
**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

August 27, 2017
Date of Report (Date of earliest event reported)

ATYR PHARMA, INC.
(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction
of incorporation)

001-37378
(Commission
File Number)

20-3435077
(IRS Employer
Identification No.)

3545 John Hopkins Court, Suite #250
San Diego, California 92121
(Address of principal executive offices, including zip code)

(858) 731-8389
(Registrant's telephone number, including area code)

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligations 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))

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

Emerging growth company

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

Item 1.01. Entry into a Material Definitive Agreement.

On August 27, 2017, aTyr Pharma, Inc. (the “Company”) entered into a Securities Purchase Agreement (the “Securities Purchase Agreement”) for a private placement (the “Private Placement”) with a select group of institutional investors, including Viking Global Investors (“Viking”), EcoR1 Capital, Redmile Group, and other accredited investors, certain of whom are affiliated with the directors and officers of the Company (collectively, the Purchasers”). Pursuant to the Securities Purchase Agreement, (i) Viking has agreed to purchase 1,777,784 shares of the Company’s common stock, par value \$0.001 per share (the “Common Shares”), at a price of \$2.65 per share, 2,285,952 shares of the Company’s Class X Convertible Preferred Stock, par value \$0.001 per share (the “Preferred Shares” and, together with the Common Shares, the “Shares”), at a price of \$13.25 per share, and warrants, to purchase up to that number of additional shares of Common Stock equal to thirty seven and one half percent (37.5%) of the number of Shares purchased by Viking on an as-converted basis (rounded up to the nearest whole share), and (ii) the remaining Purchasers have agreed to purchase an aggregate of 4,094,336 shares of the Company’s Common Shares, at a price of \$2.65 per share, and Warrants to purchase up to that number of additional shares of Common Stock equal to thirty seven and one half percent (37.5%) of the number of Common Shares purchased by such Purchaser (rounded up to the nearest whole share), for an aggregate purchase price of approximately \$45.8 million. The closing of the purchase and sale of the securities is expected to occur on or about August 31, 2017, subject to customary closing conditions.

Each Preferred Share is convertible into five shares of the Company’s common stock. Viking will be prohibited from converting the Preferred Shares into shares of the Company’s common stock if, as a result of such conversion, Viking, together with its affiliates, would own more than 9.50% of the shares of the Company’s common stock then issued and outstanding, which percentage may change at Viking’s election upon 61 days’ notice to the Company to (i) any other number less than or equal to 19.99% or (ii) subject to approval of the Company’s stockholders to the extent required in accordance with the NASDAQ Global Market rules, any number in excess of 19.99%.

In the event of the Company’s liquidation, dissolution or winding up, holders of Preferred Shares will participate *pari passu* with the holders of the Company’s common stock in any distribution of proceeds, pro rata based on the number of shares held by each such holder. The Preferred Shares will generally have no voting rights.

The Warrants will be exercisable at an exercise price of \$4.64 per share, subject to adjustments as provided under the terms of the Warrants. The Warrants are immediately exercisable and expire on December 31, 2019.

The Company also entered into a registration rights agreement (the “Registration Rights Agreement”) with certain of the Purchasers, excluding those Purchasers affiliated with the Company’s directors and officers, requiring the Company to register the resale of the Common Shares, the Common Shares issuable upon conversion of the Preferred Shares and the Common Shares issuable upon exercise of the Warrants. The Company is required to prepare and file a registration statement with the Securities and Exchange Commission (the “SEC”) within 30 days of the closing of the Private Placement, and to use commercially reasonable efforts to have the registration statement declared effective within 90 days if there is no review by the SEC, and within 120 days in the event of such review.

The Securities to be issued to the Purchasers under the Securities Purchase Agreement will be issued pursuant to an exemption from registration under Rule 506 of Regulation D, which is promulgated under the Securities Act of 1933 (the “Securities Act”). The Company relied on this exemption from registration based in part on representations made by the Purchasers.

Piper Jaffray & Co. acted as exclusive placement agent in connection with the Private Placement and the Company has agreed to pay a customary placement fee and reimburse certain expenses of the placement agent.

The sale of the Securities pursuant to the Securities Purchase Agreement has not been registered under the Securities Act or any state securities laws. The Securities may not be offered or sold in the United States absent registration or an applicable exemption from registration requirements. Neither this Current Report on Form 8-K, nor the exhibits attached hereto is an offer to sell or the solicitation of an offer to buy the securities described herein.

The Company expects to use the proceeds from the financing primarily to advance its pipeline of therapeutic programs, and for general corporate purposes.

The above description of the material terms of the Private Placement is qualified in its entirety by reference to the Securities Purchase Agreement attached hereto as Exhibit 10.1, the Registration Rights Agreement attached hereto as Exhibit 10.2, and the Form of Warrant to Purchase Common Stock attached hereto as Exhibit 10.3.

Item 3.02. Unregistered Sales of Equity Securities.

The information contained above under Item 1.01 is hereby incorporated by reference in response to this Item 3.02 of Form 8-K.

Item 5.03. Amendments to Articles of Incorporation or Bylaws; Change in Fiscal Year.

In connection with and prior to the closing of the Private Placement, the Company will designate 2,285,952 shares of its authorized and unissued undesignated preferred stock as Class X Convertible Preferred Stock and file a Certificate of Designation of Preferences, Rights and Limitations of Class X Convertible Preferred Stock with the Secretary of State of Delaware. A summary of the rights, preferences and privileges of the Class X Convertible Preferred Stock is described above under "Item 1.01 Entry into a Material Definitive Agreement," which is incorporated by reference herein.

