Lock-Up Period without the prior written consent of the Representative (which consent may be withheld at the Representative's sole discretion). The Company will cause each person and entity listed in Exhibit B to furnish to the Representative, prior to the Closing Date, a letter, substantially in the form of Exhibit A hereto. The Company also agrees that during such period, other than for the sale of the Stock hereunder, the Company will not file any registration statement, preliminary prospectus or prospectus, or any amendment or supplement thereto, under the Securities Act for any such transaction or which registers, or offers for sale, Common Stock or any securities convertible into or exercisable or exchangeable for Common Stock; provided, however, the foregoing limitation shall not apply to filing of any registration statement on Form S-8 in respect of any equity compensation plans or arrangements maintained by the Company. Notwithstanding anything to the contrary contained in this paragraph, the Company shall be permitted to keep in effect the Controlled Equity Offering<sup>SM</sup> Sales Agreement, dated as of April 28, 2017, by and between the Company and Cantor Fitzgerald & Co. (the "Cantor Agreement"); provided that pursuant to the terms of this paragraph, no sales under the Cantor Agreement may be made during the Lock-Up Period.

(m) To supply the Representative with copies of all correspondence to and from, and all documents issued to and by, the Commission in connection with the registration of the Stock under the Securities Act or any of the Registration Statement, any Preliminary Prospectus or the Prospectus, or any amendment or supplement thereto or document incorporated by reference therein.

(n) Prior to the Closing Date, not to issue any press release or other communication directly or indirectly or hold any press conference with respect to the Company, its condition, financial or otherwise, or earnings, business affairs or business prospects (except for routine oral marketing communications in the ordinary course of business and consistent with the past practices of the Company and of which the Representative is notified), without the prior consent of the Representative, which consent shall not be unreasonably withheld, delayed or conditioned, unless in the judgment of the Company and its counsel, and after notification to the Representative, such press release or communication is required by law.

(o) Until the Representative shall have notified the Company of the completion of the resale of the Stock, that the Company will not, and will use its reasonable best efforts to cause its affiliated purchasers (as defined in Regulation M under the Exchange Act) not to, either alone or with one or more other persons, bid for or purchase, for any account in which it or any of its affiliated purchasers has a beneficial interest, any Stock, or attempt to induce any person to purchase any Stock; and not to, and to use its reasonable best efforts to cause its affiliated purchasers not to, make bids or purchase for the purpose of creating actual, or apparent, active trading in or of raising the price of the Stock.

(p) To at all times comply in all material respects with applicable provisions of the Sarbanes-Oxley Act in effect from time to time.

(q) To maintain, at its expense, a registrar and transfer agent for the Stock.

(r) To apply the net proceeds from the sale of the Stock as set forth in the Registration Statement, the General Disclosure Package and the Prospectus under the heading "Use of Proceeds," and, except as disclosed in the General Disclosure Package, the Company does not intend to use any of the proceeds from the sale of the Stock hereunder to repay any outstanding debt owed to any affiliate of any Underwriter.

(s) To use its reasonable efforts to list, subject to notice of issuance, and to maintain the listing of the Stock on the NYSE American LLC.

(t) To use its reasonable efforts to do and perform all things required to be done or performed under this Agreement by the Company prior to each Closing Date and to satisfy all conditions precedent to the delivery of the Stock.

*5. Payment of Expenses.* The Company agrees to pay, or reimburse if paid by the Underwriters, whether or not the transactions contemplated hereby are consummated or this Agreement is terminated: (a) the costs incident to the authorization, issuance, sale, preparation and delivery of the Stock and any taxes payable in that connection; (b) the costs incident to the registration of the Stock under the Securities Act; (c) the costs incident to the preparation, printing and distribution of the Registration Statement, the Base Prospectus, any Preliminary Prospectus, any Issuer Free Writing Prospectus, the General Disclosure Package, the Prospectus, any amendments, supplements and exhibits thereto or any document incorporated by reference therein and the costs of printing, reproducing and distributing this Agreement and any closing documents by mail, telex or other means of communications; (d) the reasonable and documented fees and expenses (including related fees and expenses of counsel for the Underwriters) incurred in connection with securing any required review by FINRA of the terms of the sale of the Stock and any filings made with FINRA, if applicable; (e) any applicable listing or other fees; (f) the reasonable and documented fees and expenses (including related fees and expenses of counsel to the Underwriters) of qualifying the Stock under the securities laws of the several jurisdictions as provided in Section 4(j) and of preparing, printing and distributing wrappers, Blue Sky Memoranda and Legal Investment Surveys; (g) the cost of preparing and printing stock certificates; (h) all fees and expenses of the registrar and transfer agent of the Stock; (i) the costs and expenses of the Company relating to investor presentations on any "road show" undertaken in connection with the marketing of the offering of the Stock, including, without limitation, expenses associated with the preparation or dissemination of any electronic road show, expenses associated with the production of road show slides and graphics; (j) all other costs and expenses of the Company incident to the offering of the Stock or the performance of the obligations of the Company under this Agreement (including, without limitation, the fees and expenses of the Company's counsel and the Company's independent accountants); and (k) all other "out of pocket" costs of the Underwriters and all reasonable fees and disbursements of the Underwriters' legal counsel (such fees and expenses payable pursuant to the foregoing clauses (d), (f) and (k) in the aggregate not to exceed \$100,000). Except to the extent otherwise provided in this Section 5 and in Sections 9 and 10, the Underwriters shall pay their own costs and expenses, including other fees and expenses of their counsel and any transfer taxes on the resale of any Stock by them.



6. *Conditions of Underwriters' Obligations.* The respective obligations of the several Underwriters hereunder are subject to the accuracy, when made and as of the Applicable Time and on the Closing Date, of the representations and warranties of the Company contained herein, to the accuracy of the statements of the Company made in any certificates pursuant to the provisions hereof, to the performance by the Company of its obligations hereunder, and to each of the following additional terms and conditions:

(a) The Registration Statement has become effective under the Securities Act, and no stop order suspending the effectiveness of any Registration Statement or any part thereof, preventing or suspending the use of any Base Prospectus, any Preliminary Prospectus, the Prospectus or any Permitted Free Writing Prospectus or any part thereof shall have been issued and no proceedings for that purpose or pursuant to Section 8A under the Securities Act shall have been initiated or threatened by the Commission, and all requests for additional information on the part of the Commission (to be included or incorporated by reference in the Registration Statement or the Prospectus or otherwise) shall have been complied with to the reasonable satisfaction of the Representative; the Rule 462(b) Registration Statement, if any, each Issuer Free Writing Prospectus and the Prospectus shall have been filed with the Commission within the applicable time period prescribed for such filing by, and in compliance with, the Rules and Regulations and in accordance with Section 4(a), and the Rule 462(b) Registration Statement, if any, shall have become effective immediately upon its filing with the Commission; and FINRA shall have raised no objection to the fairness and reasonableness of the terms of this Agreement or the transactions contemplated hereby.

(b) None of the Underwriters shall have discovered and disclosed to the Company on or prior to the Closing Date that any Registration Statement or any amendment or supplement thereto contains an untrue statement of a fact that, in the opinion of counsel for the Underwriters, is material or omits to state any fact that, in the opinion of such counsel, is material and is required to be stated therein or is necessary to make the statements therein not misleading, or that the General Disclosure Package, any Issuer Free Writing Prospectus or the Prospectus or any amendment or supplement thereto contains an untrue statement of fact that, in the opinion of such counsel, is material or omits to state any fact which, in the opinion of such counsel, is material and is necessary in order to make the statements, in the light of the circumstances in which they were made, not misleading.

