

Mast Therapeutics, Inc.
Form 424B3
February 10, 2014

Filed Pursuant to Rule 424(b)(3)
Registration No. 333-188870

Prospectus Supplement No. 7

(To prospectus dated June 14, 2013)

Warrants to Purchase up to 28,097,500 Shares of Common Stock

This Prospectus Supplement No. 7 (the "Prospectus Supplement") supplements our Prospectus dated June 14, 2013 and Prospectus Supplements No. 1 through 6, dated June 26, 2013, August 5, 2013, August 9, 2013, October 30, 2013, November 4, 2013 and January 8, 2014, respectively (together, the "Prospectus"), relating to the issuance of up to 28,097,500 shares of our common stock issuable upon exercise of outstanding warrants issued in connection with our registered offering which closed on June 19, 2013. We cannot predict when or if the warrants will be exercised, and it is possible that the warrants may expire and never be exercised.

Recent Developments

This Prospectus Supplement is being filed to update and supplement the information in the Prospectus with the information contained in our Current Reports on Form 8-K filed with the Securities and Exchange Commission on February 10, 2014 (the "Current Reports"). Accordingly, we have attached the Current Reports to this Prospectus Supplement. Any statement contained in the Prospectus shall be deemed to be modified or superseded to the extent that information in this Prospectus Supplement modifies or supersedes such statement. Any statement that is modified or superseded shall not be deemed to constitute a part of the Prospectus except as modified or superseded by this Prospectus Supplement.

This Prospectus Supplement should be read in conjunction with, and may not be delivered or utilized without, the Prospectus.

In reviewing this Prospectus Supplement, you should carefully consider the matters described under the caption "Risk Factors" beginning on page 4 of the Prospectus.

Neither the U.S. Securities and Exchange Commission nor any state securities commission has approved or disapproved these securities or determined if this Prospectus Supplement is truthful or complete. Any representation to the contrary is a criminal offense.

This Prospectus Supplement does not constitute an offer to sell or the solicitation of an offer to buy any securities.

The date of this Prospectus Supplement is February 10, 2014

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): February 7, 2014

Mast Therapeutics, Inc.

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction
of incorporation)

001-32157
(Commission File Number)

84-1318182
(IRS Employer
Identification No.)

12390 El Camino Real, Suite 150, San Diego, California
(Address of principal executive offices)

92130
(Zip Code)

(858) 552-0866

Registrant's telephone number, including area code

Not applicable

(Former name or former address, if changed since last report)

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:

- .. 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(b))
- .. 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))

Item 1.01. Entry into a Material Definitive Agreement.

Merger Agreement

On February 7, 2014, Mast Therapeutics, Inc. (the Company) and its wholly-owned subsidiary AP Acquisition Sub, Inc., a Delaware corporation (Merger Sub), entered into an Agreement and Plan of Merger (the Merger Agreement) with Aires Pharmaceuticals, Inc., (Target) and a stockholders representative (the Stockholders Representative). Pursuant to the Merger Agreement, the Company will acquire Target, a privately held pharmaceutical company focused on the development of inhaled sodium nitrite. The Merger Agreement provides that at the effective time of the Merger (the Effective Time), Merger Sub will be merged with and into Target (the Merger), with Target continuing as the surviving corporation and a wholly-owned subsidiary of the Company.

Under the terms of the Merger Agreement, at the Effective Time, each outstanding share of Target capital stock (other than shares held by stockholders of Target who have properly demanded appraisal rights for their shares in accordance with Delaware law) will be converted into the right to receive from the Company, in the aggregate, such number of unregistered shares of the Company's common stock, par value \$0.001 (Common Stock) as is equal to (i) the product of Target's net cash immediately prior to the Effective Time multiplied by 1.5, (ii) divided by the price that is the average of the closing price per share of Common Stock during the 10 trading day period immediately preceding the closing date of the Merger (the Merger Consideration). Approximately 80% of the shares that constitute the Merger Consideration (the Holdback Amount) will be held back from issuance for a period of six months from the Effective Time for the benefit of the Company to satisfy the indemnification obligations of Target's stockholders pursuant to the Merger Agreement. Based on the average of the closing prices per share of Common Stock for the 10-day period ending February 7, 2014 and the Company's estimate of Target's net cash immediately prior to the Effective Time, the Company expects that the Merger Consideration will be approximately 6,000,000 shares of Common Stock.

The shares of Common Stock constituting the Merger Consideration will be issued by the Company in reliance on the exemptions provided by Section 4(a)(2) of the Securities Act of 1933, as amended (the Securities Act), and Regulation D promulgated thereunder and in reliance on similar exemptions under applicable state laws.

The parties have made customary representations, warranties and covenants in the Merger Agreement, including among other things, covenants that Target shall, during the period from the date of the Merger Agreement until the closing date of the Merger (the Closing Date), (a) maintain its corporate existence; (b) use its reasonable best efforts to preserve intact its present business organization; (c) maintain its books and records in accordance with current practice, and to use its reasonable best efforts to maintain in full force and effect all authorizations and policies; and (d) use its reasonable best efforts to conduct its business in such a manner that on the Closing Date the representations and warranties of Target contained in the Merger Agreement shall be true and correct, as though such representations and warranties were made on and as of such date; and (e) Target shall use its reasonable best efforts to cause all of the conditions to the obligations of the Company and Merger Sub to be satisfied as soon as practicable following the date of the Merger Agreement. Additionally, Target agrees that it shall not, (i) adopt or propose any amendment to its organizational documents; (ii) declare, or pay any dividend or other distribution with respect to any of its securities; (iii) issue or authorize for issuance any securities, or make any change in any issued and outstanding securities, or redeem, purchase or otherwise acquire any securities, other than with respect to the issuance of securities upon the exercise of its stock option and warrants; (iv) mortgage, pledge or permit to become subject to liens (other than permitted liens) any properties or assets of the Company; (v) be party to (A) any merger, acquisition, consolidation, recapitalization, liquidation, dissolution or similar transaction involving Target or (B) any purchase of all or any substantial portion of the assets or securities of Target; (vi) (A) other than file income tax returns for calendar year 2012, file any tax return or amendment to any tax return unless copies of such tax return or amendment have first been delivered to the Company for its review and approval at a reasonable time prior to filing, (B) except as required by applicable law, make or change any material election in respect of taxes or adopt or change any accounting method in respect of taxes, or (C) enter into any closing agreement, settle any claim or assessment in respect of taxes, or consent

to any extension or waiver of the limitation period applicable to any claim or assessment in respect of taxes; (vii) enter into any severance or termination arrangement with any employee or consultant which include any covenants, obligations or liabilities that will continue or survive on or after the Closing, other than as set forth in the Merger Agreement; (viii) incur any indebtedness, or make any capital expenditures or commit to make any capital expenditures which, in any one case exceeds \$10,000 or which in the aggregate exceed \$30,000; (ix) enter into or renew any material contract, other than as set forth in the Merger Agreement; (x) modify any of Target's insurance policies in effect on the date of the Merger Agreement; (xi) waive, release, assign, settle or compromise any material claims, settle any proceeding or initiated proceeding; (xii) sell, lease, transfer or assign any material property or assets of Target, other than as set forth in the Merger Agreement; (xiii) amend any of Target's benefit plans unless required by applicable law or requested by the Company; (xiv) delay or

postpone the payment of accounts payable or other liabilities, in each case, outside the ordinary course of business, consistent with past practice, make any change in its accounting principles or practices or the methods by which such principles or practices are applied for financial reporting purposes (except as required by GAAP), or write down or write up (or fail to write down or write up in accordance with GAAP consistent with past practice) the value of any inventories or revalue any of their respective assets other than in the ordinary course of business consistent with past practice and in accordance with GAAP; or (xv) agree, whether in writing or otherwise, to do any of the foregoing.

Pursuant to the Merger Agreement, the Company, on the one hand, and the stockholders of Target on the other, will indemnify and hold the other harmless as a result of the breach of the representations, warranties and covenants in the Merger Agreement. To provide a fund for payment to the Company in respect of its indemnification rights, the Holdback Amount will be held back for a period of six months following the Effective Time. Subject to certain limited exceptions, no claim for indemnification of losses by the Company shall be made unless the aggregate amount of losses exceeds \$50,000, in which case the Company shall be entitled to seek compensation for all losses without regard to such limitation. Subject to certain exceptions, the Merger Agreement provides for a maximum limit on indemnification by the stockholders of Target equal to the Holdback Amount.

The consummation of the Merger is subject to certain customary conditions, including, without limitation, (a) the approval of the Merger Agreement and the transactions contemplated thereunder by Target's stockholders; (b) the absence of any legal prohibitions on the closing of the Merger; (c) subject to certain exceptions, the continued accuracy of the Company's and Target's representations and warranties as of the Effective Time; (d) the absence of any circumstance or event since the date of the Merger Agreement that has had or would reasonably be expected to have, individually or in the aggregate, a material adverse effect on Target; (e) Target's stock option plan shall have been terminated; (f) Target's stock options and capital stock equivalents shall have been terminated; (g) certain of Target's agreements and plans shall have terminated; (h) certain employees of Target shall have entered into separation agreements and/or releases providing for the termination of such employees' employment effective immediately prior to the Effective Time; (i) certain employees of Target shall have entered into offer letters and/or remain employed by Target immediately prior to the closing of the Merger; and (j) and the Company shall have received approval from the NYSE MKT LLC of its additional listing application with respect to the shares constituting the Merger Consideration.

Under the Merger Agreement, each of the Company and Target has certain rights to terminate the Merger Agreement and the Merger, including (a) by mutual written consent of either party, (b) by either party if the Merger has not been consummated on or prior to February 28, 2014, subject to certain exceptions; (c) by the Company, if the required Target stockholder approval is not obtained; (d) by either party if a governmental authority shall have issued an order or taken any other action, in each case having the effect of permanently restraining, enjoining or otherwise prohibiting the Merger, subject to certain exceptions; or (e) by either party if there has been a breach of any representation, warranty, covenant or agreement on the part of the other party set forth in this Agreement, which breach (i) causes certain closing conditions to not be met and (ii) shall not have been cured within 10 calendar days following receipt by the breaching party of written notice of such breach from the other party.

The Company expects that five of Target's current employees, including its chief medical officer, will continue with the surviving corporation following the closing of the Merger. Three of those employees will continue on a transitional basis, for two to four months post-closing. The Company plans to enter into an offer letter agreement with Target's chief medical officer prior to the closing date, which agreement will govern the initial terms of his employment with Target post-closing.

Stockholder Agreement

On February 7, 2014, promptly following the execution of the Merger Agreement, the Company and stockholders holding all of the outstanding shares of the preferred stock and approximately 90% of the Common Stock of Target each (i) entered into a stockholder agreement (the "Stockholder Agreement") and (ii) delivered a written consent of the

stockholders of Target (which constitutes the required vote under the Merger Agreement) approving the Merger Agreement, the ancillary documents, the Merger and the transactions contemplated thereby. Each Stockholder Agreement became effective as of February 7, 2014. Pursuant to the terms and conditions of the Stockholder Agreement each stockholder signatory thereto has agreed to, among other items (i) not transfer the shares of Common Stock issued as Merger Consideration (the Merger Shares) held by such stockholder for a period of six months from closing date of the Merger, subject to certain exceptions, (ii) not transfer the Target s shares held by such stockholder, subject to certain exceptions, (iii) vote the Target s shares held by such stockholder at any meeting of Target stockholders or written consent of Target stockholders to approve the Merger Agreement and the Merger and the transactions contemplated thereby, and against any other acquisition proposal and also grant an irrevocable proxy to the Target s officers to vote such shares in the same manner, and (iv) grant an irrevocable proxy to the Company s officers to vote the Merger Shares held by such stockholder at any meeting of the Company stockholders or written consent of the Company stockholders

in the same manner, which proxy shall terminate on the earlier of the termination of the Merger Agreement and the 30-month anniversary of the closing date of the Merger. The transfer restrictions and proxy with respect to Target's shares held by the stockholder terminate on the earlier of the termination of the Merger Agreement or the Effective Date. The Stockholder Agreement shall terminate automatically on the termination of the Merger Agreement.

The Stockholder Agreement also provides for certain covenants and representations and warranties, including those relied on by the Company in connection with issuing the Merger Shares in reliance on Section 4(a)(2) of the Securities Act and Regulation D thereunder. Additionally, the Stockholder Agreement provides that the stockholder releases the Company and Target from claims relating to Target, but excluding claims under the Merger Agreement.