Item 7.01. Regulation FD Disclosure.

On August 28, 2017, the Company issued a press release announcing its entry into the Securities Purchase Agreement with the Purchasers. A copy of the press release is being furnished as Exhibit 99.1 to this Report on Form 8-K.

In addition, the Company intends to use an investor presentation to conduct meetings with investors, stockholders and analysts and at investor conferences, and which the Company intends to place on its website. A copy of the presentation materials is attached hereto as Exhibit 99.2. The Company does not undertake to update the presentation materials.

The information in Item 7.01 of this Current Report on Form 8-K and Exhibits 99.1 and 99.2 attached hereto is being furnished and shall not be deemed "filed" for the purposes of Section 18 of the Securities Exchange Act of 1934, as amended ("Exchange Act"), or otherwise subject to the liability of that section, nor shall such information be deemed incorporated by reference in any filing under the Exchange Act or the Securities Act of 1933, as amended, regardless of the general incorporation language of such filing, except as shall be expressly set forth by specific reference in such filing.

Item 9.01. Financial Statements and Exhibits.

(d) Exhibits.

Exhibit No.	Description
10.1	Securities Purchase Agreement, dated August 27, 2017, by and among the Company and the Purchasers
10.2	Registration Rights Agreement, dated August 27, 2017, by and among the Company and the Purchasers
10.3	Form of Warrant to Purchase Common Stock
99.1	Press Release dated August 28, 2017
99.2	Corporate Presentation Materials of aTyr Pharma, Inc. dated August 2017

SIGNATURE

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.

ATYR PHARMA, INC.

By: /s/ John T. Blake
John T. Blake
Senior Vice President, Finance

Date: August 28, 2017

INDEX TO EXHIBITS

<u>Exhibit No.</u>	<u>Description</u>
10.1	<u>Securities Purchase Agreement, dated August 27, 2017, by and among the Company and the Purchasers</u>
10.2	<u>Registration Rights Agreement, dated August 27, 2017, by and among the Company and the Purchasers</u>
10.3	<u>Form of Warrant to Purchase Common Stock</u>
99.1	<u>Press Release dated August 28, 2017</u>
99.2	<u>Corporate Presentation Materials of aTyr Pharma, Inc. dated August 2017</u>

SECURITIES PURCHASE AGREEMENT

This Securities Purchase Agreement (this “*Agreement*”) is dated as of August 27, 2017 by and among aTyr Pharma, Inc., a Delaware corporation (the “*Company*”), and each purchaser identified on the signature pages hereto (each, including its successors and assigns, a “*Purchaser*” and collectively, the “*Purchasers*”).

RECITALS

A. The Company and each Purchaser is executing and delivering this Agreement in reliance upon the exemption from securities registration afforded by Section 4(a)(2) of the Securities Act of 1933, as amended (the “*Securities Act*”), and Rule 506 of Regulation D (“*Regulation D*”) as promulgated by the United States Securities and Exchange Commission (the “*Commission*”) under the Securities Act.

B. Each Purchaser, severally and not jointly, wishes to purchase, and the Company wishes to sell, upon the terms and conditions stated in this Agreement, (i)(a) that aggregate number of shares of common stock, par value \$0.001 per share (the “*Common Stock*”), of the Company, set forth below such Purchaser’s name on the signature page of this Agreement (which aggregate amount for all Purchasers together shall be 5,872,120 shares of Common Stock and shall be collectively referred to herein as the “*Common Shares*”) and (b) warrants (the “*Warrants Relating to Common Shares*”), in substantially the form attached hereto as Exhibit A, to acquire up to that number of additional shares of Common Stock equal to thirty seven and one half percent (37.5%) of the number of Common Shares purchased by such Purchaser (rounded up to the nearest whole share); and (ii)(a) that aggregate number of shares of Class X Preferred Stock, par value \$0.001 per share (the “*Preferred Stock*”), of the Company, set forth below such Purchaser’s name on the signature page of this Agreement (which aggregate amount for all Purchasers together shall be 2,285,952 shares of Preferred Stock and shall be collectively referred to herein as the “*Preferred Shares*” and together with the Common Shares, the “*Shares*”) and (b) warrants (the “*Warrants Relating to Preferred Shares*” and together with the Warrants Relating to Common Shares, the “*Warrants*”), in substantially the form attached hereto as Exhibit A, to acquire up to that number of additional shares of Common Stock equal to one hundred eighty seven and one half percent (187.5%) of the number of Preferred Shares purchased by such Purchaser (rounded up to the nearest whole share). The shares of Common Stock issuable upon exercise of or otherwise pursuant to the Warrants are referred to herein as “*Warrant Shares*”.

C. The Shares, the Warrants, the Warrant Shares and the Underlying Shares (as defined below) collectively are referred to herein as the “*Securities*”.

D. The Company has engaged Piper Jaffray & Co. as its exclusive placement agent (the “*Placement Agent*”) for the offering of the Shares and Warrants on a “best efforts” basis.

E. Contemporaneously with the execution and delivery of this Agreement, certain of the parties hereto are executing and delivering a Registration Rights Agreement, substantially in the form attached hereto as Exhibit B (the “*Registration Rights Agreement*”), pursuant to which, among other things, the Company will agree to provide certain registration rights with respect to the Common Shares, the Warrant Shares and the Underlying Shares (as defined below) under the Securities Act and the rules and regulations promulgated thereunder and applicable state securities laws. Certain of the parties hereto are affiliated with the Company’s directors and officers and will not be entering into the Registration Rights Agreement.