(c) All corporate proceedings incident to the authorization, form and validity of each of this Agreement, the Stock, the Registration Statement, the General Disclosure Package, each Issuer Free Writing Prospectus and the Prospectus and the transactions contemplated hereby shall be reasonably satisfactory in all material respects to counsel for the Underwriters, and the Company shall have furnished to such counsel all documents and information that they may reasonably request to enable them to pass upon such matters.

(d) Lowenstein Sandler LLP, counsel to the Company, shall have furnished to the Representative such counsel's written opinion and negative assurance statement, each addressed to the Representative and dated the Closing Date, each in form and substance reasonably satisfactory to the Representative.

(e) Each of MH2 Technology Law Group LLP and Arent Fox LLP, counsel for the Company with respect to intellectual property matters, shall have furnished to the Representative such counsel's written opinion, in form and substance reasonably satisfactory to the Representative.

(f) The Representative shall have received from Goodwin Procter LLP, counsel for the Underwriters, such counsel's written opinion and negative assurance statement, dated the Closing Date, with respect to such matters as the Underwriters may reasonably require, and the Company shall have furnished to such counsel such documents as they request for enabling them to pass upon such matters.

(g) At the time of the execution of this Agreement, the Representative shall have received from EisnerAmper LLP a letter, addressed to the Underwriters, executed and dated such date, in form and substance satisfactory to the Representative (i) confirming that they are an independent registered accounting firm with respect to the Company within the meaning of the Securities Act and the Rules and Regulations and PCAOB and (ii) stating the conclusions and findings of such firm, of the type ordinarily included in accountants' "comfort letters" to underwriters, with respect to the financial statements and certain financial information contained or incorporated by reference in the Registration Statement, the General Disclosure Package and the Prospectus.

(h) On the effective date of any post-effective amendment to any Registration Statement and on the Closing Date, the Representative shall have received a letter (the "bring-down letter") from EisnerAmper LLP addressed to the Underwriters and dated the Closing Date confirming, as of the date of the bring-down letter (or, with respect to matters involving changes or developments since the respective dates as of which specified financial information is given in the General Disclosure Package and the Prospectus, as the case may be, as of a date not more than three (3) business days prior to the date of the bring-down letter), the conclusions and findings of such firm, of the type ordinarily included in accountants' "comfort letters" to underwriters, with respect to the financial information and other matters covered by its letter delivered to the Representative concurrently with the execution of this Agreement pursuant to paragraph (g) of this Section 6.

(i) The Company shall have furnished to the Representative a certificate, dated the Closing Date, of its Chief Executive Officer or President and its Chief Financial Officer stating in their respective capacities as officers of the Company on behalf of the Company that (i) no stop order suspending the effectiveness of the Registration Statement (including, for avoidance of doubt, any Rule 462(b) Registration Statement), or any post-effective amendment thereto, shall be in effect and no proceedings for such purpose shall have been instituted or, to their knowledge, threatened by the Commission, (ii) for the period from and including the date of this Agreement through and including such Closing Date, there has not occurred any Material Adverse Change, (iii) to their knowledge, as of the Closing Date, the representations and warranties of the Company in this Agreement are true and correct in all material respects and the Company has complied in all material respects with all agreements and satisfied all conditions on its part to be performed or satisfied hereunder at or prior to the Closing Date, and (iv) there has not been, subsequent to the date of the most recent audited financial statements included or incorporated by reference in the General Disclosure Package, any material adverse change in the financial position or results of operations of the Company and its subsidiaries taken as a whole, or 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 and its subsidiaries taken as a whole, except as set forth in the Prospectus.

(j) Since the date of the latest audited financial statements included in the General Disclosure Package or incorporated by reference in the General Disclosure Package as of the date hereof, (i) neither the Company nor its subsidiaries shall have sustained any loss or interference with its business from fire, explosion, flood or other calamity, whether or not covered by insurance, or from any labor dispute or court or governmental action, order or decree, otherwise than as set forth in the General Disclosure Package, and (ii) there shall not have been any change in the capital stock (other than issuance of options or other securities in the ordinary course of business and pursuant to the Company's equity incentive or stock purchase plans described in the General Disclosure Package and the Prospectus or Common Stock issued pursuant to the exercise of warrants or upon the exercise of stock options previously outstanding under the Company's stock option plans and the issuance of Common Stock pursuant to employee stock purchase plans) or long-term debt of the Company or its subsidiaries, or any change, or any development involving a prospective change, in or affecting the business, general affairs, management, financial position, stockholders' equity or results of operations of the Company and its subsidiaries, otherwise than as set forth in the General Disclosure Package, the effect of which, in any such case described in clause (i) or (ii) of this paragraph (i) is, in the judgment of the Representative, so material and adverse as to make it impracticable or inadvisable to proceed with the sale or delivery of the Stock on the terms and in the manner contemplated in the General Disclosure Package.

(k) No action shall have been taken and no law, statute, rule, regulation or order shall have been enacted, adopted or issued by any governmental agency or body which would prevent the issuance or sale of the Stock or materially and adversely affect or potentially materially and adversely affect the business or operations of the Company or its subsidiaries; and no injunction, restraining order or order of any other nature by any federal or state court of competent jurisdiction shall have been issued which would prevent the issuance or sale of the Stock or materially and adversely affect or potentially materially and adversely affect the business or operations of the Company and its subsidiaries.

(l) Subsequent to the execution and delivery of this Agreement there shall not have occurred any of the following: (i) trading in securities generally on the New York Stock Exchange, Nasdaq Global Market or the NYSE American LLC or in the over-the-counter market, or trading in any securities of the Company on any exchange or in the over-the-counter market, shall have been suspended or materially limited, or minimum or maximum prices or maximum range for prices shall have been established on any such exchange or such market by the Commission, by such exchange or market or by any other regulatory body or governmental authority having jurisdiction, (ii) a banking moratorium shall have been declared by Federal or state authorities or a material disruption has occurred in commercial banking or securities settlement or clearance services in the United States, (iii) the United States shall have become engaged in hostilities, or the subject of an act of terrorism, or there shall have been an outbreak of or escalation in hostilities involving the United States, or there shall have been a declaration of a national emergency or war by the United States or (iv) there shall have occurred such a material adverse change in general economic, political or financial conditions (or the effect of international conditions on the financial markets in the United States shall be such) as to make it, in the judgment of the Representative, impracticable or inadvisable to proceed with the sale or delivery of the Stock on the terms and in the manner contemplated in the General Disclosure Package and the Prospectus.

(m) The Company shall have filed an Additional Listing Application with the NYSE American LLC and shall have received no objection thereto from the NYSE American LLC.

(n) The Representative shall have received on and as of the Closing Date satisfactory evidence of the good standing of the Company in the State of Delaware, in writing or any standard form of telecommunication from the appropriate Governmental Authorities of such jurisdiction.

(o) The Representative shall have received the written agreements, substantially in the form of Exhibit A hereto, of the persons listed in Exhibit B to this Agreement.