Description of the AIR001 Program

Target's lead product candidate is AIR001 (sodium nitrite) inhalation solution. AIR001 is an 80 mg/mL solution of sodium nitrite in a sterile phosphate buffer solution for nebulization. Nitrite is a physiological signaling molecule with roles in intravascular endocrine nitric oxide (NO) production, hypoxic vasodilation, signaling, and cytoprotection after ischemia-reperfusion. Nitrite serves as the largest physiologic reservoir of NO and can be converted to NO independent of nitric oxide synthase (NOS) activity. Nitrite mediated NO formation has been shown to have multiple vasoprotective characteristics, including inhibition of endothelial cell apoptosis, inhibition of platelet aggregation and adhesion, inhibition of leukocyte chemotaxis, and inhibition of smooth muscle cell proliferation and migration. Results of nitrite use in monocrotaline and hypoxic animal models of pulmonary hypertension have demonstrated improved remodeling both in the pulmonary vasculature and right ventricle.

To date, Target's development of AIR001 has been focused primarily on WHO (World Health Organization) Group 1 pulmonary hypertension, or pulmonary arterial hypertension (PAH), and Target had initiated two phase 2 studies of AIR001 in that setting. Prior to execution of the Merger Agreement, Target terminated and began the process of closing those studies. After the Merger, the Company will continue the closing process. Though the terminated studies did not complete enrollment, assuming the closing of the Merger, the Company expects data from subjects who completed the protocol-specified 16 weeks of treatment (approximately 20 subjects) in the second quarter of 2014.

The Company has not defined its development strategy for AIR001 and, other than potentially supporting an extension of an ongoing study at the University of Pittsburgh (described below), does not have plans to initiate immediately any clinical or nonclinical studies involving AIR001. Over the three to nine months following the Merger, the Company plans to meet with clinical and regulatory experts in pulmonary hypertension and heart failure to define the optimal development strategy for AIR001. However, the Company is considering working with the University of Pittsburgh to expand an ongoing phase 2a clinical study sponsored by the university, which currently is evaluating whether AIR001 can reduce pulmonary vascular resistance in subjects with WHO Group 1 and WHO Group 3 PH, to evaluate whether AIR001 can reduce wedge pressure and right atrial pressure in WHO Group 2, or patients with PH with left heart disease. The Company believes that, with its support, data from that study could be available as early as summer 2015.

The Company currently estimates that, during the 12-month period following the Merger, the costs of the AIR001 program, including costs associated with the wind-down of Target's clinical studies in PAH, costs to support the University of Pittsburgh's clinical study, and Target personnel costs, will be approximately \$2.0 million. The Company currently expects that Target's net cash at closing will exceed the Company's estimated 12-month post-closing expenses for the AIR001 program. However, as noted above, the Company will be refining its development strategy for AIR001 over the next few months and expects that its initial plans and, therefore, its estimated costs for the program, will change.

Forward-Looking Statements

Mast Therapeutics cautions you that statements included in this report, including under Description of the AIR001 Program, that are not a description of historical facts are forward-looking statements that are based on the Company's current expectations and assumptions. Such forward-looking statements include, but are not limited to, statements regarding the number of shares of Common Stock that constitutes the Merger Consideration and the Company's development plans for AIR001, as well as the cost and timing of activities related to those plans. Among the factors that could cause or contribute to material differences between the Company's actual results and the expectations indicated by the forward-looking statements are risks and uncertainties that include, but are not limited to: the potential that the closing of the Merger may be delayed and/or the Merger Agreement may be terminated pursuant to its terms and the Company will not acquire Target on a timely basis or at all; the potential that the number of shares of Common Stock that constitutes the Merger Consideration will be greater or less than the Company's estimated amount as a result of differences between the Company's estimate of and Target's actual net cash immediately prior to the Effective Time and/or volatility in the closing sales prices of the Common Stock; the potential for delays in the commencement or completion of nonclinical and clinical studies, including as a result of difficulties in obtaining regulatory agency agreement on clinical development plans or clinical study design, opening trial sites, enrolling study subjects, manufacturing clinical trial material, completing manufacturing process development activities, and being subject to a clinical hold; the risk of suspension or termination of a clinical study, including due to lack of adequate funding or patient safety concerns; the potential for institutional review boards or the FDA or other regulatory agencies to require additional nonclinical or clinical studies in addition to those that the Company includes in its development plan, which likely would increase the total time and cost of development; the risk that clinical studies are not successfully executed and/or do not successfully demonstrate the safety or efficacy of the investigational drug; the risk that, even if clinical studies are successful, the FDA

determines they are not sufficient to support a new drug application; the risk that even if clinical studies of an investigational drug in one indication are successful, clinical studies in another indication may not be successful; the Company's reliance on contract research organizations (CROs), contract manufacturing organizations (CMOs), and other third parties to assist in the conduct of important aspects of development of its product candidates, including nonclinical and clinical studies and regulatory activities, and that such third parties may fail to perform as expected; the Company's ability to obtain additional funding on a timely basis or on acceptable terms, or at all; the potential for the Company to delay, reduce or discontinue current and/or planned development activities, partner its product candidates at inopportune times or pursue less expensive but higher-risk and/or lower return development paths if it is unable to raise sufficient additional capital as needed; the risk that the Company is not able to adequately protect its intellectual property rights relating to the AIR001 program, if acquired, and prevent competitors from duplicating or developing equivalent versions of the drug; and other risks and uncertainties more fully described in the Company's periodic filings with the SEC and press releases.

You are cautioned not to place undue reliance on forward-looking statements, which speak only as of the date hereof. Mast Therapeutics does not intend to revise or update any forward-looking statement set forth in this report to reflect events or circumstances arising after the date hereof, except as may be required by law. This caution is made under the safe harbor provisions of Section 21E of the Exchange Act.

Item 3.02. Unregistered Sales of Equity Securities.

The information set forth in Item 1.01 of this report related to the issuance of shares of the Company's common stock is hereby incorporated by reference under this Item 3.02.

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.

Mast Therapeutics, Inc.

February 10, 2014

By: /s/ Patrick L. Keran

Name: Patrick L. Keran

Title: President and Chief Operating Officer

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): February 10, 2014

Mast Therapeutics, Inc.

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction

of incorporation)

001-32157
(Commission

File Number)

84-1318182
(IRS Employer

Identification No.)

12390 El Camino Real, Suite 150,

92130

San Diego, California
(Address of principal executive offices) **(Zip Code)**
Registrant's telephone number, including area code: (858) 552-0866

Not Applicable

Former name or former address, if changed since last report

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:

- .. 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))

Item 1.01. Entry into a Material Definitive Agreement.

On February 10, 2014, Mast Therapeutics, Inc. (the Company) entered into a Sales Agreement (the Sales Agreement) with Cowen and Company, LLC (Cowen) to sell shares of its Common Stock, par value \$0.001 (the Common Stock), having an aggregate offering price of up to \$30,000,000 (the Shares) from time to time, through an at-the-market equity offering program (the ATM Offering) under which Cowen will act as sales agent.

The offer and sale of the Shares will be made pursuant to the Company s effective shelf registration statement on Form S-3 (File No. 333-179989), the base prospectus contained therein, dated May 1, 2012, and a prospectus supplement related to the ATM Offering, dated February 10, 2014.

This Current Report on Form 8-K shall not constitute an offer to sell or the solicitation of any offer to buy the Shares, nor shall there be any offer, solicitation or sale of the Shares in any state in which such offer, solicitation or sale would be unlawful prior to registration or qualification under the securities laws of such state.

Subject to the terms and conditions of the Sales Agreement, Cowen will use its commercially reasonable efforts to sell the Shares, based upon the Company s instructions, consistent with its normal trading and sales practices and applicable state and federal laws, rules and regulations and rules of the NYSE MKT LLC. The Company will set the parameters for sales of the Shares, including the number of Shares to be sold, the time period during which sales are requested to be made, any limitation on the number of Shares that may be sold in one trading day, and any minimum price below which sales may not be made. Under the Sales Agreement, Cowen may sell the Shares by any method permitted by law deemed to be an at-the-market offering , as defined in Rule 415 of the Securities Act of 1933, as amended (the Securities Act), including sales made through the NYSE MKT LLC, on any other existing trading market for the Common Stock or to or through a market maker. In addition, if expressly authorized by the Company, Cowen may also sell Shares in privately negotiated transactions. The Company has no obligation to sell any of the Shares and may at any time suspend offers and sales under the Sales Agreement. The Company and Cowen each have the right, in their sole discretion, to terminate the Sales Agreement at any time upon prior written notice as provided in the Sales Agreement.

The Company will pay to Cowen a commission, or allow a discount, in an amount up to 3.0% of the gross sales price per share of Common Stock sold through it as sales agent under the Sales Agreement. In addition, the Company has agreed to reimburse Cowen for certain expenses it incurs in the performance of its obligations under the Sales Agreement up to a maximum of \$30,000. The Company has also agreed pursuant to the Sales Agreement to indemnify and provide contribution to Cowen against certain liabilities, including liabilities under the Securities Act.

The foregoing description of the terms of the Sales Agreement is subject to, and qualified in its entirety by, the Sales Agreement, a copy of which is filed as Exhibit 10.1 hereto and incorporated herein by reference.

The legal opinion of DLA Piper LLP (US), counsel to the Company, relating to the Shares is filed as Exhibit 5.1 hereto.

Item 9.01. Financial Statements and Exhibits.

(d) Exhibits.

The list of exhibits called for by this Item is incorporated by reference to the Exhibit Index filed with this report.

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.

Mast Therapeutics, Inc.

February 10, 2014

By: /s/ Patrick L. Keran

Name: Patrick L. Keran

Title: President and Chief Operating Officer

Exhibit Index

Exhibit

No.	Description
5.1	Opinion of DLA Piper LLP (US)
10.1	Sales Agreement, dated February 10, 2014, by and between Mast Therapeutics, Inc. and Cowen and Company, LLC
23.1	Consent of DLA Piper LLP (US) (included in Exhibit 5.1)

DLA Piper LLP (US)
4365 Executive Drive
San Diego, California 92121-2133
T 858.677.1400
F 858.677.1401

February 10, 2014

Mast Therapeutics, Inc.

12390 El Camino Real, Suite 150

San Diego, CA 92130

Ladies and Gentlemen:

You have requested our opinion with respect to certain matters in connection with the sale and issuance from time to time by Mast Therapeutics, Inc., a Delaware corporation (the **Company**), of shares of the Company's common stock, par value \$0.001 per share (the **Common Stock**), having an aggregate offering price of up to \$30,000,000 (the **Shares**), pursuant to an effective shelf registration statement on Form S-3 (File No. 333-179989) (the **Registration Statement**) filed with the Securities and Exchange Commission (the **Commission**) under the Securities Act of 1933, as amended (the **Act**), and the related prospectus dated May 1, 2012 (the **Base Prospectus**), as supplemented by the prospectus supplement dated February 10, 2014 filed with the Commission pursuant to Rule 424(b) promulgated under the Act (together with the Base Prospectus, the **Prospectus**).

In connection with this opinion, we have examined and relied upon the Registration Statement and the related Prospectus, the Company's Amended and Restated Certificate of Incorporation and Amended and Restated Bylaws, as currently in effect, and the originals or copies certified to our satisfaction of such other documents, records, certificates, memoranda and other instruments as in our judgment are necessary or appropriate to enable us to render the opinion expressed below.

In rendering this opinion, we have assumed the genuineness and authenticity of all signatures on original documents; the genuineness and authenticity of all documents submitted to us as originals; the conformity to originals of all documents submitted to us as copies; the accuracy, completeness and authenticity of certificates of public officials; and the due authorization, execution and delivery of all documents where due authorization, execution and delivery are prerequisites to the effectiveness of such documents (other than with respect to the Company).

On the basis of the foregoing, and in reliance thereon, we are of the opinion that the Shares have been duly and validly authorized and, when issued and sold pursuant to that certain Sales Agreement by and between the Company and Cowen and Company, LLC, dated February 10, 2014, in accordance with the Registration Statement and the Prospectus, will be validly issued, fully paid and nonassessable.