NOW, THEREFORE, IN CONSIDERATION of the mutual covenants contained in this Agreement, and for other good and valuable consideration, the receipt and adequacy of which are hereby acknowledged, the Company and the Purchasers hereby agree as follows:

ARTICLE I.
DEFINITIONS

1.1 Definitions. In addition to the terms defined elsewhere in this Agreement, for all purposes of this Agreement, the following terms shall have the meanings indicated in this Section 1.1:

“*Acquiring Person*” has the meaning set forth in Section 4.6.

“*Action*” means any action, suit, inquiry, notice of violation, proceeding (including any partial proceeding such as a deposition) or investigation pending or, to the Company’s Knowledge, threatened in writing against the Company, any Subsidiary or any of their respective properties or any officer, director or employee of the Company or any Subsidiary acting in his or her capacity as an officer, director or employee before or by any federal, state, county, local or foreign court, arbitrator, governmental or administrative agency, regulatory authority, stock market, stock exchange or trading facility.

“*Affiliate*” means, with respect to any Person, any other Person that, directly or indirectly through one or more intermediaries, Controls, is controlled by or is under common control with such Person, as such terms are used in and construed under Rule 405 under the Securities Act. With respect to a Purchaser, any investment fund or managed account that is managed on a discretionary basis by the same investment manager as such Purchaser will be deemed to be an Affiliate of such Purchaser.

“*Agreement*” has the meaning set forth in the Preamble.

“*Board of Directors*” means the board of directors of the Company.

“*Business Day*” means any day except Saturday, Sunday, any day which is a federal legal holiday in the United States or any day on which banking institutions in the State of New York are authorized or required by law or other governmental action to close.

“*Certificate of Designation*” means the Certificate of Designation of Rights, Preferences and Privileges of the Class X Preferred Stock setting forth the preferences, rights and limitations of the Preferred Stock to be filed prior to the Closing by the Company with the Secretary of State of the State of Delaware substantially in the form attached hereto as Exhibit K.

“*Closing*” means the closing of the purchase and sale of the Shares and the Warrants pursuant to this Agreement.

“*Closing Date*” means the Trading Day when all of the Transaction Documents have been executed and delivered by the applicable parties thereto, and all of the conditions set forth in Sections 2.1, 2.2, 5.1 and 5.2 hereof are satisfied or waived, as the case may be, or such other date as the parties may agree.

“*Code*” has the meaning set forth in Section 3.1(jj).

“*Commission*” has the meaning set forth in the Recitals.

“*Common Shares*” has the meaning set forth in the Recitals.

“*Common Stock*” has the meaning set forth in the Recitals, and also includes any other class of securities into which the Common Stock may hereafter be reclassified or changed into.

“*Common Stock Equivalents*” means any securities of the Company or any Subsidiary which would entitle the holder thereof to acquire at any time Common Stock, including, without limitation, any debt, preferred stock, rights, options, warrants or other instrument that is at any time convertible into or exchangeable for, or otherwise entitles the holder thereof to receive, Common Stock or other securities that entitle the holder to receive, directly or indirectly, Common Stock.

“*Common Stock Subscription Amount*” means, with respect to each Purchaser, the aggregate amount to be paid for the Common Shares and the Warrants Relating to Common Shares purchased hereunder as indicated on such Purchaser’s signature page to this Agreement next to the heading “Common Stock Subscription Amount” in United States dollars and in immediately available funds.

“*Common Unit Purchase Price*” means \$2.65 per unit of Common Share and Warrant Relating to Common Shares.

“*Company*” has the meaning set forth in the Preamble.

“*Company Counsel*” means Goodwin Procter LLP, with offices located at Three Embarcadero Center, 28th Floor, San Francisco, CA 94111.

“*Company Deliverables*” has the meaning set forth in [Section 2.2\(a\)](#).

“*Company’s Knowledge*” means with respect to any statement made to the Company’s Knowledge, that the statement is based upon the actual knowledge of the executive officers of the Company having responsibility for the matter or matters that are the subject of the statement.

“*Control*” (including the terms “controlling”, “controlled by” or “under common control with”) means the possession, direct or indirect, of the power to direct or cause the direction of the management and policies of a Person, whether through the ownership of voting securities, by contract or otherwise.

“*Disclosure Materials*” has the meaning set forth in [Section 3.1\(h\)](#).

“*DTC*” has the meaning set forth in [Section 4.1\(c\)](#).

“*Effective Date*” means the date on which the initial Registration Statement required by Section 2(a) of the Registration Rights Agreement is first declared effective by the Commission.

“*Effectiveness Deadline*” means the date on which the initial Registration Statement is required to be declared effective by the Commission under the terms of the Registration Rights Agreement.

“*Environmental Laws*” has the meaning set forth in [Section 3.1\(dd\)](#).

“*Evaluation Date*” has the meaning set forth in [Section 3.1\(t\)](#).

“*Exchange Act*” means the Securities Exchange Act of 1934, as amended, or any successor statute, and the rules and regulations promulgated thereunder.

“*GAAP*” means U.S. generally accepted accounting principles, as applied by the Company.

“*Intellectual Property Rights*” has the meaning set forth in [Section 3.1\(p\)](#).