(p) The Company shall have furnished to the Underwriters a Secretary's Certificate of the Company, in form and substance reasonably satisfactory to counsel for the Underwriters and customary for the type of offering contemplated by this Agreement.

(q) The Company shall have furnished to the Representative a Certificate of the Chief Financial Officer of the Company, in form and substance reasonably satisfactory to counsel for the Underwriters.

(r) On or prior to the Closing Date, the Company shall have furnished to the Representative such further certificates and documents as the Representative may reasonably request.

All opinions, letters, evidence and certificates mentioned above or elsewhere in this Agreement shall be deemed to be in compliance with the provisions hereof only if they are in form and substance reasonably satisfactory to counsel for the Underwriters.

#### *7. Indemnification and Contribution.*

(a) The Company shall indemnify and hold harmless each Underwriter, its directors, officers, managers, members, employees, representatives and agents and each person, if any, who controls any Underwriter within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act (collectively the “Underwriter Indemnified Parties,” and each an “Underwriter Indemnified Party”) against any loss, claim, damage, expense or liability whatsoever (or any action, investigation or proceeding in respect thereof), joint or several, to which such Underwriter Indemnified Party may become subject, under the Securities Act or otherwise, insofar as such loss, claim, damage, expense, liability, action, investigation or proceeding arises out of or is based upon (A) any untrue statement or alleged untrue statement of a material fact contained in any Preliminary Prospectus, any Issuer Free Writing Prospectus, any “issuer information” that is used in connection with the offering and sale of the Stock by, or with the approval of, the Company filed or required to be filed pursuant to Rule 433(d) of the Rules and Regulations, any Registration Statement or the Prospectus, or in any amendment or supplement thereto or document incorporated by reference therein, (B) the omission or alleged omission to state in any Preliminary Prospectus, any Issuer Free Writing Prospectus, any “issuer information” that is used in connection with the offering and sale of the Stock by, or with the approval of, the Company filed or required to be filed pursuant to Rule 433(d) of the Rules and Regulations, any Registration Statement or the Prospectus, or in any amendment or supplement thereto or document incorporated by reference therein, a material fact required to be stated therein or necessary to make the statements therein in light of (other than in the case of any Registration Statement) the circumstances under which they are made not misleading, (C) any investigation or proceeding by any governmental authority relating to or arising out of the matters described in the foregoing clauses (A) or (B), whether commenced or threatened (whether or not any Underwriter is a target of or party to such investigation or proceeding), or (D) any breach of the representations and warranties of the Company contained herein or the failure of the Company to perform its obligations hereunder or pursuant to any law, and shall reimburse each Underwriter Indemnified Party promptly upon demand for any legal fees or other expenses reasonably incurred by that Underwriter Indemnified Party in connection with investigating, or preparing to defend, or defending against, or appearing as a third party witness in respect of, or otherwise incurred in connection with, any such loss, claim, damage, expense, liability, action, investigation or proceeding, as such fees and expenses are incurred; *provided, however*, that the Company shall not be liable in any such case to the extent that any such loss, claim, damage, expense or liability arises out of or is based upon an untrue statement or alleged untrue statement in, or omission or alleged omission from any Preliminary Prospectus, any Registration Statement or the Prospectus, or any such amendment or supplement thereto, or any Issuer Free Writing Prospectus made in reliance upon and in conformity with written information furnished to the Company through the Representative by or on behalf of any Underwriter specifically for use therein, which information the parties hereto agree is limited to the Underwriters’ Information (as defined in Section 17).

The indemnity agreement in this Section 7(a) is not exclusive and is in addition to each other liability which the Company might have under this Agreement or otherwise, and shall not limit any rights or remedies which may otherwise be available under this Agreement, at law or in equity to any Underwriter Indemnified Party.

(b) Each Underwriter, severally and not jointly, shall indemnify and hold harmless the Company and its directors, its officers who signed the Registration Statement and each person, if any, who controls the Company within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act (collectively the “Company Indemnified Parties” and each a “Company Indemnified Party”) against any loss, claim, damage, expense or liability whatsoever (or any action, investigation or proceeding in respect thereof), joint or several, to which such Company Indemnified Party may become subject, under the Securities Act or otherwise, insofar as such loss, claim, damage, expense, liability, action, investigation or proceeding arises out of or is based upon (i) any untrue statement or alleged untrue statement of a material fact contained in any Preliminary Prospectus, any Issuer Free Writing Prospectus, any “issuer information” filed or required to be filed pursuant to Rule 433(d) of the Rules and Regulations, any Registration Statement or the Prospectus, or in any amendment or supplement thereto, or (ii) the omission or alleged omission to state in any Preliminary Prospectus, any Issuer Free Writing Prospectus, any “issuer information” filed or required to be filed pursuant to Rule 433(d) of the Rules and Regulations, any Registration Statement or the Prospectus, or in any amendment or supplement thereto, a material fact required to be stated therein or necessary to make the statements therein in light of (other than in the case of any Registration Statement) the circumstances under which they are made not misleading, but in each case only to the extent that the untrue statement or alleged untrue statement or omission or alleged omission was made in reliance upon and in conformity with written information furnished to the Company through the Representative by or on behalf of that Underwriter specifically for use therein, which information the parties hereto agree is limited to the Underwriters’ Information as defined in Section 17, and shall reimburse the Company Indemnified Parties promptly on demand for any legal or other expenses reasonably incurred by such party in connection with investigating or preparing to defend or defending against or appearing as third party witness in connection with any such loss, claim, damage, liability, action, investigation or proceeding, as such fees and expenses are incurred. This indemnity agreement is not exclusive and is in addition to each other liability which the Underwriters might otherwise have and shall not limit any rights or remedies which may otherwise be available under this Agreement, at law or in equity to the Company Indemnified Parties.