We consent to the reference to our firm under the caption **Legal Matters** in the Prospectus and to the filing of this opinion as an exhibit to a Current Report of the Company on Form 8-K. In giving our consent, we do not thereby 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 of the Commission thereunder.

Very truly yours,

/s/ DLA PIPER LLP (US)

DLA PIPER LLP (US)

MAST THERAPEUTICS, INC.

\$30,000,000

SALES AGREEMENT

February 10, 2014

Cowen and Company, LLC

599 Lexington Avenue

New York, NY 10022

Ladies and Gentlemen:

Mast Therapeutics, Inc. (the **Company**), confirms its agreement (this **Agreement**) with Cowen and Company, LLC (**Cowen**), as follows:

1. **Issuance and Sale of Shares**. The Company agrees that, from time to time during the term of this Agreement, on the terms and subject to the conditions set forth herein, it may issue and sell through Cowen, acting as agent and/or principal, shares of the Company's common stock, par value 0.001 per share (the **Common Stock**), having an aggregate offering price of up to \$30,000,000. Notwithstanding anything to the contrary contained herein, the parties hereto agree that compliance with the limitation set forth in this **Section 1** on the number of shares of Common Stock issued and sold under this Agreement shall be the sole responsibility of the Company, and Cowen shall have no obligation in connection with such compliance. The issuance and sale of Common Stock through Cowen will be effected pursuant to the Registration Statement (as defined below) filed by the Company and declared effective by the Securities and Exchange Commission (the **Commission**), although nothing in this Agreement shall be construed as requiring the Company to use the Registration Statement (as defined below) to issue the Common Stock.

The Company has filed, in accordance with the provisions of the Securities Act of 1933, as amended, and the rules and regulations thereunder (collectively, the **Securities Act**), with the Commission a registration statement on Form S-3 (File No. 333-179989), including a base prospectus, relating to certain securities, including the Common Stock, to be issued from time to time by the Company, and which incorporates by reference documents that the Company has filed or will file in accordance with the provisions of the Securities Exchange Act of 1934, as amended, and the rules and regulations thereunder (collectively, the **Exchange Act**). The Company has prepared a prospectus supplement specifically relating to the Common Stock being offered under this Agreement (the **Prospectus Supplement**) to the base prospectus included as part of such registration statement. The Company has furnished to Cowen, for use by Cowen, copies of the prospectus included as part of such registration statement, as supplemented by the Prospectus Supplement, relating to the Common Stock. Except where the context otherwise requires, such registration statement, as amended when it became effective, including all documents filed as part thereof or incorporated by reference therein, and including any information contained in a Prospectus (as defined below) subsequently filed with the

Commission pursuant to Rule 424(b) under the Securities Act or deemed to be a part of such registration statement pursuant to Rule 430B or 462(b) of the Securities Act, is herein called the **Registration Statement**. The base prospectus, including all documents incorporated therein by reference, included in the Registration Statement, as it may be supplemented by the Prospectus Supplement, in the form in which such prospectus and/or Prospectus Supplement have most recently been filed by the Company with the Commission pursuant to Rule 424(b) under the Securities Act, together with any issuer free writing prospectus, as defined in Rule 433 of the Securities Act Regulations (**Rule 433**), relating to the Common Stock offered under this Agreement that (i) is required to be filed with the Commission by the Company or (ii) is exempt from filing pursuant to Rule 433(d)(5)(i), in each case in the form filed or required to be filed with the Commission or, if not required to be filed, in the form retained in the Company's records pursuant to Rule 433(g), is herein called the **Prospectus**. Any reference herein to the Registration Statement, the Prospectus or any amendment or supplement thereto shall be deemed to refer to and include the documents incorporated by reference therein, and any reference herein to the terms amend, amendment or supplement with respect to the Registration Statement or the Prospectus shall be deemed to refer to and include the filing after the execution hereof of any document with the Commission deemed to be incorporated by reference therein. For purposes of this Agreement, all references to the Registration Statement, the Prospectus or to any amendment or supplement thereto shall be deemed to include any copy filed with the Commission pursuant to either the Electronic Data Gathering Analysis and Retrieval System or Interactive Data Electronic Applications (collectively **IDEA**).

2. **Placements**. Each time that the Company wishes to issue and sell the Common Stock hereunder (each, a **Placement**), it will notify Cowen by email notice (or other method mutually agreed to in writing by the parties) (a **Placement Notice**) containing the parameters in accordance with which it desires the shares of Common Stock to be sold, which shall at a minimum include the number of shares of Common Stock to be issued (the **Placement Shares**), the time period during which sales are requested to be made, any limitation on the number of shares of Common Stock that may be sold in any one Trading Day (as defined in Section 3) and any minimum price below which sales may not be made, a form of which containing such minimum sales parameters necessary is attached hereto as **Schedule 1**. The Placement Notice shall originate from any of the individuals from the Company set forth on **Schedule 2** (with a copy to each of the other individuals from the Company listed on such schedule), and shall be addressed to each of the individuals from Cowen set forth on **Schedule 2**, as such **Schedule 2** may be amended from time to time. The Placement Notice shall be effective upon receipt by Cowen unless and until (i) in accordance with the notice requirements set forth in Section 4, Cowen declines to accept the terms contained therein for any reason, in its sole discretion, (ii) the entire amount of the Placement Shares have been sold, (iii) in accordance with the notice requirements set forth in Section 4, the Company suspends or terminates the Placement Notice for any reason, in its sole discretion, (iv) the Company issues a subsequent Placement Notice with parameters superseding those on the earlier dated Placement Notice, or (v) the Agreement has been terminated under the provisions of **Section 11**. The amount of any discount, commission or other compensation to be paid by the Company to Cowen in connection with the sale of the Placement Shares shall be calculated in accordance with the terms set forth in **Schedule 3**. It is expressly acknowledged and agreed that neither the Company nor Cowen will have any obligation whatsoever with respect to a Placement or any Placement Shares unless and until the Company delivers a Placement Notice to Cowen and Cowen does not decline such

Placement Notice pursuant to the terms set forth above, and then only upon the terms specified therein and herein. In the event of a conflict between the terms of this Agreement and the terms of a Placement Notice, the terms of the Placement Notice will control.

3. Sale of Placement Shares by Cowen. Subject to the terms and conditions herein set forth, upon the Company's issuance of a Placement Notice, and unless the sale of the Placement Shares described therein has been declined, suspended, or otherwise terminated in accordance with the terms of this Agreement, Cowen, for the period specified in the Placement Notice, will use its commercially reasonable efforts consistent with its normal trading and sales practices and applicable state and federal laws, rules and regulations and the rules of the NYSE MKT, LLC (the Exchange) to sell such Placement Shares up to the amount specified, and otherwise in accordance with the terms of such Placement Notice. Cowen will provide written confirmation to the Company (including by email correspondence to each of the individuals of the Company set forth on Schedule 2, if receipt of such correspondence is actually acknowledged by any of the individuals to whom the notice is sent, other than via auto-reply) no later than the opening of the Trading Day (as defined below) immediately following the Trading Day on which it has made sales of Placement Shares hereunder setting forth the number of Placement Shares sold on such day, the price per share at which each sale of Placement Shares occurs on such day, the compensation payable by the Company to Cowen pursuant to Section 2 with respect to such sales, and the Net Proceeds (as defined below) payable to the Company, with an itemization of the deductions made by Cowen (as set forth in Section 5(a)) from the gross proceeds that it receives from such sales. Cowen may sell Placement Shares by any method permitted by law deemed to be an at the market offering as defined in Rule 415 of the Securities Act, including without limitation sales made through the Exchange, on any other existing trading market for the Common Stock or to or through a market maker. If expressly authorized by the Company in a Placement Notice, Cowen may also sell Placement Shares in privately negotiated transactions. Notwithstanding the provisions of Section 6(cc), Cowen shall not purchase Placement Shares for its own account as principal unless expressly authorized to do so by the Company in a Placement Notice. The Company acknowledges and agrees that (i) there can be no assurance that Cowen will be successful in selling Placement Shares, and (ii) Cowen will incur no liability or obligation to the Company or any other person or entity if it does not sell Placement Shares for any reason other than a failure by Cowen to use its commercially reasonable efforts consistent with its normal trading and sales practices to sell such Placement Shares as required under this Section 3. For the purposes hereof, Trading Day means any day on which the Company's Common Stock is purchased and sold on the principal market on which the Common Stock is listed or quoted.

4. Suspension of Sales.

(a) The Company or Cowen may, upon notice to the other party in writing (including by email correspondence to each of the individuals of the other party set forth on Schedule 2, if receipt of such correspondence is actually acknowledged by any of the individuals to whom the notice is sent, other than via auto-reply) or by telephone (confirmed immediately by verifiable facsimile transmission or email correspondence to each of the individuals of the other party set forth on Schedule 2), suspend any sale of Placement Shares; *provided, however*, that such suspension shall not affect or impair either party's obligations with respect to any Placement Shares sold hereunder prior to the receipt of such notice. Each of the Parties agrees that no such notice under this Section 4 shall be effective against the other unless it is made to one of the individuals named on Schedule 2 hereto, as such schedule may be amended from time to time.

(b) Notwithstanding any other provision of this Agreement, during any period in which the Company is in possession of material non-public information, the Company and Cowen agree that (i) no sale of Placement Shares will take place, (ii) the Company shall not request the sale of any Placement Shares, and (iii) Cowen shall not be obligated to sell or offer to sell any Placement Shares.

(c) If either Cowen or the Company has reason to believe that the exemptive provisions set forth in Rule 101(c)(1) of Regulation M under the Exchange Act are not satisfied with respect to the Common Stock, it shall promptly notify the other party, and Cowen may, at its sole discretion, suspend sales of the Placement Shares under this Agreement. Cowen shall calculate on a weekly basis the average daily trading volume (as defined by Rule 100 of Regulation M under the Exchange Act) of the Common Stock.

5. Settlement.

(a) Settlement of Placement Shares. Unless otherwise specified in the applicable Placement Notice, settlement for sales of Placement Shares will occur on the third (3rd) Trading Day (or such earlier day as is industry practice for regular-way trading) following the date on which such sales are made (each, a **Settlement Date** and the first such settlement date, the **First Delivery Date**). The amount of proceeds to be delivered to the Company on a Settlement Date against receipt of the Placement Shares sold (the **Net Proceeds**) will be equal to the aggregate sales price received by Cowen at which such Placement Shares were sold, after deduction for (i) Cowen's commission, discount or other compensation for such sales payable by the Company pursuant to Section 2 hereof, (ii) any other amounts due and payable by the Company to Cowen hereunder pursuant to Section 7(g) (Expenses) hereof, and (iii) any transaction fees imposed by any governmental or self-regulatory organization in respect of such sales.

(b) Delivery of Placement Shares. On or before each Settlement Date, the Company will, or will cause its transfer agent to, electronically transfer the Placement Shares being sold by crediting Cowen's or its designee's account (provided Cowen shall have given the Company written notice of such designee prior to the Settlement Date) at The Depository Trust Company through its Deposit and Withdrawal at Custodian System or by such other means of delivery as may be mutually agreed upon by the parties hereto which in all cases shall be freely tradeable, transferable, registered shares in good deliverable form. On each Settlement Date, Cowen will deliver the related Net Proceeds in same day funds to an account designated by the Company on, or prior to, the Settlement Date. The Company agrees that if the Company, or its transfer agent (if applicable), defaults in its obligation to deliver duly authorized Placement Shares on a Settlement Date, the Company agrees that in addition to and in no way limiting the rights and obligations set forth in Section 9(a) (Indemnification and Contribution) hereto, it will (i) hold Cowen harmless against any loss, claim, damage, or expense (including reasonable legal fees and expenses), as incurred, arising out of or in connection with such default by the Company and (ii) pay to Cowen any commission, discount, or other compensation to which it would otherwise have been entitled absent such default.

6. Representations and Warranties of the Company. The Company represents and warrants to, and agrees with, Cowen that, unless such representation or warranty specifies otherwise, as of the date of this Agreement and as of each Applicable Time (as defined in Section 20 (a)):

(a) Compliance with Registration Requirements. The Registration Statement and any Rule 462(b) Registration Statement have been declared effective by the Commission under the Securities Act. The Company has complied to the Commission's satisfaction with all requests of the Commission for additional or supplemental information with respect to the Registration Statement. No stop order suspending the effectiveness of the Registration Statement or any Rule 462(b) Registration Statement is in effect and no proceedings for such purpose have been instituted or are pending or, to the knowledge of the Company, are contemplated or threatened by the Commission. The Company meets the requirements for use of Form S-3 under the Securities Act.