“*Irrevocable Transfer Agent Instructions*” means, with respect to the Company, the Irrevocable Transfer Agent Instructions, in substantially the form of Exhibit E-1 and E-2, executed by the Company and delivered to and acknowledged in writing by the Transfer Agent.

“*Legend Removal Date*” has the meaning set forth in Section 4.1(c).

“*Lien*” means any lien, charge, claim, encumbrance, security interest, right of first refusal, preemptive right or other restrictions of any kind.

“*Material Adverse Effect*” means a material adverse effect on the results of operations, assets, prospects, business or financial condition of the Company and the Subsidiaries, taken as a whole, except that any of the following, either alone or in combination, shall not be deemed a Material Adverse Effect: (i) effects caused by changes or circumstances affecting general market conditions in the U.S. economy or which are generally applicable to the industry in which the Company operates, provided that such effects are not borne disproportionately by the Company, (ii) effects resulting from or relating to the announcement or disclosure of the sale of the Securities or other transactions contemplated by this Agreement, or (iii) effects caused by any event, occurrence or condition resulting from or relating to the taking of any action in accordance with this Agreement.

“*Material Contract*” means any contract of the Company that has been filed or was required to have been filed as an exhibit to the SEC Reports pursuant to Item 601(b)(4) or Item 601(b)(10) of Regulation S-K.

“*Material Permits*” has the meaning set forth in Section 3.1(n).

“*New York Courts*” means the state and federal courts sitting in the City of New York, Borough of Manhattan.

“*OFAC*” has the meaning set forth in Section 3.1(kk).

“*Outside Date*” means the thirtieth day following the date of this Agreement.

“*Person*” means an individual, corporation, partnership, limited liability company, trust, business trust, association, joint stock company, joint venture, sole proprietorship, unincorporated organization, governmental authority or any other form of entity not specifically listed herein.

“*Placement Agent*” has the meaning set forth in the Recitals.

“*Preferred Shares*” has the meaning set forth in the Recitals.

“*Preferred Stock*” means Class X Preferred Stock, par value \$0.001 per share issued pursuant to this Agreement, and any securities into which such Class X Preferred Stock may hereinafter be reclassified.

“*Preferred Stock Subscription Amount*” means, with respect to each Purchaser, the aggregate amount to be paid for the Preferred Shares and the Warrants Relating to Preferred Shares purchased hereunder as indicated on such Purchaser’s signature page to this Agreement next to the heading “Preferred Stock Subscription Amount” in United States dollars and in immediately available funds.

“*Preferred Unit Purchase Price*” means \$13.25 per unit of Preferred Share and Warrant Relating to Preferred Shares

“*Press Release*” has the meaning set forth in Section 4.5.

“*Pricing 8-K*” has the meaning set forth in Section 4.5.

“*Principal Trading Market*” means the Trading Market on which the Common Stock is primarily listed on and quoted for trading, which, as of the date of this Agreement and the Closing Date, shall be The NASDAQ Global Select Market.

“*Proceeding*” means an action, claim, suit, investigation or proceeding (including, without limitation, an investigation or partial proceeding, such as a deposition), whether commenced or threatened.

“*Purchase Price*” means the Common Unit Purchase Price and the Preferred Unit Purchase Price.

“*Purchaser*” or “*Purchasers*” has the meaning set forth in the Recitals.

“*Purchaser Deliverables*” has the meaning set forth in Section 2.2(b).

“*Purchaser Party*” has the meaning set forth in Section 4.9.

“*Registration Rights Agreement*” has the meaning set forth in the Recitals.

“*Registration Statement*” means a registration statement meeting the requirements set forth in the Registration Rights Agreement and covering the resale by certain of the Purchasers of the Registrable Securities (as defined in the Registration Rights Agreement).

“*Regulation D*” has the meaning set forth in the Recitals.

“*Required Approvals*” has the meaning set forth in Section 3.1(e).

“*Rule 144*” means Rule 144 promulgated by the Commission pursuant to the Securities Act, as such Rule may be amended from time to time, or any similar rule or regulation hereafter adopted by the Commission having substantially the same effect as such Rule.

“*SEC Reports*” has the meaning set forth in Section 3.1(h).

“*Secretary’s Certificate*” has the meaning set forth in Section 2.2(a)(vi).

“*Securities Act*” has the meaning set forth in the Recitals.

“*Shares*” has the meaning set forth in the Recitals.

“*Short Sales*” include, without limitation, (i) all “short sales” as defined in Rule 200 promulgated under Regulation SHO under the Exchange Act, whether or not against the box, and all types of direct and indirect stock pledges, forward sale contracts, options, puts, calls, short sales, swaps, “put equivalent positions” (as defined in Rule 16a-1(h) under the Exchange Act) and similar arrangements (including on a total return basis), and (ii) sales and other transactions through non-U.S. broker dealers or foreign regulated brokers (but shall not be deemed to include the location and/or reservation of borrowable shares of Common Stock).

“*Subscription Amount*” means the Common Stock Subscription Amount and the Preferred Stock Subscription Amount.

“*Subsidiary*” means Pangu BioPharma Limited, a company registered in Hong Kong.

“*Threshold Amount*” shall have the meaning set forth in the Certificate of Designation.

“*Trading Affiliate*” has the meaning set forth in Section 3.2(h).