(c) Promptly after receipt by an indemnified party under this Section 7 of notice of the commencement of any action, the indemnified party shall, if a claim in respect thereof is to be made against an indemnifying party under this Section 7, notify such indemnifying party in writing of the commencement of that action; *provided, however*, that the failure to notify the indemnifying party shall not relieve it from any liability which it may have under this Section 7 except to the extent it has been materially prejudiced by such failure; and, *provided, further*, that the failure to notify an indemnifying party shall not relieve it from any liability which it may have to an indemnified party otherwise than under this Section 7. If any such action shall be brought against an indemnified party, and it shall notify the indemnifying party thereof, the indemnifying party shall be entitled to participate therein and, to the extent that it wishes, jointly with any other similarly notified indemnifying party, to assume the defense of such action with counsel reasonably satisfactory to the indemnified party (which counsel shall not, except with the written consent of the indemnified party, be counsel to the indemnifying party). After notice from the indemnifying party to the indemnified party of its election to assume the defense of such action, except as provided herein, the indemnifying party shall not be liable to the indemnified party under Section 7 for any legal or other expenses subsequently incurred by the indemnified party in connection with the defense of such action other than reasonable costs of investigation; *provided, however*, that any indemnified party shall have the right to employ separate counsel in any such action and to participate in the defense of such action but the fees and expenses of such counsel (other than reasonable costs of investigation) shall be at the expense of such indemnified party unless (i) the employment thereof has been specifically authorized in writing by the Company in the case of a claim for indemnification under Section 7(a) or the Representative in the case of a claim for indemnification under Section 7(b), (ii) such indemnified party shall have been advised by its counsel that there may be one or more legal defenses available to it which are different from or additional to those available to the indemnifying party, or (iii) the indemnifying party has failed to assume the defense of such action and employ counsel reasonably satisfactory to the indemnified party within a reasonable period of time after notice of the commencement of the action or the indemnifying party does not diligently defend the action after assumption of the defense, in which case, if such indemnified party notifies the indemnifying party in writing that it elects to employ separate counsel at the expense of the indemnifying party, the indemnifying party shall not have the right to assume the defense of (or, in the case of a failure to diligently defend the action after assumption of the defense, to continue to defend) such action on behalf of such indemnified party and the indemnifying party shall be responsible for legal or other expenses subsequently incurred by such indemnified party in connection with the defense of such action; *provided, however*, that the indemnifying party shall not, in connection with any one such action or separate but substantially similar or related actions in the same jurisdiction arising out of the same general allegations or circumstances, be liable for the reasonable fees and expenses of more than one separate firm of attorneys at any time for all such indemnified parties (in addition to any local counsel), which firm shall be designated in writing by the Representative if the indemnified parties under this Section 7 consist of any Underwriter Indemnified Party or by the Company if the indemnified parties under this Section 7 consist of any Company Indemnified Parties. Subject to this Section 7(c), the amount payable by an indemnifying party under Section 7 shall include, but not be limited to, (x) reasonable legal fees and expenses of counsel to the indemnified party and any other expenses in investigating, or preparing to defend or defending against, or appearing as a third party witness in respect of, or otherwise incurred in connection with, any action, investigation, proceeding or claim, and (y) all amounts paid in settlement of any of the foregoing. No indemnifying party shall, without the prior written consent of the indemnified parties, settle or compromise or consent to the entry of judgment with respect to any pending or threatened action or any claim whatsoever, in respect of which indemnification or contribution could be sought under this Section 7 (whether or not the indemnified parties are actual or potential parties thereto), unless such settlement, compromise or consent (i) includes an unconditional release of each indemnified party in form and substance reasonably satisfactory to such indemnified party from all liability arising out of such action or claim and (ii) does not include a statement as to or an admission of fault, culpability or a failure to act by or on behalf of any indemnified party. Subject to the provisions of the following sentence, no indemnifying party shall be liable for settlement of any pending or threatened action or any claim whatsoever that is effected without its written consent (which consent shall not be unreasonably withheld or delayed), but if settled with its written consent, if its consent has been unreasonably withheld or delayed or if there be a judgment for the plaintiff in any such matter, the indemnifying party agrees to indemnify and hold harmless any indemnified party from and against any loss or liability by reason of such settlement or judgment. In addition, if at any time an indemnified party shall have requested that an indemnifying party reimburse the indemnified party for reasonable fees and expenses of counsel, such indemnifying party agrees that it shall be liable for any settlement of the nature contemplated by Section 8(a) effected without its written consent if (i) such settlement is entered into more than forty-five (45) days after receipt by such indemnifying party of the request for reimbursement, (ii) such indemnifying party shall have received notice of the terms of such settlement at least thirty (30) days prior to such settlement being entered into and (iii) such indemnifying party shall not have reimbursed such indemnified party in accordance with such request prior to the date of such settlement.

(d) If the indemnification provided for in this Section 7 is unavailable or insufficient to hold harmless an indemnified party under Section 7(a) or 7(b), then each indemnifying party shall, in lieu of indemnifying such indemnified party, contribute to the amount paid, payable or otherwise incurred by such indemnified party as a result of such loss, claim, damage, expense or liability (or any action, investigation or proceeding in respect thereof), as incurred, (i) in such proportion as shall be appropriate to reflect the relative benefits received by the Company on the one hand and the Underwriters on the other from the offering of the Stock, or (ii) if the allocation provided by clause (i) of this Section 7(d) is not permitted by applicable law, in such proportion as is appropriate to reflect not only the relative benefits referred to in clause (i) of this Section 7(d) but also the relative fault of the Company on the one hand and the Underwriters on the other with respect to the statements, omissions, acts or failures to act which resulted in such loss, claim, damage, expense or liability (or any action, investigation or proceeding in respect thereof) as well as any other relevant equitable considerations. The relative benefits received by the Company on the one hand and the Underwriters 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 Stock purchased under this Agreement (before deducting expenses) received by the Company bear to the total underwriting discounts and commissions received by the Underwriters with respect to the Stock purchased under this Agreement, in each case as set forth in the table on the cover page of the Prospectus. The relative fault of the Company on the one hand and the Underwriters on the other shall be determined by reference to, among other things, whether the untrue or alleged untrue statement of a material fact or the omission or alleged omission to state a material fact relates to information supplied by the Company on the one hand or the Underwriters on the other, the intent of the parties and their relative knowledge, access to information and opportunity to correct or prevent such untrue statement, omission, act or failure to act; *provided* that the parties hereto agree that the written information furnished to the Company through the Representative by or on behalf of the Underwriters for use in the Preliminary Prospectus, any Registration Statement or the Prospectus, or in any amendment or supplement thereto, consists solely of the Underwriters' Information as defined in Section 17.

(e) The Company and the Underwriters agree that it would not be just and equitable if contributions pursuant to Section 7(d) above were to be determined by pro rata allocation or by any other method of allocation which does not take into account the equitable considerations referred to in Section 7(d) above. The amount paid or payable by an indemnified party as a result of the loss, claim, damage, expense, liability, action, investigation or proceeding referred to in Section 7(d) above shall be deemed to include, subject to the limitations set forth above, any legal or other expenses reasonably incurred by such indemnified party in connection with investigating, preparing to defend or defending against or appearing as a third party witness in respect of, or otherwise incurred in connection with, any such loss, claim, damage, expense, liability, action, investigation or proceeding. Notwithstanding the provisions of this Section 7, no Underwriters shall be required to contribute any amount in excess of the total underwriting discounts and commissions received by such Underwriter with respect to the offering of the Stock to the extent that the total underwriting discounts and commissions received by such Underwriter exceeds the amount of any damages which such Underwriter has otherwise paid or become liable to pay by reason of any untrue or alleged untrue statement, omission or alleged omission, act or alleged act or failure to act or alleged failure to act. 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. The Underwriters' obligations to contribute as provided in this Section 7 are several in proportion to their respective underwriting obligations and not joint.

8. *Termination.* The obligations of the Underwriters hereunder may be terminated by the Representative, in its absolute discretion by notice given to the Company prior to delivery of and payment for the Firm Stock if, prior to that time, any of the events described in Sections 6(j) or 6(l) have occurred, or if the Underwriters shall decline to purchase the Stock for any reason permitted under this Agreement.