(b) No Misstatement or Omission. The Prospectus when filed complied and, as amended or supplemented, if applicable, will comply in all material respects with the Securities Act. Each of the Registration Statement, any Rule 462(b) Registration Statement and any post-effective amendment thereto, at the time it became effective, complied and, as of each of the Settlement Dates, if any, will comply in all material respects with the Securities Act and did not and, as of each of the Settlement Dates, if any, will not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements therein not misleading. The Prospectus, as amended or supplemented, as of its date, did not and, as of each of the Settlement Dates, if any, will not contain any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading. The representations and warranties set forth in the two immediately preceding sentences do not apply to statements in or omissions from the Registration Statement, any Rule 462(b) Registration Statement, or any post-effective amendment thereto, or the Prospectus, or any amendments or supplements thereto, made in reliance upon and in conformity with information relating to Cowen furnished to the Company in writing by Cowen expressly for use therein. There are no contracts or other documents required to be described in the Prospectus or to be filed as exhibits to the Registration Statement which have not been described or filed as required.

(c) Offering Materials Furnished to Cowen. The Company has delivered to Cowen one complete copy of the Registration Statement and a copy of each consent and certificate of experts filed as a part thereof, and conformed copies of the Registration Statement (without exhibits) and the Prospectus, as amended or supplemented, in such quantities and at such places as Cowen has reasonably requested.

(d) Distribution of Offering Material By the Company. The Company has not distributed and will not distribute, prior to the completion of Cowen's distribution of the Common Stock issued and sold under this Agreement, any offering material in connection with the offering and sale of the Common Stock issued and sold under this Agreement other than the Prospectus or the Registration Statement.

(e) The Sales Agreement. This Agreement has been duly authorized, executed and delivered by, and is a valid and binding agreement of, the Company, enforceable in accordance with its terms, except as rights to indemnification hereunder may be limited by applicable law and except as the enforcement hereof may be limited by bankruptcy, insolvency, reorganization, moratorium or other similar laws relating to or affecting the rights and remedies of creditors or by general equitable principles.

(f) Authorization of the Common Stock. The shares of Common Stock to be sold by Cowen under this Agreement, acting as agent and/or principal for the Company, have been duly authorized for issuance and sale pursuant to this Agreement and, when issued and delivered by the Company to Cowen pursuant to this Agreement, will be validly issued, fully paid and nonassessable.

(g) No Applicable Registration or Other Similar Rights. There are no persons with registration or other similar rights to have any equity or debt securities registered for sale under the Registration Statement or included in the offering contemplated by this Agreement, except for such rights as have been duly waived.

(h) No Material Adverse Change. Except as otherwise disclosed in the Prospectus, subsequent to the respective dates as of which information is given in the Prospectus: (i) there has been no material adverse change, or any development that would reasonably be expected to result in a material adverse change, in the condition, financial or otherwise, or in the results of operations, business, operations or prospects, whether or not arising from transactions in the ordinary course of business, of the Company and its subsidiaries, considered as one entity (any such change is called a **Material Adverse Change**); (ii) the Company and its subsidiaries, considered as one entity, have not incurred any material liability or obligation, direct or contingent, not in the ordinary course of business nor entered into any material transaction or agreement not in the ordinary course of business; and (iii) there has been no dividend or distribution of any kind declared, paid or made by the Company or, except for regular quarterly dividends publicly announced by the Company or dividends paid to the Company or other subsidiaries, any of its subsidiaries on any class of capital stock or repurchase or redemption by the Company or any of its subsidiaries of any class of capital stock.

(i) Independent Accountants. PricewaterhouseCoopers LLP, who have expressed their opinion with respect to the financial statements (which term as used in this Agreement includes the related notes thereto) and supporting schedules included in the Company's Form 10-K for the fiscal year ended December 31, 2012, filed with the Commission or incorporated by reference as a part of the Registration Statement and included in the Prospectus, is an independent registered public accounting firm as required by the Securities Act and the Exchange Act.

(j) Preparation of the Financial Statements. The financial statements filed with the Commission as a part of or incorporated by reference in the Registration Statement and included in the Prospectus present fairly in all material respects the consolidated financial position of the Company and its subsidiaries as of and at the dates indicated therein and the results of their operations and cash flows for the periods specified. Such financial statements have been prepared in accordance with generally accepted accounting principles in the United States applied on a consistent basis throughout the periods involved, except as may be expressly stated in the related notes thereto. No other financial statements or supporting schedules are required to be included in or incorporated in the Registration Statement.

(k) Incorporation and Good Standing of the Company and its Subsidiaries. The Company has been duly incorporated and is validly existing as a corporation in good standing under the laws of the State of Delaware and has corporate power and authority to own, lease and operate its properties and to conduct its business as described in the Prospectus and to enter into and perform its obligations under this Agreement. SynthRx, Inc. is the Company's only significant subsidiary (as defined in Rule 1-02 (w) of Regulation S-X of the Exchange Act) (the **Significant Subsidiary**). All references herein to subsidiaries of the Company shall be deemed to refer to such single subsidiary, mutatis mutandis. The Significant Subsidiary has been duly organized and is validly existing as a corporation in good standing under the laws of the State of Delaware and has the requisite power and authority to own, lease and operate its properties and to conduct its business as described in the Prospectus. Each of the Company and the Significant Subsidiary is duly qualified as a foreign corporation or foreign partnership to transact business and is in good standing in the State of California and each other jurisdiction in which such qualification is required, whether by reason of the ownership or leasing of property or the conduct of business, except for such jurisdictions (other than the State of California) where the failure to so qualify or to be in good standing would not, individually or in the aggregate, result in a Material Adverse Change. Except as described in the Prospectus, all of the issued and outstanding equity interests of the Significant Subsidiary have been duly authorized and validly issued, are fully paid and nonassessable and are owned by the Company free and clear of any security interest, mortgage, pledge, lien, encumbrance or claim. The Company does not own or control, directly or indirectly, any corporation, association or other entity other than the subsidiaries listed in Exhibit 21.1 to the Company's most recent Annual Report on Form 10-K and other than (i) those subsidiaries not required to be listed on Exhibit 21.1 by Item 601 of Regulation S-K under the Exchange Act and (ii) those subsidiaries formed since the last day of the most recently ended fiscal year.

(l) Capital Stock Matters. The Common Stock conforms in all material respects to the description thereof contained in the Prospectus. All of the issued and outstanding shares of Common Stock have been duly authorized and validly issued, are fully paid and nonassessable and have been issued in compliance with federal and state securities laws. None of the outstanding shares of Common Stock were issued in violation of any preemptive rights, rights of first refusal or other similar rights to subscribe for or purchase securities of the Company. There are no authorized or outstanding 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 any of its subsidiaries other than those accurately described in all material respects in the Prospectus. The description of the Company's stock option, stock bonus and other stock plans or arrangements, and the options or other rights granted thereunder, set forth in the Prospectus accurately and fairly presents in all material respects the information required to be shown with respect to such plans, arrangements, options and rights.

(m) Non-Contravention of Existing Instruments; No Further Authorizations or Approvals Required. Neither the Company nor any of its subsidiaries is in violation of its charter or by-laws or is in default (or, with the giving of notice or lapse of time, would be in default) (**Default**) under any indenture, mortgage, loan or credit agreement, note, contract, franchise, lease or other instrument to which the Company or any of its subsidiaries is a party or by which it or any of them may be bound, or to which any of the property or assets of the

Company or any of its subsidiaries is subject (each, an **Existing Instrument**), except for such Defaults as would not, individually or in the aggregate, result in a Material Adverse Change. The Company's execution, delivery and performance of this Agreement and consummation of the transactions contemplated hereby (i) have been duly authorized by all necessary corporate action and will not result in any violation of the provisions of the charter or by-laws of the Company or any subsidiary, (ii) will not conflict with or constitute a breach of, or Default under, or result in the creation or imposition of any lien, charge or encumbrance upon any property or assets of the Company or any of its subsidiaries pursuant to, or require the consent of any other party to, any Existing Instrument, except for such conflicts, breaches, Defaults, liens, charges or encumbrances as would not, individually or in the aggregate, result in a Material Adverse Change and (iii) will not result in any violation of any law, administrative regulation or administrative or court decree applicable to the Company or any subsidiary. Except for such consent, approval, authorization or other order of, or registration or filing with, the Exchange, no consent, approval, authorization or other order of, or registration or filing with, any court or other governmental or regulatory authority or agency, is required for the Company's execution, delivery and performance of this Agreement and consummation of the transactions contemplated hereby and by the Prospectus, except such as have been obtained or made by the Company and are in full force and effect under the Securities Act, applicable state securities or blue sky laws and from the Financial Industry Regulatory Authority (**FINRA**).

(n) **No Material Actions or Proceedings.** Except as disclosed in the Prospectus, there are no legal or governmental actions, suits or proceedings pending or, to the Company's knowledge, threatened (i) against the Company or any of its subsidiaries, (ii) to the Company's knowledge, which has as the subject thereof any officer or director of the Company and is required to be disclosed by the Company pursuant to the Exchange Act, (iii) which has as the subject thereof any property owned or leased by the Company or any of its subsidiaries or (iv) relating to environmental or discrimination matters, where in any such case (A) there is a reasonable possibility that such action, suit or proceeding might be determined adversely to the Company or such subsidiary and (B) any such action, suit or proceeding, if so determined adversely, would reasonably be expected to result in a Material Adverse Change or adversely affect the ability of the Company to consummate the transactions contemplated by this Agreement. No material labor dispute with the employees of the Company or any of its subsidiaries exists or, to the Company's knowledge, is threatened or imminent.

(o) **All Necessary Permits, etc.** Except as otherwise disclosed in the Prospectus, the Company and each subsidiary possess or has obtained such valid and current certificates, authorizations or permits issued by the appropriate state, federal or foreign regulatory agencies or bodies necessary to conduct their respective businesses, other than those the failure to possess or own would not result in a Material Adverse Change, and neither the Company nor any subsidiary has received any written notice of proceedings relating to the revocation or modification of, or non-compliance with, any such certificate, authorization or permit which, singly or in the aggregate, if the subject of an unfavorable decision, ruling or finding, would result in a Material Adverse Change.

(p) **Tax Law Compliance.** Subject to any permitted extensions, the Company and its consolidated subsidiaries have filed all necessary federal, state and foreign income, property and franchise tax returns and have paid all taxes required to be paid by any of them and, if due and

payable, any related or similar assessment, fine or penalty levied against any of them except as may be being contested in good faith and by appropriate proceedings. The Company has made adequate charges, accruals and reserves in the applicable financial statements referred to in Section 1 (i) above in respect of all federal, state and foreign income, property and franchise taxes for all periods as to which the tax liability of the Company or any of its consolidated subsidiaries has not been finally determined.

(q) Insurance. Except as otherwise described in the Prospectus, each of the Company and its subsidiaries are insured by insurers believed to be financially sound and reputable, with policies in such amounts and with such deductibles and covering such risks as are customary for the business for which it is engaged. The Company has no reason to believe that it or any subsidiary will not be able (i) to renew its existing insurance coverage as and when such policies expire or (ii) to obtain comparable coverage from similar institutions as may be necessary or appropriate to conduct its business as now conducted and at a cost that would not result in a Material Adverse Change.

(r) No Price Stabilization or Manipulation. The Company has not taken and will not take, directly or indirectly, any action designed to or that might be reasonably expected to cause or result in stabilization or manipulation of the price of any security of the Company to facilitate the sale or resale of the Common Stock.

(s) Related Party Transactions. There are no business relationships or related-party transactions involving the Company or any subsidiary or any other person required to be described in the Prospectus which have not been described as required.

(t) Exchange Act Compliance. The documents incorporated or deemed to be incorporated by reference in the Prospectus, at the time they were or hereafter are filed with the Commission, complied and will comply in all material respects with the requirements of the Exchange Act, and, when read together with the other information in the Prospectus, at each Applicable Time, will 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 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.

(u) No Unlawful Contributions or Other Payments. Neither the Company nor any of its subsidiaries nor, to the Company's knowledge, any employee or agent of the Company or any subsidiary, has made any contribution or other payment to any official of, or candidate for, any federal, state or foreign office in violation of any law or of the character required to be disclosed in the Prospectus.