“*Trading Day*” means (i) a day on which the Common Stock is listed or quoted and traded on its Principal Trading Market (other than the OTC Bulletin Board), or (ii) if the Common Stock is not listed on a Trading Market (other than the OTC Bulletin Board), a day on which the Common Stock is traded in the over-the-counter market, as reported by the OTC Bulletin Board, or (iii) if the Common Stock is not quoted on any Trading Market, a day on which the Common Stock is quoted in the over-the-counter market as reported in the “pink sheets” by Pink Sheets LLC (or any similar organization or agency succeeding to its functions of reporting prices); *provided*, that in the event that the Common Stock is not listed or quoted as set forth in (i), (ii) and (iii) hereof, then Trading Day shall mean a Business Day.

“*Trading Market*” means whichever of the New York Stock Exchange, the NYSE Amex Equities (formerly the American Stock Exchange), the NASDAQ Global Select Market, the NASDAQ Global Market, the NASDAQ Capital Market or the OTC Bulletin Board on which the Common Stock is listed or quoted for trading on the date in question.

“*Transaction Documents*” means this Agreement, the schedules and exhibits attached hereto, the Warrants, the Registration Rights Agreement, the Certificate of Designation, the Irrevocable Transfer Agent Instructions and any other documents or agreements explicitly contemplated hereunder.

“*Transfer Agent*” means American Stock Transfer & Trust Company, LLC, the current transfer agent of the Company, with a mailing address of 6201 15th Avenue, Brooklyn, NY 11219, and a facsimile number of [redacted], or any successor transfer agent for the Company.

“*Underlying Shares*” means the shares of Common Stock issued or issuable upon conversion of the Preferred Stock.

“*Viking*” has the meaning set forth in Section 3.2(n).

“*Warrants*” has the meaning set forth in the Recitals to this Agreement.

“*Warrants Relating to Common Shares*” has the meaning set forth in the Recitals to this Agreement.

“*Warrants Relating to Preferred Shares*” has the meaning set forth in the Recitals to this Agreement.

“*Warrant Shares*” has the meaning set forth in the Recitals.

ARTICLE II. PURCHASE AND SALE

2.1 Closing.

(a) Amount. Subject to the terms and conditions set forth in this Agreement, at the Closing, the Company shall issue and sell to each Purchaser, and each Purchaser shall, severally and not jointly, purchase from the Company, (i) such number of shares of Common Stock equal to the quotient resulting from dividing (1) the Common Stock Subscription Amount for such Purchaser by (2) the Common

Unit Purchase Price, rounded down to the nearest whole Common Share. In addition, each Purchaser shall receive a Warrant to purchase a number of Warrant Shares equal to thirty seven and one half percent (37.5%) of the number of Common Shares purchased by such Purchaser, as indicated below such Purchaser's name on the signature page to this Agreement; and/or (ii) such number of shares of Preferred Stock equal to the quotient resulting from dividing (1) the Preferred Stock Subscription Amount for such Purchaser by (2) the Preferred Unit Purchase Price, rounded down to the nearest whole Preferred Share. In addition, each Purchaser shall receive a Warrant to purchase a number of Warrant Shares equal to one hundred eighty seven and one half percent (187.5%) of the number of Preferred Shares purchased by such Purchaser, as indicated below such Purchaser's name on the signature page to this Agreement. The Warrants shall have an exercise price equal to \$4.64 per Warrant Share.

(b) Underlying Shares. The Company has authorized and has reserved and covenants to continue to reserve, free of preemptive rights and other similar contractual rights of stockholders, a number of its authorized but unissued shares of Common Stock equal to the aggregate number of shares of Common Stock necessary to effect the conversion of the Preferred Stock. The Purchasers acknowledge that the Company shall not be required to issue any shares of Common Stock to a Purchaser upon conversion by such Purchaser (or its assigns) of any shares of the Preferred Stock to the extent (and only to the extent) that such conversion would result in the Purchaser (including its predecessors-in-interest) beneficially owning shares of Common Stock in excess of the applicable Threshold Amount unless approved by the Company's stockholders in accordance with the applicable stockholder approval requirements of Nasdaq Marketplace Rule 5635.

(c) Closing. The Closing of the purchase and sale of the Shares and Warrants shall take place at the offices of Dechert LLP, 1095 Avenue of the Americas, New York, NY 10036 on the Closing Date or at such other locations or remotely by facsimile transmission or other electronic means as the parties may mutually agree.

(d) Form of Payment. Except as may otherwise be agreed to among the Company and one or more of the Purchasers, on or prior to the Business Day immediately prior to the Closing Date, each Purchaser shall wire its Subscription Amount, in United States dollars and in immediately available funds, to a non-interest bearing escrow account established by the Company and the Placement Agent with JPMorgan Chase Bank, N.A. (the "Escrow Agent") as set forth on Exhibit H hereto (the aggregate amounts received being held in escrow by the Escrow Agent are referred to herein as the "Escrow Amount"). On the Closing Date, (a) the Company and the Placement Agent shall instruct the Escrow Agent to deliver, in immediately available funds, the Escrow Amount constituting the aggregate purchase price as follows: (1) to the Placement Agent, the fees and reimbursable expenses payable to the Placement Agent (which fees and expenses shall be set forth in such instructions), and (2) the balance of the aggregate purchase price to the Company, (b) the Company shall irrevocably instruct the Transfer Agent to issue to each Purchaser the Shares in book entry form in such name as such Purchaser may designate in an amount equal to the number of Common Shares and Preferred Shares such Purchaser is purchasing as is set forth on such Purchaser's signature page to this Agreement next to the headings "Number of Common Shares to be Acquired" and "Number of Preferred Shares to be Acquired", respectively, within three (3) Trading Days after the Closing and (c) the Company shall deliver to each Purchaser one or more Warrants, free and clear of all restrictive and other legends (except as expressly provided in Section 4.1(b) hereof), evidencing the number of Warrants such Purchaser is purchasing as is set forth on such Purchaser's signature page to this Agreement next to the headings "Underlying Shares Subject to Warrant Relating to Common Shares" and "Underlying Shares Subject to Warrant Relating to Preferred Shares", within three (3) Trading Days after the Closing.