9. *Reimbursement of Underwriters' Expenses.* Notwithstanding anything to the contrary in this Agreement, if (a) this Agreement shall have been terminated pursuant to Section 8, (b) the Company shall fail to tender the Stock for delivery to the Underwriters for any reason not permitted under this Agreement, (c) the Underwriters shall decline to purchase the Stock for any reason permitted under this Agreement, or (d) the sale of the Stock is not consummated (i) because any condition to the obligations of the Underwriters set forth herein is not satisfied or (ii) because of the refusal, inability or failure on the part of the Company to perform any agreement herein or satisfy any condition or to comply with the provisions hereof (A) prior to the Closing Date, then in addition to the payment of amounts in accordance with Section 5, the Company shall reimburse the Underwriters for the reasonable and documented fees and expenses of Underwriters' counsel and for such other out-of-pocket expenses as shall have been reasonably and actually incurred by them in connection with this Agreement and the proposed purchase of the Stock, including, without limitation, travel and lodging expenses of the Underwriters, and upon demand the Company shall pay the full amount thereof to the Representative and (B) after the Closing Date but prior to any Option Closing Date with respect to the purchase of any Optional Stock pursuant to a notice delivered by the Representative to the Company under Section 3 hereof, the Company shall reimburse the Underwriters for the reasonable and documented fees and expenses of Underwriters' counsel and for such other out-of-pocket expenses as shall have been reasonably and actually incurred by them following the Closing Date pursuant to this Agreement in connection with the proposed purchase of such Optional Stock, and upon demand the Company shall pay the full amount thereof to the Representative, *provided* that, in no event shall the Company be obligated to reimburse the Underwriters pursuant to clauses (a), (c) or (d)(i) above in an amount in excess of \$100,000 in the aggregate. If this Agreement is terminated pursuant to Section 10 by reason of the default of one or more Underwriters, the Company shall not be obligated to reimburse any defaulting Underwriter on account of expenses to the extent incurred by such defaulting Underwriter *provided* that the foregoing shall not limit any reimbursement obligation of the Company to any non-defaulting Underwriter under this Section 9.

10. *Substitution of Underwriters.* If any Underwriter or Underwriters shall default in its or their obligations to purchase shares of Stock hereunder on the Closing Date and the aggregate number of shares which such defaulting Underwriter or Underwriters agreed but failed to purchase does not exceed ten percent (10%) of the total number of shares to be purchased by all Underwriters on the Closing Date, the other Underwriters shall be obligated severally, in proportion to their respective commitments set forth on Schedule I hereto, to purchase the shares which such defaulting Underwriter or Underwriters agreed but failed to purchase on the Closing Date. If any Underwriter or Underwriters shall so default and the aggregate number of shares with respect to which such default or defaults occur is more than ten percent (10%) of the total number of shares to be purchased by all Underwriters on the Closing Date and arrangements satisfactory to the Representative and the Company for the purchase of such shares by other persons are not made within forty-eight (48) hours after such default, this Agreement shall terminate.

If the remaining Underwriters or substituted Underwriters are required hereby or agree to take up all or part of the shares of Stock of a defaulting Underwriter or Underwriters on the Closing Date as provided in this Section 10, (i) the Company shall have the right to postpone the Closing Date for a period of not more than five (5) full business days in order that the Company may effect whatever changes may thereby be made necessary in the Registration Statement or the Prospectus, or in any other documents or arrangements, and the Company agrees promptly to file any amendments to the Registration Statement or supplements to the Prospectus which may thereby be made necessary, and (ii) the respective numbers of shares to be purchased by the remaining Underwriters or substituted Underwriters shall be taken as the basis of their underwriting obligation for all purposes of this Agreement. Nothing herein contained shall relieve any defaulting Underwriter of its liability to the Company or the other Underwriters for damages occasioned by its default hereunder. Any termination of this Agreement pursuant to this Section 10 shall be without liability on the part of any non-defaulting Underwriter or the Company, except that the representations, warranties, covenants, indemnities, agreements and other statements set forth in Section 2, the obligations with respect to expenses to be paid or reimbursed to non-defaulting Underwriters pursuant to Sections 5 and 9 and the provisions of Section 7 and Sections 11 through 21, inclusive, shall not terminate and shall remain in full force and effect, and provided that any such termination shall not relieve a defaulting Underwriter from liability for its default.

11. *Absence of Fiduciary Relationship.* The Company acknowledges and agrees that:

(a) each Underwriter's responsibility to the Company is solely contractual in nature, the Representative has been retained solely to act as an underwriter in connection with the sale of the Stock and no fiduciary, advisory or agency relationship between the Company and the Representative has been created in respect of any of the transactions contemplated by this Agreement, irrespective of whether the Representative has advised or is advising the Company on other matters;

(b) the price of the Stock set forth in this Agreement was established by the Company following discussions and arms-length negotiations with the Representative, and the Company is capable of evaluating and understanding, and understands and accepts, the terms, risks and conditions of the transactions contemplated by this Agreement;

(c) it has been advised that the Representative and its affiliates are engaged in a broad range of transactions which may involve interests that differ from those of the Company and that the Representative has no obligation to disclose such interests and transactions to the Company by virtue of any fiduciary, advisory or agency relationship; and

(d) it waives, to the fullest extent permitted by law, any claims it may have against the Representative for breach of fiduciary duty or alleged breach of fiduciary duty and agrees that the Representative shall have no liability (whether direct or indirect) to the Company in respect of such a fiduciary duty claim or to any person asserting a fiduciary duty claim on behalf of or in right of the Company, including stockholders, employees or creditors of the Company.

12. *Successors; Persons Entitled to Benefit of Agreement* This Agreement shall inure to the benefit of and be binding upon the several Underwriters, the Company and their respective successors and assigns. Nothing expressed or mentioned in this Agreement is intended or shall be construed to give any person, other than the persons mentioned in the preceding sentence, any legal or equitable right, remedy or claim under or in respect of this Agreement, or any provisions herein contained, this Agreement and all conditions and provisions hereof being intended to be and being for the sole and exclusive benefit of such persons and for the benefit of no other person; except that the representations, warranties, covenants, agreements and indemnities of the Company contained in this Agreement shall also be for the benefit of the Underwriter Indemnified Parties, and the indemnities of the several Underwriters shall be for the benefit of the Company Indemnified Parties. It is understood that each Underwriter's responsibility to the Company is solely contractual in nature and the Underwriters do not owe the Company, or any other party, any fiduciary duty as a result of this Agreement. No purchaser of any of the Stock from any Underwriter shall be deemed to be a successor or assign by reason merely of such purchase.

13. *Survival of Indemnities, Representations, Warranties, etc* The respective indemnities, covenants, agreements, representations, warranties and other statements of the Company and the several Underwriters, as set forth in this Agreement or made by them respectively, pursuant to this Agreement, shall remain in full force and effect, regardless of any investigation made by or on behalf of any Underwriter, the Company or any person controlling any of them and shall survive delivery of and payment for the Stock. Notwithstanding any termination of this Agreement, including without limitation any termination pursuant to Section 8 or Section 10, the indemnities, contribution, covenants, agreements, representations, warranties and other statements forth in Sections 2, 5, 7 and 9 and Sections 11 through 21, inclusive, of this Agreement shall not terminate and shall remain in full force and effect at all times.