(v) Company's Accounting System. The Company maintains a system of accounting controls in a manner designed to provide reasonable assurance that (i) transactions are executed in accordance with management's general or specific authorization; (ii) transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles in the United States 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.

(w) Compliance with Environmental Laws. Except as otherwise described in the Prospectus, and except as would not, individually or in the aggregate, result in a Material Adverse Change (i) neither the Company nor any of its subsidiaries is in violation of any federal, state, local or foreign law or regulation relating to pollution or protection of human health or the environment (including, without limitation, ambient air, surface water, groundwater, land surface or subsurface strata) or wildlife, including without limitation, laws and regulations relating to emissions, discharges, releases or threatened releases of chemicals, pollutants, contaminants, wastes, toxic substances, hazardous substances, petroleum and petroleum products (collectively, Materials of Environmental Concern), or otherwise relating to the manufacture, processing, distribution, use, treatment, storage, disposal, transport or handling of Materials of Environment Concern (collectively, Environmental Laws), which violation includes, but is not limited to, noncompliance with any permits or other governmental authorizations required for the operation of the business of the Company or its subsidiaries under applicable Environmental Laws, or noncompliance with the terms and conditions thereof, nor has the Company or any of its subsidiaries received any written communication, whether from a governmental authority, citizens group, employee or otherwise, that alleges that the Company or any of its subsidiaries is in violation of any Environmental Law; (ii) there is no claim, action or cause of action filed with a court or governmental authority, no investigation with respect to which the Company has received written notice, and no written notice by any person or entity alleging potential liability for investigatory costs, cleanup costs, governmental responses costs, natural resources damages, property damages, personal injuries, attorneys' fees or penalties arising out of, based on or resulting from the presence, or release into the environment, of any Material of Environmental Concern at any location owned, leased or operated by the Company or any of its subsidiaries, now or in the past (collectively, Environmental Claims), pending or, to the Company's knowledge, threatened in writing against the Company or any of its subsidiaries or any person or entity whose liability for any Environmental Claim the Company or any of its subsidiaries has retained or assumed either contractually or by operation of law; and (iii) to the Company's knowledge, there are no past or present actions, activities, circumstances, conditions, events or incidents, including, without limitation, the release, emission, discharge, presence or disposal of any Material of Environmental Concern, that would reasonably be expected to result in a violation of any Environmental Law or an Environmental Claim against the Company or any of its subsidiaries or against any person or entity whose liability for any Environmental Claim the Company or any of its subsidiaries has retained or assumed either contractually or by operation of law.

(x) Intellectual Property. Except as otherwise disclosed in the Prospectus, the Company and its subsidiaries own or possess the valid right to use all (i) patents, patent applications, trademarks, trademark registrations, service marks, service mark registrations, Internet domain name registrations, copyrights, copyright registrations, licenses, trade secret rights (Intellectual Property Rights) and (ii) inventions, software, works of authorships, 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), in each case reasonably necessary to conduct their respective businesses as now conducted, except for those rights as such failure to own, possess, license, or acquire such rights would not reasonably be expected to result in a Material Adverse Change (collectively, Intellectual Property Assets). The Company and its subsidiaries 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 or its subsidiaries. Except as would not reasonably be expected to result in a Material Adverse Change, to the knowledge of the Company, (i) the Company and its subsidiaries respective businesses as now conducted do 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, (ii) all licenses for the use of material Intellectual Property Rights described in the Prospectus are valid, binding upon, and enforceable by or against the parties thereto in accordance to its terms, (iii) the Company has complied in all material respects with, and is not in breach, nor has received any written asserted or threatened claim of breach, of any such Intellectual Property license, and the Company has no knowledge of any breach or anticipated breach by any other person to any Intellectual Property license. Except as described in the Prospectus, to the Company's knowledge, no claim has been made against the Company alleging the infringement by the Company of any patent, trademark, service mark, trade name, copyright, trade secret, license in or other intellectual property right or franchise right of any person. The Company has taken all 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 the consent of any other person in respect of, the Company's right 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.

(y) Regulatory Authorizations. Except as disclosed in the Prospectus, each of the Company and its subsidiaries possesses all certificates, authorizations and permits issued by the appropriate federal, state or foreign regulatory authorities necessary to conduct its business as currently conducted (including without limitation, those required for the manufacture and distribution of its product candidates for clinical and nonclinical testing, and the clinical and nonclinical testing of any product candidates) as disclosed in the Prospectus, except where the failure to possess such certificates, authorizations and permits would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Change.

(z) Brokers. There is no broker, finder or other party that is entitled to receive from the Company any brokerage or finder's fee or other fee or commission as a result of any transactions contemplated by this Agreement, except as may otherwise exist with respect to Cowen pursuant to this Agreement.

(aa) No Outstanding Loans or Other Indebtedness. Except as described in the Prospectus, there are no outstanding loans, advances (except normal advances for business expenses in the ordinary course of business) or guarantees or indebtedness by the Company to or for the benefit of any of the officers or directors of the Company or any of the members of any of them.

(bb) No Reliance. The Company has not relied upon Cowen or legal counsel for Cowen for any legal, tax or accounting advice in connection with the offering and sale of the Placement Shares.

(cc) Cowen Purchases. The Company acknowledges and agrees that Cowen has informed the Company that Cowen may, to the extent permitted under the Securities Act and the Exchange Act, purchase and sell shares of Common Stock outside of this Agreement for its own account while this Agreement is in effect.

(dd) Compliance with Certain Laws, Rules, Procedures, Etc. Except as disclosed in the Prospectus, to the Company's knowledge, the conduct of the preclinical and clinical testing, and manufacture of the products of the Company or any subsidiary is in compliance, in all material respects, with all laws, rules and regulations applicable to such activities, including without limitation applicable good laboratory practices, good clinical practices and good manufacturing practices, except for such non-compliance as would not, individually or in the aggregate, reasonably be expected to result in a Material Adverse Change. The descriptions of the results of such tests and trials contained in the Prospectus are accurate in all material respects. Except as otherwise disclosed in the Prospectus, the Company has not received notice of adverse finding, warning letter or clinical hold notice from the FDA or any non-U.S. counterpart of any of the foregoing, or any untitled letter or other correspondence or notice from the FDA or any other governmental authority or agency or any institutional or ethical review board alleging or asserting noncompliance with any law, rule or regulation applicable in any jurisdiction, except notices, letters, and correspondences and non-U.S. counterparts thereof alleging or asserting such noncompliance as would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Change. Except as disclosed in the Prospectus, neither the Company nor any subsidiary has, either voluntarily or involuntarily, initiated, conducted or issued, or caused to be initiated, conducted or issued, any recall, field correction, market withdrawal or replacement, safety alert, warning, dear doctor letter, investigator notice, or other notice or action relating to an alleged or potential lack of safety or efficacy of any product of the Company or any subsidiary, any alleged product defect of any product of the Company or the subsidiary, or any violation of any material applicable law, rule, regulation or any clinical trial or marketing license, approval, permit or authorization for any product of the Company or any subsidiary, and the Company is not aware of any facts or information that would cause it to initiate any such notice or action and has no knowledge or reason to believe that the FDA, the EMEA or any other governmental agency or authority or any institutional or ethical review board or other non-governmental authority intends to impose, require, request or suggest such notice or action, except in each case, as would not, individually or in the aggregate, reasonably be expected to result in a Material Adverse Change. The Company has not received and is otherwise not aware of any notices, correspondence or other communication from the FDA or other governmental regulatory agency or subdivision thereof, or any institutional or ethical review boards, asserting non-compliance with any applicable statutes, rules, regulations, orders, or other laws, or requiring or requesting the termination, suspension or modification of any preclinical or clinical studies, tests, investigations, or trials conducted by, or on behalf of, the Company or any subsidiary or in which the Company or any subsidiary has participated.

The Company acknowledges that Cowen and, for purposes of the opinions to be delivered pursuant to Section 7 hereof, counsel to the Company and counsel to Cowen, will rely upon the accuracy and truthfulness of the foregoing representations and hereby consents to such reliance.

7. Covenants of the Company. The Company covenants and agrees with Cowen that:

(a) Registration Statement Amendments. After the date of this Agreement and during any period in which a Prospectus relating to any Placement Shares is required to be delivered by

Cowen under the Securities Act (including in circumstances where such requirement may be satisfied pursuant to Rule 172 under the Securities Act), (i) the Company will notify Cowen promptly of the time when any subsequent amendment to the Registration Statement, other than documents incorporated by reference, has been filed with the Commission and/or has become effective or any subsequent supplement to the Prospectus has been filed and of any request by the Commission for any amendment or supplement to the Registration Statement or Prospectus (insofar as it relates to the transactions contemplated hereby) or for additional information, (ii) the Company will not file any amendment or supplement to the Registration Statement or Prospectus, other than documents incorporated by reference, relating to the Placement Shares or a security convertible into the Placement Shares unless a copy thereof has been submitted to Cowen within two days before the filing and Cowen has not reasonably objected thereto within the two day period (*provided, however,* that (A) the failure of Cowen to make such objection shall not relieve the Company of any obligation or liability hereunder, or affect Cowen's right to rely on the representations and warranties made by the Company in this Agreement and (B) the Company has no obligation to provide Cowen any advance copy of such filing or to provide Cowen an opportunity to object to such filing if such filing does not name Cowen or does not relate to the transactions contemplated hereunder; provided, further, that the only remedy Cowen shall have with respect to the failure by the Company to provide Cowen with such copy shall be to cease making sales under this Agreement) and the Company will furnish to Cowen at the time of filing thereof a copy of any document that upon filing is deemed to be incorporated by reference into the Registration Statement or Prospectus, except for those documents available via IDEA; and (iii) the Company will cause each amendment or supplement to the Prospectus, other than documents incorporated by reference, to be filed with the Commission as required pursuant to the applicable paragraph of Rule 424(b) of the Securities Act (the determination to file or not file any amendment or supplement with the Commission under this Section 7(a), based on the Company's reasonable opinion or reasonable objections, shall be made exclusively by the Company).

(b) Notice of Commission Stop Orders. The Company will advise Cowen, promptly after it receives notice or obtains knowledge thereof, of the issuance or threatened issuance by the Commission of any stop order suspending the effectiveness of the Registration Statement, of the suspension of the qualification of the Placement Shares for offering or sale in any jurisdiction, or of the initiation or threatening of any proceeding for any such purpose; and it will promptly use its commercially reasonable efforts to prevent the issuance of any stop order or to obtain its withdrawal if such a stop order should be issued.

(c) Delivery of Prospectus; Subsequent Changes. During any period in which a Prospectus relating to the Placement Shares is required to be delivered by Cowen under the Securities Act with respect to a pending sale of the Placement Shares, (including in circumstances where such requirement may be satisfied pursuant to Rule 172 under the Securities Act), the Company will comply in all material respects with all requirements imposed upon it by the Securities Act, as from time to time in force, and to file on or before their respective due dates (taking into account any extensions available under the Exchange Act) all reports and any definitive proxy or information statements required to be filed by the Company with the Commission pursuant to Sections 13(a), 13(c), 14, 15(d) or any other provision of or under the Exchange Act. If during such period any event occurs as a result of which the Prospectus as then amended or supplemented would include an untrue statement of a material

fact or omit to state a material fact necessary to make the statements therein, in the light of the circumstances then existing, not misleading, or if during such period it is necessary to amend or supplement the Registration Statement or Prospectus to comply with the Securities Act, the Company will promptly notify Cowen to suspend the offering of Placement Shares during such period and the Company will promptly amend or supplement the Registration Statement or Prospectus (at the expense of the Company) so as to correct such statement or omission or effect such compliance; *provided, however*, that the Company may delay any such amendment or supplement if, in the judgment of the Company, it is in the best interests of the Company to do so.

(d) Listing of Placement Shares. During any period in which the Prospectus relating to the Placement Shares is required to be delivered by Cowen under the Securities Act with respect to a pending sale of the Placement Shares (including in circumstances where such requirement may be satisfied pursuant to Rule 172 under the Securities Act), the Company will use its commercially reasonable efforts to cause the Placement Shares to be listed on the Exchange and to qualify the Placement Shares for sale under the securities laws of such jurisdictions as Cowen reasonably designates and to continue such qualifications in effect so long as required for the distribution of the Placement Shares; *provided, however*, that the Company shall not be required in connection therewith to qualify as a foreign corporation or dealer in securities or file a general consent to service of process in any jurisdiction.