(e) Purchase Price Allocation. The Company and the Purchasers shall use commercially reasonable efforts to agree on a reasonable allocation of (i) the Common Stock Subscription Amount between the Common Shares and the Warrants Relating to Common Shares and (ii) the Preferred Stock Subscription Amount between the Preferred Shares and the Warrants Relating to the Preferred Shares. The

Company and the Purchasers agree to file all relevant tax returns in a manner consistent with the allocation agreed to pursuant to this Section 2.1(e).

2.2 Closing Deliveries. (a) On or prior to the Closing, the Company shall issue, deliver or cause to be delivered to each Purchaser the following (the “*Company Deliverables*”):

- (i) this Agreement, duly executed by the Company;
- (ii) facsimile copies of one or more Warrants, executed by the Company and registered in the name of such Purchaser as set forth on the Book Entry Questionnaire included as Exhibit C-2 hereto, pursuant to which such Purchaser shall have the right to acquire such number of Warrant Shares as calculated pursuant to Section 2.1, with the original Warrants delivered within three (3) Trading Days of Closing;
- (iii) a legal opinion of Company Counsel, dated as of the Closing Date and in substantially the form attached hereto as Exhibit D, executed by such counsel and addressed to the Purchasers and the Placement Agent;
- (iv) the Registration Rights Agreement, duly executed by the Company;
- (v) duly executed Irrevocable Transfer Agent Instructions instructing the Transfer Agent to deliver a book entry statement evidencing the number of Shares equal to such Purchaser’s (a) Common Stock Subscription Amount divided by the Common Unit Purchase Price and/or (b) Preferred Stock Subscription Amount divided by the Preferred Unit Purchase Price, registered in the name of such Purchaser;
- (vi) a certificate of the Secretary of the Company (the “*Secretary’s Certificate*”), dated as of the Closing Date, (a) certifying the resolutions adopted by the Board of Directors of the Company or a duly authorized committee thereof approving the transactions contemplated by this Agreement and the other Transaction Documents and the issuance of the Securities, (b) certifying the current versions of the certificate or articles of incorporation, as amended, by-laws of the Company and Certificate of Designation and (c) certifying as to the signatures and authority of persons signing the Transaction Documents and related documents on behalf of the Company, in substantially the form attached hereto as Exhibit E;
- (vii) the Compliance Certificate referred to in Section 5.1(h);
- (viii) a Lock-Up Agreement, substantially in the form of Exhibit I hereto (the “*Lock-Up Agreement*”) executed by each person or entity listed on Exhibit J hereto, and each such Lock-Up Agreement shall be in full force and effect on the Closing Date;
- (ix) a certificate evidencing the formation and good standing of the Company issued by the Secretary of State (or comparable office) of Delaware, as of a date within three (3) Business Days of the Closing Date;
- (x) a certificate evidencing the Company’s qualification as a foreign corporation and good standing issued by the Secretary of State (or comparable office) of each jurisdiction in which the Company is qualified to do business as a foreign corporation, as of a date within three (3) Business Days of the Closing Date;

(xi) a certified copy of the certificate or articles of incorporation, as certified by the Secretary of State (or comparable office) of Delaware, as of a date within three (3) Business Days of the Closing Date;

(xii) evidence that the Common Shares, Warrant Shares and the Underlying Shares issued or to be issued to the Purchasers have been approved for listing on the Trading Market, subject only to official notice of issuance.

(b) On or prior to the Closing, each Purchaser shall deliver or cause to be delivered to the Company the following (the “*Purchaser Deliverables*”):

(i) this Agreement, duly executed by such Purchaser;

(ii) its Subscription Amount, in United States dollars and in immediately available funds, in the amount set forth as the “Purchase Price” indicated below such Purchaser’s name on the applicable signature page hereto under the heading “Total Subscription Amount”) by wire transfer to the Escrow Account, as set forth on Exhibit H attached hereto;

(iii) the Registration Rights Agreement, duly executed by each such Purchaser that is entering into the Registration Rights Agreement;

(iv) a fully completed and duly executed Selling Stockholder Questionnaire in the form attached as Annex B to the Registration Rights Agreement; and

(v) a fully completed and duly executed Accredited Investor Questionnaire, satisfactory to the Company, and Book Entry Questionnaire in the forms attached hereto as Exhibits C-1 and C-2, respectively.

ARTICLE III. REPRESENTATIONS AND WARRANTIES

3.1 Representations and Warranties of the Company. The Company hereby represents and warrants as of the date hereof and the Closing Date (except for the representations and warranties that speak as of a specific date, which shall be made as of such date), to each of the Purchasers and to the Placement Agent:

(a) Subsidiaries. The Company has no direct or indirect Subsidiaries other than Pangu BioPharma Limited, a company registered in Hong Kong. Except as disclosed in the SEC Reports, the Company owns, directly or indirectly, all of the capital stock or comparable equity interests of each Subsidiary free and clear of any and all Liens, and all the issued and outstanding shares of capital stock or comparable equity interest of each Subsidiary are validly issued and are fully paid, non-assessable and free of preemptive and similar rights to subscribe for or purchase securities.