14. *Notices.* All statements, requests, notices and agreements hereunder shall be in writing, and:

(a) if to the Underwriters, shall be delivered or sent by mail, telex, email or facsimile transmission to Piper Sandler & Co., 800 Nicollet Mall, Suite 800, Minneapolis, MN 55402, Attention: General Counsel, with a copy (which shall not constitute notice hereunder) to Goodwin Procter LLP, The New York Times Building, 620 Eighth Avenue, New York, New York 10018, Attention: Michael D. Maline, Esq., Fax: 212-355-3333; and



(b) if to the Company, shall be delivered or sent by mail, telex, facsimile transmission or email to Matinas Biopharma Holdings, Inc., 1545 Route 206 South, Suite 302, Bedminster, NJ 07921, Attention: Jerry Jabbour, with a copy (which shall not constitute notice hereunder) to Lowenstein Sandler LLP, 1251 Avenue of the Americas, New York, New York 10021, Attention: Steve Skolnick, Fax: 973-597-2477;

*provided, however,* that any notice to an Underwriter pursuant to Section 7 shall be delivered or sent by mail, or facsimile transmission to such Underwriter at its address set forth in its acceptance telex to the Representative, which address will be supplied to any other party hereto by the Representative upon request. Any such statements, requests, notices or agreements shall take effect at the time of receipt thereof, except that any such statement, request, notice or agreement delivered or sent by email shall take effect at the time of confirmation of receipt thereof by the recipient thereof.

15. *Definition of Certain Terms.* For purposes of this Agreement, (a) “business day” means any day on which the NYSE American LLC is open for trading and (b) “subsidiaries” has the meaning set forth in Rule 405 of the Rules and Regulations.

**16. GOVERNING LAW AND JURISDICTION.** This Agreement shall be governed by and construed in accordance with the laws of the State of New York, including without limitation Section 5-1401 of the New York General Obligations. The Company irrevocably (a) submits to the non-exclusive jurisdiction of the Federal and state courts in the Borough of Manhattan in The City of New York for the purpose of any suit, action or other proceeding arising out of this Agreement or the transactions contemplated by this Agreement, the Registration Statement and any Preliminary Prospectus or the Prospectus, (b) agrees that all claims in respect of any such suit, action or proceeding may be heard and determined by any such court, (c) waives to the fullest extent permitted by applicable law, any immunity from the jurisdiction of any such court or from any legal process, (d) agrees not to commence any such suit, action or proceeding other than in such courts, and (e) waives, to the fullest extent permitted by applicable law, any claim that any such suit, action or proceeding is brought in an inconvenient forum.

17. *Underwriters' Information.* The parties hereto acknowledge and agree that, for all purposes of this Agreement, the “Underwriters' Information” consists solely of the information in the third and ninth through eleventh paragraphs under the heading “Underwriting”.

18. *Authority of the Representative.* In connection with this Agreement, the Representative will act for and on behalf of the several Underwriters, and any action taken under this Agreement by the Representative, will be binding on all the Underwriters.

19. *Partial Unenforceability.* The invalidity or unenforceability of any section, paragraph, clause or provision of this Agreement shall not affect the validity or enforceability of any other section, paragraph, clause or provision hereof. If any section, paragraph, clause or provision of this Agreement is for any reason determined to be invalid or unenforceable, there shall be deemed to be made such minor changes (and only such minor changes) as are necessary to make it valid and enforceable.

20. *General.* This Agreement constitutes the entire agreement of the parties to this Agreement and supersedes all prior written or oral and all contemporaneous oral agreements, understandings and negotiations with respect to the subject matter hereof. In this Agreement, the masculine, feminine and neuter genders and the singular and the plural include one another. The section headings in this Agreement are for the convenience of the parties only and will not affect the construction or interpretation of this Agreement. This Agreement may be amended or modified, and the observance of any term of this Agreement may be waived, only by a writing signed by the Company and the Representative.

21. *Counterparts.* This Agreement may be signed in any number of counterparts, each of which shall be an original, with the same effect as if the signatures thereto and hereto were upon the same instrument and such signatures may be delivered by facsimile or by e-mail delivery of a “.pdf” format data file.

[Signature page follows.]

If the foregoing is in accordance with your understanding of the agreement between the Company and the several Underwriters, kindly indicate your acceptance in the space provided for that purpose below.

Very truly yours,

MATINAS BIOPHARMA HOLDINGS, INC.

By: /s/ Jerome D. Jabbour

Name: Jerome D. Jabbour

Title: Chief Executive Officer

Accepted as of  
the date first above written:

PIPER SANDLER & CO.

Acting on its own behalf  
and as Representative of the several  
Underwriters referred to in the  
foregoing Agreement.

By: /s/ Chad Huber

Name: Chad Huber

Title: Managing Director

[Signature Page to Underwriting Agreement]

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**SCHEDULE I**

**Underwriters**

<u>Name</u>	<u>Number of Shares of Firm Stock to be Purchased</u>	<u>Number of Shares of Optional Stock to be Purchased</u>
PIPER SANDLER & CO.	19,356,000	2,903,400
SUNTRUST ROBINSON HUMPHREY, INC.	7,258,500	1,088,775
BTIG, LLC	3,226,000	483,900
H.C. WAINWRIGHT & CO., LLC	806,500	120,975
MAXIM GROUP LLC	806,500	120,975
ROTH CAPITAL PARTNERS, LLC	806,500	120,975
<b>Total</b>	<b>32,260,000</b>	<b>4,839,000</b>

*Schedule I*

**SCHEDULE II**

**Pricing Information**

Firm Stock to be Sold: 32,260,000 shares

Offering Price: \$1.55 per share

Underwriting Discounts and Commissions: \$0.093 per share

Estimated Net Proceeds to the Company (after underwriting discounts and commissions, but before transaction expenses): \$46,902,820.00

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*Schedule II*

**SCHEDULE III**

**General Use Free Writing Prospectuses**

None.

*Schedule III*

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EXHIBIT A

Form of Lock-Up Agreement

December , 2019

Piper Jaffray & Co.  
As representative of the underwriters named  
in Schedule II to the Purchase Agreement  
referred to below

c/o Piper Jaffray & Co.  
800 Nicollet Mall, Suite 800  
Minneapolis, MN 55402

Dear Ladies and Gentlemen:

As an inducement to the underwriters (the "*Underwriters*") to execute a purchase agreement (the "*PURCHASE AGREEMENT*") providing for a public offering (the "*Offering*") of common stock (the "*COMMON STOCK*"), of Matinas BioPharma Holdings, Inc. and any successor (by merger or otherwise) thereto (the "*Company*"), the undersigned hereby agrees that without, in each case, the prior written consent of Piper Jaffray & Co. ("*Piper Jaffray*") during the period specified in the second succeeding paragraph (the "*LOCK-UP PERIOD*"), the undersigned will not: (1) offer, pledge, 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, make any short sale or otherwise transfer or dispose of, directly or indirectly, any shares of Common Stock or any securities convertible into, exercisable or exchangeable for or that represent the right to receive Common Stock (including without limitation, Common Stock which may be deemed to be beneficially owned by the undersigned in accordance with the rules and regulations of the Securities and Exchange Commission and securities which may be issued upon exercise of a stock option or warrant) whether now owned or hereafter acquired (the "*Undersigned's Securities*"); (2) enter into any swap or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of the Undersigned's Securities, 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; (3) make any demand for or exercise any right with respect to, the registration of any Common Stock or any security convertible into or exercisable or exchangeable for Common Stock; or (4) publicly disclose the intention to do any of the foregoing.