(e) Delivery of Registration Statement and Prospectus. The Company will furnish to Cowen and its counsel (at the expense of the Company) copies of the Registration Statement, the Prospectus (including all documents incorporated by reference therein) and all amendments and supplements to the Registration Statement or Prospectus that are filed with the Commission during any period in which a Prospectus relating to the Placement Shares is required to be delivered under the Securities Act (including all documents filed with the Commission during such period that are deemed to be incorporated by reference therein), in each case as soon as reasonably practicable and in such quantities as Cowen may from time to time reasonably request and, at Cowen's request, will also furnish copies of the Prospectus to each exchange or market on which sales of the Placement Shares may be made; *provided, however*, that the Company shall not be required to furnish any document (other than the Prospectus) to Cowen to the extent such document is available on IDEA.

(f) Earnings Statement. The Company will make generally available to its security holders as soon as practicable, but in any event not later than 15 months after the end of the Company's current fiscal quarter, an earnings statement covering a 12-month period that satisfies the provisions of Section 11(a) and Rule 158 of the Securities Act. For the avoidance of doubt, the Company's compliance with the reporting requirements of the Exchange Act shall be deemed to satisfy this Section 7(f).

(g) Expenses. The Company, whether or not the transactions contemplated hereunder are consummated or this Agreement is terminated, in accordance with the provisions of Section 11 hereunder, will pay the following expenses all incident to the performance of its obligations hereunder, including, but not limited to, expenses relating to (i) the preparation, printing and filing of the Registration Statement and each amendment and supplement thereto, of each Prospectus and of each amendment and supplement thereto, (ii) the preparation, issuance and

delivery of the Placement Shares, (iii) the qualification of the Placement Shares under securities laws in accordance with the provisions of Section 7(d) of this Agreement, including filing fees (provided, however, that any fees or disbursements of counsel for Cowen in connection therewith shall be paid by Cowen except as set forth in (vii) below), (iv) the printing and delivery to Cowen of copies of the Prospectus and any amendments or supplements thereto, and of this Agreement, (v) the fees and expenses incurred in connection with the listing or qualification of the Placement Shares for trading on the Exchange, (vi) filing fees and expenses, if any, of the Commission and the FINRA Corporate Financing Department and (vii) the reasonable fees and disbursements of Cowen's counsel, in an aggregate amount not to exceed \$30,000, provided, however, in no event shall the total compensation paid to Cowen exceed 8.0% of the gross proceeds to the Company from the sale of Placement Shares.

(h) Use of Proceeds. The Company will use the Net Proceeds as described in the Prospectus in the section entitled "Use of Proceeds."

(i) Notice of Other Sales. During the pendency of any Placement Notice given hereunder, and for 3 trading days following the termination of any Placement Notice given hereunder, the Company shall provide Cowen notice as promptly as reasonably possible before it offers to sell, contracts to sell, sells, grants any option to sell or otherwise disposes of any shares of Common Stock (other than Placement Shares offered pursuant to the provisions of this Agreement) or securities convertible into or exchangeable for Common Stock, warrants or any rights to purchase or acquire Common Stock; *provided*, that such notice shall not be required in connection with the (i) issuance, grant or sale of Common Stock, options to purchase shares of Common Stock or Common Stock issuable upon the exercise of options or other equity awards pursuant to any stock incentive plan or other stock plan or arrangement described in the Prospectus or pursuant to any qualifying employment inducement award under the Exchange rules, (ii) the issuance of securities in connection with an acquisition, merger or sale or purchase of assets or (iii) the issuance or sale of Common Stock pursuant to any dividend reinvestment plan that the Company may adopt from time to time provided the implementation of such is disclosed to Cowen in advance, (iv) any shares of common stock issuable upon the exchange, conversion or redemption of securities or the exercise of warrants, options or other rights in effect or outstanding or (v) filing of any registration statement under the Securities Act, or any pre-effective or post-effective amendment or prospectus supplement thereto, other than the Registration Statement, relating to the Placement Shares or that is intended to commence a public offering of equity, equity-linked or other derivative securities of the Company.

(j) Change of Circumstances. The Company will, at any time during a fiscal quarter in which the Company intends to tender a Placement Notice or sell Placement Shares, advise Cowen promptly after it shall have received notice or obtained knowledge thereof, of any information or fact that would alter or affect in any material respect any opinion, certificate, letter or other document required to be provided to Cowen pursuant to this Agreement.

(k) Due Diligence Cooperation. The Company will cooperate with any reasonable due diligence review conducted by Cowen or its agents in connection with the transactions contemplated hereby, including, without limitation, providing information and making available documents and senior corporate officers, during regular business hours and at the Company's principal offices, as Cowen may reasonably request.

(l) Required Filings Relating to Placement of Placement Shares. The Company agrees that on such dates as the Securities Act shall require, the Company will (i) file a prospectus supplement with the Commission under the applicable paragraph of Rule 424(b) under the Securities Act (each and every filing under Rule 424(b), a **Filing Date**), which prospectus supplement will set forth, within the relevant period, the amount of Placement Shares sold through Cowen, the Net Proceeds to the Company and the compensation payable by the Company to Cowen with respect to such Placement Shares (provided that the Company may satisfy its obligations under this Section 7(l)(i) by effecting a filing in accordance with the Exchange Act with respect to such information), and (ii) deliver such number of copies of each such prospectus supplement to each exchange or market on which such sales were effected as may be required by the rules or regulations of such exchange or market.

(m) Representation Dates; Certificate. On or prior to the First Delivery Date and each time the Company (i) amends or supplements the Registration Statement or the Prospectus relating to the Placement Shares (other than a prospectus supplement filed in accordance with Section 7(l) of this Agreement) by means of a post-effective amendment, sticker, or supplement but not by means of incorporation of document(s) by reference to the Registration Statement or the Prospectus relating to the Placement Shares; (ii) files an annual report on Form 10-K under the Exchange Act; (iii) files its quarterly reports on Form 10-Q under the Exchange Act; or (iv) files a current report on Form 8-K containing amended financial information (other than information furnished pursuant to Items 2.02 or 7.01 of Form 8-K) under the Exchange Act (each date of filing of one or more of the documents referred to in clauses (i) through (iv) shall be a **Representation Date**); the Company shall furnish Cowen, if requested by Cowen, with a certificate, in the form attached hereto as Exhibit 7(m) within three (3) Trading Days of any Representation Date if requested by Cowen. The requirement to provide a certificate under this Section 7(m) shall be waived for any Representation Date occurring at a time at which no Placement Notice is pending, which waiver shall continue until the earlier to occur of the date the Company delivers a Placement Notice hereunder (which for such calendar quarter shall be considered a Representation Date) and the next occurring Representation Date; *provided, however*, that such waiver shall not apply for any Representation Date on which the Company files its annual report on Form 10-K. Notwithstanding the foregoing, if the Company subsequently decides to sell Placement Shares following a Representation Date when the Company relied on such waiver and did not provide Cowen with a certificate under this Section 7(m), then before the Company delivers the Placement Notice or Cowen sells any Placement Shares, the Company shall provide Cowen with a certificate, in the form attached hereto as Exhibit 7(m), dated the date of the Placement Notice.

(n) Legal Opinion. On or prior to the First Delivery Date and within three (3) Trading Days of each Representation Date with respect to which the Company is obligated to deliver a certificate in the form attached hereto as Exhibit 7(m) for which no waiver is applicable, the Company shall cause to be furnished to Cowen a written opinion of DLA Piper LLP (US) (Company Counsel), or other counsel satisfactory to Cowen, in form and substance satisfactory to Cowen and its counsel, dated the date that the opinion is required to be delivered, substantially similar to the forms of opinion provided to Cowen, modified, as necessary, to relate to the Registration Statement and the Prospectus as then amended or supplemented; *provided, however*, that in lieu of such opinions for subsequent Representation Dates, Company Counsel may furnish Cowen with a letter (a **Reliance Letter**) to the effect that Cowen may rely on a

prior opinion delivered under this Section 7(n) to the same extent as if it were dated the date of such letter (except that statements in such prior opinion shall be deemed to relate to the Registration Statement and the Prospectus as amended or supplemented at such Representation Date).

(o) Comfort Letter. On or prior to the First Delivery Date and within five (5) Trading Days of each Representation Date with respect to which the Company is obligated to deliver a certificate in the form attached hereto as Exhibit 7(m) for which no waiver is applicable, the Company shall cause its independent accountants to furnish Cowen letters (the Comfort Letters), dated the date of the Comfort Letter is delivered, in form and substance satisfactory to Cowen, (i) confirming that they are an independent registered public accounting firm within the meaning of the Securities Act and the PCAOB, (ii) stating, as of such date, the conclusions and findings of such firm with respect to the financial information and other matters ordinarily covered by accountants' comfort letters to Cowen in connection with registered public offerings (the first such letter, the Initial Comfort Letter) and (iii) updating the Initial Comfort Letter with any information that would have been included in the Initial Comfort Letter had it been given on such date and modified as necessary to relate to the Registration Statement and the Prospectus, as amended and supplemented to the date of such letter.

(p) Market Activities. The Company will not, directly or indirectly, (i) take any action designed to cause or result in, or that constitutes or might reasonably be expected to constitute, the stabilization or manipulation of the price of any security of the Company to facilitate the sale or resale of the Placement Shares or (ii) sell, bid for, or purchase the Placement Shares, or pay anyone any compensation for soliciting purchases of the Placement Shares other than Cowen; provided, however, that the Company may bid for and purchase shares of its common stock in accordance with Rule 10b-18 under the Exchange Act.

(q) Insurance. The Company and its subsidiaries shall maintain, or caused to be maintained, insurance in such amounts and covering such risks as are generally deemed prudent and customary for the business for which it is engaged.

(r) Compliance with Laws. The Company and its subsidiaries shall maintain, or cause to be maintained, all material environmental permits or other governmental authorizations necessary to conduct their businesses as described in the Prospectus, and the Company and its subsidiaries shall conduct their businesses, or cause their businesses to be conducted, in substantial compliance with such permits and other governmental authorizations and under applicable environmental laws, except where the failure to maintain or be in compliance with such permits and other governmental authorizations would not reasonably be expected to have a Material Adverse Change.

(s) Investment Company Act. The Company will conduct its affairs in such a manner so as to reasonably ensure that neither it nor the subsidiaries will be or become, at any time prior to the termination of this Agreement, an investment company, as such term is defined in the Investment Company Act, assuming no change in the Commission's current interpretation as to entities that are not considered an investment company.

(t) Securities Act and Exchange Act. The Company will use its commercially reasonable efforts to comply in all material respects with all requirements imposed upon it by the Securities Act and the Exchange Act as from time to time in force, so far as necessary to permit the continuance of sales of, or dealings in, the Placement Shares as contemplated by the provisions hereof and the Prospectus.

(u) No Offer to Sell. Other than a free writing prospectus (as defined in Rule 405 under the Act) approved in advance by the Company and Cowen in its capacity as principal or agent hereunder, neither Cowen nor the Company (including its agents and representatives, other than Cowen in its capacity as such) will make, use, prepare, authorize, approve or refer to any written communication (as defined in Rule 405 under the Act), required to be filed with the Commission, that constitutes an offer to sell or solicitation of an offer to buy Common Stock relating to the Placement Shares to be sold by Cowen as principal or agent hereunder

(v) Sarbanes-Oxley Act. The Company and the Subsidiaries will use their commercially reasonable efforts to comply in all material respects with all effective applicable provisions of the Sarbanes-Oxley Act.

(w) Form S-3. The Company shall notify Cowen no later two (2) Trading Days prior to any time or date it does not expect to meet the requirements for the use of the Registration Statement pursuant to General Instruction I.B.1 of Form S-3 under the Securities Act.

8. Conditions to Cowen's Obligations. The obligations of Cowen hereunder with respect to a Placement will be subject to the continuing accuracy and completeness of the representations and warranties made by the Company herein, to the due performance by the Company of its obligations hereunder, to the completion by Cowen of a due diligence review satisfactory to Cowen in its reasonable judgment, and to the continuing satisfaction (or waiver by Cowen in its sole discretion) of the following additional conditions:

(a) Registration Statement Effective. The Registration Statement shall be effective and shall be available for (i) all sales of Placement Shares issued pursuant to all prior Placement Notices and (ii) the sale of all Placement Shares contemplated to be issued by any Placement Notice.