(b) Organization and Qualification. The Company and each of its Subsidiaries is an entity duly incorporated or otherwise organized, validly existing and in good standing under the laws of the jurisdiction of its incorporation or organization (as applicable), with the requisite corporate or other power and authority to own or lease and use its properties and assets and to carry on its business as currently conducted. Neither the Company nor any Subsidiary is in violation or default of any of the provisions of its respective certificate or articles of incorporation, bylaws or other organizational or charter documents. The Company and each of its Subsidiaries is duly qualified to conduct business and is in good standing as a foreign corporation or other entity in each jurisdiction in which the nature of the business conducted or

property owned by it makes such qualification necessary, except where the failure to be so qualified or in good standing, as the case may be, would not have or reasonably be expected to result in a Material Adverse Effect, and no Proceeding has been instituted, is pending, or, to the Company's Knowledge, has been threatened in writing in any such jurisdiction revoking, limiting or curtailing or seeking to revoke, limit or curtail such power and authority or qualification.

(c) Authorization; Enforcement; Validity. The Company has the requisite corporate power and authority to enter into and to consummate the transactions contemplated by each of the Transaction Documents to which it is a party and otherwise to carry out its obligations hereunder and thereunder. The Company's execution and delivery of each of the Transaction Documents to which it is a party and the consummation by it of the transactions contemplated hereby and thereby (including, but not limited to, the sale and delivery of the Shares and the Warrants and the reservation for issuance and the subsequent issuance of the Warrant Shares upon exercise of the Warrants and the Underlying Shares upon conversion of the Preferred Stock) have been duly authorized by all necessary corporate action on the part of the Company, and no further corporate action is required by the Company, its Board of Directors or its stockholders in connection therewith other than in connection with the Required Approvals. Each of the Transaction Documents to which it is a party has been (or upon delivery will have been) duly executed by the Company and is, or when delivered in accordance with the terms hereof, will constitute the legal, valid and binding obligation of the Company enforceable against the Company in accordance with its terms, except (i) as such enforceability may be limited by applicable bankruptcy, insolvency, reorganization, moratorium, liquidation or similar laws relating to, or affecting generally the enforcement of, creditors' rights and remedies or by other equitable principles of general application, (ii) as limited by laws relating to the availability of specific performance, injunctive relief or other equitable remedies and (iii) insofar as indemnification and contribution provisions may be limited by applicable law.

(d) No Conflicts. The execution, delivery and performance by the Company of the Transaction Documents to which it is a party and the consummation by the Company of the transactions contemplated hereby or thereby (including, without limitation, the issuance of the Shares and Warrants and the reservation for issuance and issuance of the Warrant Shares and Underlying Shares) do not and will not (i) conflict with or violate any provisions of the Company's or any Subsidiary's certificate or articles of incorporation, bylaws or otherwise result in a violation of the organizational documents of the Company, (ii) conflict with, or constitute a default (or an event that with notice or lapse of time or both would result in a default) under, result in the creation of any Lien upon any of the properties or assets of the Company or any Subsidiary or give to others any rights of termination, amendment, acceleration or cancellation (with or without notice, lapse of time or both) of, any Material Contract, or (iii) subject to the Required Approvals, conflict with or result in a violation of any law, rule, regulation, order, judgment, injunction, decree or other restriction of any court or governmental authority to which the Company or a Subsidiary is subject (including federal and state securities laws and regulations and the rules and regulations, assuming the correctness of the representations and warranties made by the Purchasers herein, of any self-regulatory organization to which the Company or its securities are subject, including all applicable Trading Markets), or by which any property or asset of the Company or a Subsidiary is bound or affected, except in the case of clauses (ii) and (iii) such as would not, individually or in the aggregate, have or reasonably be expected to result in a Material Adverse Effect.

(e) Filings, Consents and Approvals. Neither the Company nor any of its Subsidiaries is required to obtain any consent, waiver, authorization or order of, give any notice to, or make any filing or registration with, any court or other federal, state, local or other governmental authority or other Person in connection with the execution, delivery and performance by the Company of the Transaction Documents (including the issuance of the Securities), other than (i) the filing with the Commission of one or more Registration Statements in accordance with the requirements of the Registration Rights Agreement, (ii) filings required by applicable state securities laws or qualifications that may be required by the Financial

Industry Regulation Authority (“FINRA”), (iii) the filing of a Notice of Sale of Securities on Form D with the Commission under Regulation D of the Securities Act, (iv) the filing of any requisite notices and/or application(s) to the Principal Trading Market for the issuance and sale of the Securities and the listing of the Common Shares, Warrant Shares and Underlying Shares for trading or quotation, as the case may be, thereon in the time and manner required thereby, (v) the filings required in accordance with Section 4.5 of this Agreement and (vi) those that have been made or obtained prior to the date of this Agreement (collectively, the “Required Approvals”).