The undersigned agrees that the foregoing restrictions preclude the undersigned from engaging in any hedging or other transaction which is designed to or which reasonably could be expected to lead to or result in a sale or disposition of the Undersigned's Securities even if such Securities would be disposed of by someone other than the undersigned. Such prohibited hedging or other transactions would include without limitation any short sale or any purchase, sale or grant of any right (including without limitation any put or call option) with respect to any of the Undersigned's Securities or with respect to any security that includes, relates to, or derives any significant part of its value from the Undersigned's Securities.

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Exhibit A

The Lock-Up Period will commence on the date of this Agreement and continue and include the date 90 days after the date of the final prospectus used to sell Common Stock in the Offering pursuant to the Purchase Agreement,

Notwithstanding the foregoing, the undersigned may transfer the Undersigned's Securities (i) as a *bona fide* gift or gifts, (ii) to any trust for the direct or indirect benefit of the undersigned or the immediate family of the undersigned, (iii) if the undersigned is a corporation, partnership, limited liability company, trust or other business entity (1) transfers to another corporation, partnership, limited liability company, trust or other business entity that is a direct or indirect affiliate (as defined in Rule 405 promulgated under the Securities Act of 1933, as amended) of the undersigned or (2) distributions of shares of Common Stock or any security convertible into or exercisable for Common Stock to limited partners, limited liability company members or stockholders of the undersigned, (iv) if the undersigned is a trust, transfers to the beneficiary of such trust, (v) transfers by testate succession or intestate succession, (vi) as forfeiture of Common Stock to satisfy tax withholding obligations of the undersigned in connection with the vesting or exercise of equity awards by the undersigned pursuant to the Company's equity incentive plans or (vii) pursuant to the Purchase Agreement; *provided*, in the case of clauses (i)-(vi), that (x) such transfer shall not involve a disposition for value, (y) the transferee agrees in writing with the Underwriters to be bound by the terms of this Lock-Up Agreement, and (z) no filing by any party under Section 16(a) of the Securities Exchange Act of 1934, as amended (the "**Exchange Act**"), shall be required or shall be made voluntarily in connection with such transfer. For purposes of this Agreement, "immediate family" shall mean any relationship by blood, marriage or adoption, nor more remote than first cousin.

In addition, the foregoing restrictions shall not apply to (i) the exercise of stock options granted pursuant to the Company's equity incentive plans; *provided* that it shall apply to any of the Undersigned's Securities issued upon such exercise, or (ii) the establishment of any contract, instruction or plan (a "**Plan**") that satisfies all of the requirements of Rule 10b5-1(c)(1)(i)(B) under the Exchange Act; *provided* that no sales of the Undersigned's Securities shall be made pursuant to such a Plan prior to the expiration of the Lock-Up Period (as such may have been extended pursuant to the provisions hereof), and such a Plan may only be established if no public announcement of the establishment or existence thereof and no filing with the Securities and Exchange Commission or other regulatory authority in respect thereof or transactions thereunder or contemplated thereby, by the undersigned, the Company or any other person, shall be required, and no such announcement or filing is made voluntarily, by the undersigned, the Company or any other person, prior to the expiration of the Lock-Up Period (as such may have been extended pursuant to the provisions hereof).

In furtherance of the foregoing, the Company and its transfer agent and registrar are hereby authorized to decline to make any transfer of shares of Common Stock if such transfer would constitute a violation or breach of this Agreement.

The undersigned hereby represents and warrants that it has full power and authority to enter into this Agreement and that upon request, the undersigned will execute and additional documents necessary to ensure the validity or enforcement of this 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 Agreement if (i) the Company notifies the Underwriters that it does not intend to proceed with the Offering, (ii) the Purchase Agreement does not become effective, or if the Purchase 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 Offering is not completed by January 31, 2020.

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*Exhibit A*

The undersigned understands that the Underwriters are entering into the Purchase Agreement and proceeding with the Offering in reliance upon this Agreement.

This Agreement shall be governed by, and construed in accordance with, the laws of the State of New York.

Very truly yours,

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Printed Name of Holder

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

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*Exhibit A*



**EXHIBIT B**

**Officers, Directors, and Stockholders Executing Lock-Up Agreements**

Jerome D. Jabbour  
Theresa Matkovits  
Raphael J. Mannino  
Keith A. Kucinski  
James J. Ferguson  
Herbert Conrad  
Patrick LePore  
Eric J. Ende  
Matthew A. Wikler  
Adam K. Stern  
James S. Scibetta

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January 9, 2020

Matinas BioPharma Holdings, Inc.  
1545 Route 206 South, Suite 302  
Bedminster, New Jersey 07921

Ladies and Gentlemen:

We have acted as counsel to Matinas BioPharma Holdings, Inc., a Delaware corporation (the "Company"), in connection with (i) the preparation and filing of the Registration Statement on Form S-3 (Registration No. 333-217106) filed with the Securities and Exchange Commission (the "Commission") under the Securities Act of 1933, as amended (the "Securities Act"), (as so filed and as amended, the "Registration Statement") and the related prospectus contained in the Registration Statement (the "Base Prospectus") and (ii) the preparation and filing of the prospectus supplement, dated January 9, 2020 (the "Prospectus Supplement") relating to the issuance and sale by the Company of up to 37,099,000 shares of common stock, par value \$0.0001 per share (the "Common Stock") of the Company (the "Shares") (including 4,839,000 shares of Common Stock issuable by the Company upon exercise of an option to purchase additional shares granted by the Company to the underwriters).

The Shares are to be issued and sold by the Company pursuant to the Underwriting Agreement, dated as of January 9, 2020 (the "Underwriting Agreement"), between the Company and Piper Sandler & Co., as representative of the several underwriters party thereto, the form of which is being filed with the Commission as Exhibit 1.1 to the Company's Current Report on Form 8-K, filed on the date hereof.

In connection with this opinion, we have (i) investigated such questions of law, (ii) examined originals or certified, conformed or reproduction copies of such agreements, instruments, documents and records of the Company, such certificates of public officials and such other documents and (iii) received such information from officers and representatives of the Company as we have deemed necessary or appropriate for the purposes of this opinion

In all such examinations, we have assumed the legal capacity of all natural persons, the genuineness of all signatures, the authenticity of original and certified documents and the conformity to original or certified documents of all copies submitted to us as conformed or reproduction copies. As to various questions of fact relevant to the opinion expressed herein, we have relied upon, and assume the accuracy of, the representations and warranties set forth in the Underwriting Agreement, and certificates and oral or written statements and other information of or from public officials and officers and representatives of the Company.

Based upon the foregoing and subject to the limitations, qualifications and assumptions set forth herein, we are of the opinion that the Shares have been duly authorized for issuance, and when issued and paid for in accordance with the terms and conditions of the Underwriting Agreement, the Shares will be validly issued, fully paid and non-assessable.

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The opinion expressed herein is limited to the applicable provisions of the General Corporation Law of the State of Delaware (the "DGCL"), as currently in effect, and reported judicial decisions interpreting such provisions of the DGCL.

The opinion expressed herein is limited to the matters stated herein and no opinion is implied or may be inferred beyond the matters expressly stated herein. We undertake no obligation to supplement this letter if any applicable laws change after the date hereof or if we become aware of any facts that might change the opinion expressed herein after that date or for any other reason.

We hereby consent to the inclusion of this opinion as an exhibit to a Current Report on Form 8-K to be filed by the Company with the Commission, which Current Report on Form 8-K will be incorporated by reference into the Registration Statement, and to the references to our firm under the caption "Legal Matters" in the Prospectus Supplement. In giving our consent, we do not admit that we are in the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations thereunder.