(b) No Material Notices. None of the following events shall have occurred and be continuing: (i) receipt by the Company or any of its subsidiaries of any request for additional information from the Commission or any other federal or state governmental authority during the period of effectiveness of the Registration Statement, the response to which would require any post-effective amendments or supplements to the Registration Statement or the Prospectus; (ii) the issuance by the Commission or any other federal or state governmental authority of any stop order suspending the effectiveness of the Registration Statement or the initiation of any proceedings for that purpose; (iii) receipt by the Company of any notification with respect to the suspension of the qualification or exemption from qualification of any of the Placement Shares for sale in any jurisdiction or the initiation or threatening of any proceeding for such purpose; (iv) the occurrence of any event that makes any material statement made in the Registration Statement or the Prospectus or any material document incorporated or deemed to be incorporated therein by reference untrue in any material respect or that requires the making of any changes in the Registration Statement, related Prospectus or such documents so that, in the case of the Registration Statement, it will not contain any materially untrue statement of a material fact or omit to state any material fact required to be stated therein necessary to make the statements

therein not misleading and, that in the case of the Prospectus, it will not contain any materially 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 the light of the circumstances under which they were made, not misleading.

(c) No Misstatement or Material Omission. Cowen shall not have advised the Company that the Registration Statement or Prospectus, or any amendment or supplement thereto, contains an untrue statement of fact that in Cowen's reasonable opinion is material, or omits to state a fact that in Cowen's opinion is material and is required to be stated therein or is necessary to make the statements therein not misleading.

(d) Material Changes. Except as contemplated in the Prospectus, or disclosed in the Company's reports filed with the Commission, there shall not have been any material adverse change, on a consolidated basis, in the authorized capital stock of the Company or any Material Adverse Change or any development that would reasonably be expected to result in a Material Adverse Change, or any downgrading in or withdrawal of the rating assigned to any of the Company's securities (other than asset backed securities) by any rating organization or a public announcement by any rating organization that it has under surveillance or review its rating of any of the Company's securities (other than asset backed securities), the effect of which, in the case of any such action by a rating organization described above, in the reasonable judgment of Cowen (without relieving the Company of any obligation or liability it may otherwise have), is so material as to make it impracticable or inadvisable to proceed with the offering of the Placement Shares on the terms and in the manner contemplated in the Prospectus.

(e) Company Counsel Legal Opinion. Cowen shall have received the opinions of Company Counsel or Reliance Letter required to be delivered pursuant to Section 7(n) on or before the date on which such delivery of such opinion or Reliance Letter is required pursuant to Section 7(n).

(f) Cowen Counsel Legal Opinion. Cowen shall have received from LeClairRyan, A Professional Corporation, counsel for Cowen, such opinion or opinions, on or before the date on which the delivery of the Company Counsel legal opinion is required pursuant to Section 7(n), with respect to such matters as Cowen 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) Comfort Letter. Cowen shall have received the Comfort Letter required to be delivered pursuant to Section 7(o) on or before the date on which such delivery of such opinion is required pursuant to Section 7(o).

(h) Representation Certificate. Cowen shall have received the certificate required to be delivered pursuant to Section 7(m) on or before the date on which delivery of such certificate is required pursuant to Section 7(m).

(i) No Suspension. Trading in the Common Stock shall not have been suspended on the Exchange.

(j) Other Materials. On each date on which the Company is required to deliver a certificate pursuant to Section 7(m), the Company shall have furnished to Cowen such appropriate further information, certificates and documents as Cowen may have reasonably requested. All such opinions, certificates, letters and other documents shall have been in compliance with the provisions hereof. The Company will furnish Cowen with such conformed copies of such opinions, certificates, letters and other documents as Cowen shall have reasonably requested.

(k) Securities Act Filings Made. All filings with the Commission required by Rule 424 under the Securities Act to have been filed prior to the issuance of any Placement Notice hereunder shall have been made within the applicable time period prescribed for such filing by Rule 424.

(l) Approval for Listing. The Placement Shares shall either have been (i) approved for listing on the Exchange, subject only to notice of issuance, or (ii) the Company shall have filed an application for listing of the Placement Shares on the Exchange at, or prior to, the issuance of any Placement Notice.

(m) No Termination Event. There shall not have occurred any event that would permit Cowen to terminate this Agreement pursuant to Section 11(a).

9. Indemnification and Contribution.

(a) Company Indemnification. The Company agrees to indemnify and hold harmless Cowen, the directors, officers, partners, employees and agents of Cowen and each person, if any, who (i) controls Cowen within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act, or (ii) is controlled by or is under common control with Cowen (a **Cowen Affiliate**) from and against any and all losses, claims, liabilities, expenses and damages (including, but not limited to, any and all reasonable investigative, legal and other expenses incurred in connection with, and any and all amounts paid in settlement (in accordance with Section 9(c)) of, any action, suit or proceeding between any of the indemnified parties and any indemnifying parties or between any indemnified party and any third party, or otherwise, or any claim asserted), as and when incurred, to which Cowen, or any such person, may become subject under the Securities Act, the Exchange Act or other federal or state statutory law or regulation, at common law or otherwise, insofar as such losses, claims, liabilities, expenses or damages arise out of or are based, directly or indirectly, on (x) any untrue statement or alleged untrue statement of a material fact contained in the Registration Statement or the Prospectus or any amendment or supplement to the Registration Statement or the Prospectus or in any free writing prospectus or (y) the omission or alleged omission to state in any such document a material fact required to be stated in it or necessary to make the statements in it not misleading; *provided, however*, that this indemnity agreement shall not apply to the extent that such loss, claim, liability, expense or damage arises from the sale of the Placement Shares pursuant to this Agreement and is caused directly or indirectly by an untrue statement or omission made in reliance upon and in conformity with written information relating to Cowen and furnished to the Company by Cowen expressly for inclusion in any document as described in clause (x) of this Section 9(a). This indemnity agreement will be in addition to any liability that the Company might otherwise have.

(b) Cowen Indemnification. Cowen agrees to indemnify and hold harmless the Company and its directors and each officer of the Company that signed the Registration Statement, and each person, if any, who (i) controls the Company within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act or (ii) is controlled by or is under common control with the Company (a Company Affiliate) against any and all loss, liability, claim, damage and expense described in the indemnity contained in Section 9(a), as incurred, but only with respect to untrue statements or omissions, or alleged untrue statements or omissions, made in the Registration Statement (or any amendments thereto) or the Prospectus (or any amendment or supplement thereto) or any free writing prospectus in reliance upon and in conformity with written information relating to Cowen and furnished to the Company by Cowen expressly for inclusion in any document as described in clause (x) of Section 9(a).

(c) Procedure. Any party that proposes to assert the right to be indemnified under this Section 9 will, promptly after receipt of notice of commencement of any action against such party in respect of which a claim is to be made against an indemnifying party or parties under this Section 9, notify each such indemnifying party in writing of the commencement of such action, enclosing a copy of all papers served, but the omission so to notify such indemnifying party will not relieve the indemnifying party from (i) any liability that it might have to any indemnified party otherwise than under this Section 9 and (ii) any liability that it may have to any indemnified party under the foregoing provision of this Section 9 unless, and only to the extent that, such omission results in the forfeiture of substantive rights or defenses by the indemnifying party. If any such action is brought against any indemnified party and it notifies the indemnifying party of its commencement, the indemnifying party will be entitled to participate in and, to the extent that it elects by delivering written notice to the indemnified party promptly after receiving notice of the commencement of the action from the indemnified party, jointly with any other indemnifying party similarly notified, to assume the defense of the action, with counsel reasonably satisfactory to the indemnified party, and after notice from the indemnifying party to the indemnified party of its election to assume the defense, the indemnifying party will not be liable to the indemnified party for any legal or other expenses except as provided below and except for the reasonable costs of investigation subsequently incurred by the indemnified party in connection with the defense. The indemnified party will have the right to employ its own counsel in any such action, but the fees, expenses and other charges of such counsel will be at the expense of such indemnified party unless (1) the employment of counsel by the indemnified party has been authorized in writing by the indemnifying party, (2) the indemnified party has reasonably concluded (based on advice of counsel) that there may be legal defenses available to it or other indemnified parties that are different from or in addition to those available to the indemnifying party, (3) a conflict or potential conflict exists (based on advice of counsel to the indemnified party) between the indemnified party and the indemnifying party (in which case the indemnifying party will not have the right to direct the defense of such action on behalf of the indemnified party) or (4) the indemnifying party has not in fact employed counsel to assume the defense of such action within a reasonable time after receiving notice of the commencement of the action, in each of which cases the reasonable fees, disbursements and other charges of counsel will be at the expense of the indemnifying party or parties. It is understood that the indemnifying party or parties shall not, in connection with any proceeding or related proceedings in the same jurisdiction, be liable for the reasonable fees, disbursements and other charges of more than one separate firm admitted to practice in such jurisdiction at any one time for all such indemnified party or parties. All such fees, disbursements and other charges will be reimbursed

by the indemnifying party promptly as they are incurred. An indemnifying party will not, in any event, be liable for any settlement of any action or claim effected without its written consent. No indemnifying party shall, without the prior written consent of each indemnified party, settle or compromise or consent to the entry of any judgment in any pending or threatened claim, action or proceeding relating to the matters contemplated by this Section 9 (whether or not any indemnified party is a party thereto), unless such settlement, compromise or consent includes an unconditional release of each indemnified party from all liability arising or that may arise out of such claim, action or proceeding.

(d) Contribution. In order to provide for just and equitable contribution in circumstances in which the indemnification provided for in the foregoing paragraphs of this Section 9 is applicable in accordance with its terms but for any reason is held to be unavailable from the Company or Cowen, the Company and Cowen will contribute to the total losses, claims, liabilities, expenses and damages (including any investigative, legal and other expenses reasonably incurred in connection with, and any amount paid in settlement of, any action, suit or proceeding or any claim asserted, but after deducting any contribution received by the Company from persons other than Cowen, such as persons who control the Company within the meaning of the Securities Act, officers of the Company who signed the Registration Statement and directors of the Company, who also may be liable for contribution) to which the Company and Cowen may be subject in such proportion as shall be appropriate to reflect the relative benefits received by the Company on the one hand and Cowen on the other. The relative benefits received by the Company on the one hand and Cowen on the other hand shall be deemed to be in the same proportion as the total Net Proceeds from the sale of the Placement Shares (before deducting expenses) received by the Company bear to the total compensation received by Cowen from the sale of Placement Shares on behalf of the Company. If, but only if, the allocation provided by the foregoing sentence is not permitted by applicable law, the allocation of contribution shall be made in such proportion as is appropriate to reflect not only the relative benefits referred to in the foregoing sentence but also the relative fault of the Company, on the one hand, and Cowen, on the other, with respect to the statements or omission that resulted in such loss, claim, liability, expense or damage, or action in respect thereof, as well as any other relevant equitable considerations with respect to such offering. Such relative fault shall be determined by reference to, among other things, whether the untrue or alleged untrue statement of a material fact or omission or alleged omission to state a material fact relates to information supplied by the Company or Cowen, the intent of the parties and their relative knowledge, access to information and opportunity to correct or prevent such statement or omission. The Company and Cowen agree that it would not be just and equitable if contributions pursuant to this Section 9(d) were to be determined by pro rata allocation or by any other method of allocation that does not take into account the equitable considerations referred to herein. The amount paid or payable by an indemnified party as a result of the loss, claim, liability, expense, or damage, or action in respect thereof, referred to above in this Section 9(d) shall be deemed to include, for the purpose of this Section 9(d), any legal or other expenses reasonably incurred by such indemnified party in connection with investigating or defending any such action or claim to the extent consistent with Section 9(c) hereof. Notwithstanding the foregoing provisions of this Section 9(d), Cowen shall not be required to contribute any amount in excess of the commissions received by it under this Agreement and no person found guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) will be entitled to contribution from any person who was not guilty of such fraudulent misrepresentation. For purposes of this Section 9(d), any person who

controls a party to this Agreement within the meaning of the Securities Act, and any officers, directors, partners, employees or agents of Cowen, will have the same rights to contribution as that party, and each officer of the Company who signed the Registration Statement will have the same rights to contribution as the Company, subject in each case to the provisions hereof. Any party entitled to contribution, promptly after receipt of notice of commencement of any action against such party in respect of which a claim for contribution may be made under this Section 9(d), will notify any such party or parties from whom contribution may be sought, but the omission to so notify will not relieve that party or parties from whom contribution may be sought from any other obligation it or they may have under this Section 9(d) except to the extent that the failure to so notify such other party materially prejudiced the substantive rights or defenses of the party from whom contribution is sought. Except for a settlement entered into pursuant to the last sentence of Section 9(c) hereof, no party will be liable for contribution with respect to any action or claim settled without its written consent if such consent is required pursuant to Section 9(c) hereof.

10. Representations and Agreements to Survive Delivery. The indemnity and contribution agreements contained in Section 9 of this Agreement and all representations and warranties of the Company herein or in certificates delivered pursuant hereto shall survive, as of their respective dates, regardless of (i) any investigation made by or on behalf of Cowen, any controlling persons, or the Company (or any of their respective officers, directors or controlling persons), (ii) delivery and acceptance of the Placement Shares and payment therefor or (iii) any termination of this Agreement.

11. Termination.

(a) Cowen shall have the right by giving written notice as hereinafter specified at any time to terminate this Agreement if (i) any Material Adverse Change, or any development that would reasonably be expected to result in a Material Adverse Change has occurred that, in the reasonable judgment of Cowen, would materially impair the ability of Cowen to sell the Placement Shares hereunder, (ii) the Company shall have failed, refused or been unable to perform any agreement on its part to be performed hereunder; *provided, however*, in the case of any failure of the Company to deliver (or cause another person to deliver) any certification, opinion, or letter required under Sections 7(m), 7(n), or 7(o), Cowen's right to terminate shall not arise unless such failure to deliver (or cause to be delivered) continues for more than thirty (30) days from the date such delivery was required; or (iii) any other condition of Cowen's obligations hereunder is not fulfilled, or (iv), any suspension or limitation of trading in the Placement Shares or in securities generally on the Exchange shall have occurred. Any such termination shall be without liability of any party to any other party except that the provisions of Section 7(g) (Expenses), Section 9 (Indemnification and Contribution), Section 10 (Representations and Agreements to Survive Delivery), Section 16 (Applicable Law; Consent to Jurisdiction) and Section 17 (Waiver of Jury Trial) hereof shall remain in full force and effect notwithstanding such termination. If Cowen elects to terminate this Agreement as provided in this Section 11(a), Cowen shall provide the required notice as specified in Section 12 (Notices).

(b) The Company shall have the right, by giving ten (10) days notice as hereinafter specified to terminate this Agreement in its sole discretion at any time after the date of this Agreement. Any such termination shall be without liability of any party to any other party except that the provisions of Section 7(g), Section 9, Section 10, Section 16 and Section 17 hereof shall remain in full force and effect notwithstanding such termination.

(c) Cowen shall have the right, by giving ten (10) days notice as hereinafter specified to terminate this Agreement in its sole discretion at any time after the date of this Agreement. Any such termination shall be without liability of any party to any other party except that the provisions of Section 7(g), Section 9, Section 10, Section 16 and Section 17 hereof shall remain in full force and effect notwithstanding such termination.

(d) Unless earlier terminated pursuant to this Section 11, this Agreement shall automatically terminate upon the issuance and sale of all of the Placement Shares through Cowen on the terms and subject to the conditions set forth herein; *provided* that the provisions of Section 7(g), Section 9, Section 10, Section 16 and Section 17 hereof shall remain in full force and effect notwithstanding such termination.

(e) This Agreement shall remain in full force and effect unless terminated pursuant to Sections 11(a), (b), (c), or (d) above or otherwise by mutual agreement of the parties; *provided, however*, that any such termination by mutual agreement shall in all cases be deemed to provide that Section 7(g), Section 9, Section 10, Section 16 and Section 17 shall remain in full force and effect.

(f) Any termination of this Agreement shall be effective on the date specified in such notice of termination; *provided, however*, that such termination shall not be effective until the close of business on the date of receipt of such notice by Cowen or the Company, as the case may be. If such termination shall occur prior to the Settlement Date for any sale of Placement Shares, such Placement Shares shall settle in accordance with the provisions of this Agreement.

(g) Subject to the additional limitations set forth in Section 7 of the Agreement, in the event of termination of this Agreement prior to the sale of any Placement Shares, Cowen shall be entitled only to reimbursement of its out-of-pocket expenses actually incurred.

12. Notices. All notices or other communications required or permitted to be given by any party to any other party pursuant to the terms of this Agreement shall be in writing, unless otherwise specified in this Agreement, and if sent to Cowen, shall be delivered to Cowen at Cowen and Company, LLC, 599 Lexington Avenue, New York, NY 10022, fax no. 646-562-1124, Attention: General Counsel, with a copy to LeClairRyan, 885 Third Avenue, New York, NY 10022, Attention: James T. Seery. Email:james.seery@leclairryan.com; or if sent to the Company, shall be delivered to Mast Therapeutics, Inc., 12390 El Comino Real, Suite 150, San Diego, CA 92130, Attention: Chief Financial Officer, with a copy to DLA Piper LLP (US), 4365 Executive Drive, Suite 1100, San Diego, CA 92121, Attention: Michael S. Kagnoff. Email:Michael.kagnoff@dlapiper.com. Each party to this Agreement may change such address for notices by sending to the parties to this Agreement written notice of a new address for such purpose. Each such notice or other communication shall be deemed given (i) when delivered personally or by verifiable facsimile transmission (with an original to follow) on or before 4:30 p.m., New York City time, on a Business Day (as defined below), or, if such day is not a Business Day on the next succeeding Business Day, (ii) on the next Business Day after timely delivery to a nationally-recognized overnight courier and (iii) on the Business Day actually received if deposited in the U.S. mail (certified or registered mail, return receipt requested, postage prepaid). For purposes of this Agreement, Business Day shall mean any day on which the Exchange and commercial banks in the City of New York are open for business.

13. Successors and Assigns. This Agreement shall inure to the benefit of and be binding upon the Company and Cowen and their respective successors and the affiliates, controlling persons, officers and directors referred to in Section 9 hereof. References to any of the parties contained in this Agreement shall be deemed to include the successors and permitted assigns of such party. Nothing in this Agreement, express or implied, is intended to confer upon any party other than the parties hereto or their respective successors and permitted assigns any rights, remedies, obligations or liabilities under or by reason of this Agreement, except as expressly provided in this Agreement. Neither party may assign its rights or obligations under this Agreement without the prior written consent of the other party; *provided, however*, that Cowen may assign its rights and obligations hereunder to an affiliate of Cowen without obtaining the Company's consent.

14. Adjustments for Share Splits. The parties acknowledge and agree that all share-related numbers contained in this Agreement shall be adjusted to take into account any share split, share dividend or similar event effected with respect to the Common Stock.

15. Entire Agreement; Amendment; Severability. This Agreement (including all schedules and exhibits attached hereto and Placement Notices issued pursuant hereto) constitutes the entire agreement and supersedes all other prior and contemporaneous agreements and undertakings, both written and oral, among the parties hereto with regard to the subject matter hereof. Neither this Agreement nor any term hereof may be amended except pursuant to a written instrument executed by the Company and Cowen. In the event that any one or more of the provisions contained herein, or the application thereof in any circumstance, is held invalid, illegal or unenforceable as written by a court of competent jurisdiction, then such provision shall be given full force and effect to the fullest possible extent that it is valid, legal and enforceable, and the remainder of the terms and provisions herein shall be construed as if such invalid, illegal or unenforceable term or provision was not contained herein, but only to the extent that giving effect to such provision and the remainder of the terms and provisions hereof shall be in accordance with the intent of the parties as reflected in this Agreement.

16. Applicable Law; Consent to Jurisdiction. This Agreement shall be governed by, and construed in accordance with, the internal laws of the State of New York without regard to the principles of conflicts of laws. Each party hereby irrevocably submits to the non-exclusive jurisdiction of the state and federal courts sitting in the City of New York, borough of Manhattan, for the adjudication of any dispute hereunder or in connection with any transaction contemplated hereby, and hereby irrevocably waives, and agrees not to assert in any suit, action or proceeding, any claim that it is not personally subject to the jurisdiction of any such court, that such suit, action or proceeding is brought in an inconvenient forum or that the venue of such suit, action or proceeding is improper. Each party hereby irrevocably waives personal service of process and consents to process being served in any such suit, action or proceeding by mailing a copy thereof (certified or registered mail, return receipt requested) to such party at the address in effect for notices to it under this Agreement and agrees that such service shall constitute good and sufficient service of process and notice thereof. Nothing contained herein shall be deemed to limit in any way any right to serve process in any manner permitted by law.

17. Waiver of Jury Trial. The Company and Cowen each hereby irrevocably waives any right it may have to a trial by jury in respect of any claim based upon or arising out of this Agreement or any transaction contemplated hereby.

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

(a) Cowen has been retained solely to act as sales agent in connection with the sale of the Common Stock and that no fiduciary, advisory or agency relationship between the Company and Cowen has been created in respect of any of the transactions contemplated by this Agreement, irrespective of whether Cowen has advised or is advising the Company on other matters;

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

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

19. Counterparts. This Agreement may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. Delivery of an executed Agreement by one party to the other may be made by facsimile or electronic transmission.

20. Definitions. As used in this Agreement, the following term has the meaning set forth below:

(a) *Applicable Time* means the date of this Agreement, each Representation Date, the date on which a Placement Notice is given, and any date on which Placement Shares are sold hereunder.

[Remainder of Page Intentionally Blank]

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

Very truly yours,

COWEN AND COMPANY, LLC

By: /s/ Grant Miller
Name: Grant Miller
Title: Head of Equity Capital Markets

**ACCEPTED as of the date first-above
written:**

MAST THERAPEUTICS, INC.

By: /s/ Brandi Roberts
Name: Brandi Roberts
Title: CFO

FORM OF PLACEMENT NOTICE

From: []
Cc: []
To: []
Subject: Cowen at the Market Offering Placement Notice
Ladies and Gentlemen:

Pursuant to the terms and subject to the conditions contained in the Sales Agreement between Mast Therapeutics, Inc. (the Company), and Cowen and Company, LLC (Cowen) dated February 10, 2014 (the Agreement), I hereby request on behalf of the Company that Cowen sell up to [] shares of the Company s common stock, par value 0.001 per share, at a minimum market price of \$_____ per share. Sales should begin on the date of this Notice and shall continue until [DATE] [all shares are sold].

SCHEDULE 2

The Company

Brian Culley Chief Executive Officer

Brandi Roberts Chief Financial Officer

Cowen

Robert Sine Director

William Follis Director

SCHEDULE 3

Compensation

Cowen shall be paid compensation, or allowed a discount, in an amount agreed to in writing by the parties up to 3.0% of the gross proceeds from the sales of Common Stock pursuant to the terms of this Agreement.

OFFICER CERTIFICATE

The undersigned, the duly qualified and elected _____, of Mast Therapeutics, Inc. (Company), a Delaware corporation, does hereby certify in such capacity and on behalf of the Company, pursuant to Section 7(m) of the Sales Agreement dated February 10, 2014 (the Sales Agreement) between the Company and Cowen and Company, LLC, that to the knowledge of the undersigned.

(i) The representations and warranties of the Company in Section 6 of the Sales Agreement (A) to the extent such representations and warranties are subject to qualifications and exceptions contained therein relating to materiality or Material Adverse Change, are true and correct on and as of the date hereof with the same force and effect as if expressly made on and as of the date hereof, except for those representations and warranties that speak solely as of a specific date and which were true and correct as of such date, and (B) to the extent such representations and warranties are not subject to any qualifications or exceptions, are true and correct in all material respects as of the date hereof as if made on and as of the date hereof with the same force and effect as if expressly made on and as of the date hereof except for those representations and warranties that speak solely as of a specific date and which were true and correct as of such date; and

(ii) The Company has complied with all agreements and satisfied all conditions on its part to be performed or satisfied pursuant to the Sales Agreement at or prior to the date hereof.

Capitalized terms used but not defined herein shall have the meanings ascribed to them in the Sales Agreement.

MAST THERAPEUTICS, INC.

By:
Name:
Title:

Date: _____