Very truly yours,

*/s/ Lowenstein Sandler LLP*

Lowenstein Sandler LLP

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### **Matinas BioPharma Announces Proposed Public Offering of Common Stock**

BEDMINSTER, N.J., January 9, 2020 (GLOBE NEWSWIRE)— Matinas BioPharma Holdings, Inc. (“Matinas BioPharma” or the “Company”) — (NYSE AMER: MTNB), a clinical-stage biopharmaceutical company, today announced that it has commenced an underwritten public offering of its common stock. In connection with the offering, Matinas BioPharma intends to grant the underwriters a 30-day option to purchase up to an additional 15% of the shares of its common stock offered in the public offering. All of the shares to be sold in the offering are to be sold by Matinas BioPharma.

Piper Sandler & Co. is acting as the sole lead active bookrunner for the offering. SunTrust Robinson Humphrey is also acting as a bookrunner for the offering.

Matinas BioPharma anticipates using the net proceeds from the offering for ongoing development activities for its product candidates, primarily MAT9001, and for working capital and other general corporate purposes.

A shelf registration statement on Form S-3 (File No. 333-217106) relating to the public offering of the shares of common stock described above was declared effective by the Securities and Exchange Commission (the “SEC”) on April 12, 2017. The offering will be made only by means of a written prospectus and prospectus supplement that form a part of the registration statement. Before you invest, you should read the prospectus and prospectus supplement for more complete information about Matinas BioPharma and this offering. An electronic copy of the preliminary prospectus supplement and accompanying base prospectus relating to the offering, when filed, will be available on the SEC’s website at [www.sec.gov](http://www.sec.gov) and may also be obtained, when available, by contacting Piper Sandler & Co., 800 Nicollet Mall, J12S03, Minneapolis, MN, 55402, Attention: Prospectus Department, by telephone at (800) 747-3924 or by email at [prospectus@psc.com](mailto:prospectus@psc.com).

This press release shall not constitute an offer to sell or the solicitation of an offer to buy these securities, nor shall there be any sale of these securities in any state or other jurisdiction in which such offer, solicitation or sale would be unlawful prior to the registration or qualification under the securities laws of any such state or other jurisdiction.

#### **About Matinas BioPharma**

Matinas BioPharma is a clinical-stage biopharmaceutical company focused on development of its lead product candidate, MAT9001, for the treatment of cardiovascular and metabolic conditions. MAT9001 is a prescription-only omega-3 fatty acid-based composition, comprised primarily of EPA and DPA, under development for hypertriglyceridemia, that was specifically designed to overcome the shortcomings seen from other agents in the omega-3 class. Company leadership has a deep history and knowledge of cardiovascular drug development and is supported by a world-class team of scientific advisors.

In addition, the Company is developing MAT2203, an oral, encochleated formulation of amphotericin B, to treat serious invasive fungal infections. The drug is based on the Company’s proprietary lipid nano-crystal (LNC) platform technology which can help solve complex challenges relating to the safe and effective delivery of potent medicines, potentially making them more targeted, less toxic and orally bioavailable.

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**Forward Looking Statements:**

*This release contains “forward-looking statements” within the meaning of the Private Securities Litigation Reform Act of 1995, including statements regarding the completion, timing and size of its public offering and the anticipated use of proceeds. All statements other than statements of historical fact are statements that could be forward-looking statements. Forward-looking statements include words such as “expects,” “anticipates,” “intends,” “plans,” “could,” “believes,” “estimates” and similar expressions. These statements involve known and unknown risks, uncertainties and other factors which may cause actual results to be materially different from any future results expressed or implied by the forward-looking statements. Forward-looking statements are subject to a number of risks and uncertainties, including, but not limited to, our ability to obtain additional capital to meet our liquidity needs on acceptable terms, or at all, including the additional capital which will be necessary to complete the clinical trials of our product candidates; our ability to successfully complete research and further development and commercialization of our product candidates; the uncertainties inherent in clinical testing; the timing, cost and uncertainty of obtaining regulatory approvals; our ability to protect the Company’s intellectual property; the loss of any executive officers or key personnel or consultants; competition; changes in the regulatory landscape or the imposition of regulations that affect the Company’s products; and the other factors listed under “Risk Factors” in our filings with the SEC, including Forms 10-K, 10-Q and 8-K. Investors are cautioned not to place undue reliance on such forward-looking statements, which speak only as of the date of this release. Except as may be required by law, the Company does not undertake any obligation to release publicly any revisions to such forward-looking statements to reflect events or circumstances after the date hereof or to reflect the occurrence of unanticipated events.*

**Investor and Media Contact**

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Source: Matinas BioPharma Holdings, Inc.

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### **Matinas BioPharma Announces Pricing of Public Offering of Common Stock**

BEDMINSTER, N.J., January 10, 2020 (GLOBE NEWSWIRE)— Matinas BioPharma Holdings, Inc. (“Matinas BioPharma” or the “Company”) — (NYSE AMER: MTNB), a clinical-stage biopharmaceutical company, today announced the pricing of its underwritten registered public offering of 32,260,000 shares of its common stock, offered at a price to the public of \$1.55 per share for expected gross proceeds of approximately \$50.0 million, before deducting underwriting discounts and commissions and other estimated offering expenses. In addition, Matinas BioPharma has granted the underwriters a 30-day option to purchase up to an additional 4,839,000 shares of its common stock on the same terms and conditions. All of the shares in the offering are being sold by Matinas BioPharma. The offering is expected to close on or about January 14, 2020, subject to customary closing conditions.

Piper Sandler & Co. is acting as the sole lead active bookrunner for the offering. SunTrust Robinson Humphrey is also acting as a bookrunner for the offering. BTIG, LLC is acting as lead manager and H.C. Wainwright & Co., Maxim Group LLC and Roth Capital Partners are acting as co-managers for the offering.

Matinas BioPharma anticipates using the net proceeds from the offering for ongoing development activities for its product candidates, primarily MAT9001, and for working capital and other general corporate purposes.

A shelf registration statement on Form S-3 (File No. 333-217106) relating to the public offering of the shares of common stock described above was declared effective by the Securities and Exchange Commission (the “SEC”) on April 12, 2017. The offering is being made only by means of a written prospectus and prospectus supplement that form a part of the registration statement. A preliminary prospectus supplement and accompanying base prospectus relating to the offering was filed with the SEC and is available on the SEC’s website at [www.sec.gov](http://www.sec.gov). An electronic copy of the final prospectus supplement and accompanying base prospectus relating to the offering, when filed, will be available on the SEC’s website at [www.sec.gov](http://www.sec.gov) and may also be obtained by contacting Piper Sandler & Co., 800 Nicollet Mall, J12S03, Minneapolis, MN, 55402, Attention: Prospectus Department, by telephone at (800) 747-3924 or by email at [prospectus@psc.com](mailto:prospectus@psc.com).

This press release shall not constitute an offer to sell or the solicitation of an offer to buy these securities, nor shall there be any sale of these securities in any state or other jurisdiction in which such offer, solicitation or sale would be unlawful prior to the registration or qualification under the securities laws of any such state or other jurisdiction.

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Source: Matinas BioPharma Holdings, Inc.

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