(f) Issuance of the Securities. The Shares to be issued at Closing have been duly authorized and, when issued and paid for in accordance with the terms of the Transaction Documents, will be duly and validly issued, fully paid and nonassessable and free and clear of all Liens, other than restrictions on transfer provided for in the Transaction Documents or imposed by applicable securities laws, and shall not be subject to preemptive or similar rights. The Warrants have been duly authorized and, when issued and paid for in accordance with the terms of the Transaction Documents, will be duly and validly issued, free and clear of all Liens, other than restrictions on transfer provided for in the Transaction Documents or imposed by applicable securities laws, and shall not be subject to preemptive or similar rights of stockholders. The Warrant Shares issuable upon exercise of the Warrants have been duly authorized and, when issued and paid for in accordance with the terms of the Transaction Documents and the Warrants will be duly and validly issued, fully paid and nonassessable, free and clear of all Liens, other than restrictions on transfer provided for in the Transaction Documents or imposed by applicable securities laws, and shall not be subject to preemptive or similar rights of stockholders. The Underlying Shares to be issued upon conversion of the Preferred Stock have been duly authorized and, when issued and paid for in accordance with the terms of this Agreement and as set forth in the Certificate of Designation, will be validly issued, free and clear of all Liens, other than restrictions on transfer provided in the Transaction Documents or imposed by applicable securities laws and the rules and regulations of the Trading Market, and shall not be subject to preemptive or similar rights of stockholders, and the holders shall be entitled to all rights accorded to a holder of Common Stock. Assuming the accuracy of the representations and warranties of the Purchasers in this Agreement, the Shares to be issued at Closing will be issued in compliance with all applicable federal and state securities laws.

(g) Capitalization. The capitalization of the Company as of June 30, 2017 is as set forth in the SEC Reports. The Company has not issued any capital stock since the date of its most recently filed SEC Report other than to reflect stock option and warrant exercises that do not, individually or in the aggregate, have a material effect on the issued and outstanding capital stock, options and other securities. No Person has any right of first refusal, preemptive right, right of participation, or any similar right to participate in the transactions contemplated by the Transaction Documents that have not been effectively waived as of the Closing Date. Except as set forth in the SEC Reports or a result of the purchase and sale of the Shares and Warrants, there are no outstanding options, warrants, scrip rights to subscribe to, calls or commitments of any character whatsoever relating to, or securities, rights or obligations convertible into or exercisable or exchangeable for, or giving any Person any right to subscribe for or acquire any shares of Common Stock, or contracts, commitments, understandings or arrangements by which the Company or any Subsidiary is or may become bound to issue additional shares of Common Stock or Common Stock Equivalents. The issuance and sale of the Shares and Warrants will not obligate the Company to issue shares of Common Stock or other securities to any Person (other than the Purchasers) and will not result in a right of any holder of Company securities to adjust the exercise, conversion, exchange or reset price under any of such securities. All of the outstanding shares of capital stock of the Company are validly issued, fully paid and nonassessable, have been issued in compliance with all applicable federal and state securities laws, and none of such outstanding shares was issued in violation of any preemptive rights or similar rights to subscribe for or purchase securities. No further approval or authorization of any stockholder, the Board of Directors or others is required for the issuance and sale of the Securities. There are no stockholders agreements, voting agreements or other similar agreements with respect to the Company’s capital stock to

which the Company is a party or, to the Company's Knowledge, between or among any of the Company's stockholders.

(h) SEC Reports; Disclosure Materials. The Company has filed all reports, schedules, forms, statements and other documents required to be filed by it under the Exchange Act, including pursuant to Section 13(a) or 15(d) thereof, for the two years preceding the date hereof (or such shorter period as the Company was required by law or regulation to file such material) (the foregoing materials, including the exhibits thereto and documents incorporated by reference therein, being collectively referred to herein as the "SEC Reports", and the SEC Reports, being collectively referred to as the "Disclosure Materials") on a timely basis or has received a valid extension of such time of filing and has filed any such SEC Reports prior to the expiration of any such extension, except where the failure to file on a timely basis would not have or reasonably be expected to result in a Material Adverse Effect. As of their respective filing dates, or to the extent corrected by a subsequent restatement, the SEC Reports complied in all material respects with the requirements of the Securities Act and the Exchange Act and the rules and regulations of the Commission promulgated thereunder, and none of the SEC Reports, when filed, contained any untrue statement of a material fact or omitted to state a material fact required to be stated therein or necessary in order to make the statements therein, in light of the circumstances under which they were made, not misleading. Each of the Material Contracts to which the Company is a party or to which the property or assets of the Company are subject has been filed as an exhibit to the SEC Reports within the time period required under the Exchange Act.

(i) Financial Statements. The financial statements of the Company included in the SEC Reports comply in all material respects with applicable accounting requirements and the rules and regulations of the Commission with respect thereto as in effect at the time of filing (or to the extent corrected by a subsequent restatement). Such financial statements have been prepared in accordance with GAAP applied on a consistent basis during the periods involved, except as may be otherwise specified in such financial statements or the notes thereto and except that unaudited financial statements may not contain all footnotes required by GAAP, and fairly present in all material respects the financial position of the Company and its consolidated subsidiaries taken as a whole as of and for the dates thereof and the results of operations and cash flows for the periods then ended, subject, in the case of unaudited statements, to normal, immaterial year-end audit adjustments.

(j) Material Changes. Since the date of the latest audited financial statements included within the SEC Reports, except as specifically disclosed in a subsequent SEC Report filed prior to the date hereof, (i) there have been no events, occurrences or developments that have had or would reasonably be expected to have, either individually or in the aggregate, a Material Adverse Effect, (ii) the Company has not incurred any material liabilities (contingent or otherwise) other than (A) trade payables and accrued expenses incurred in the ordinary course of business consistent with past practice and (B) liabilities not required to be reflected in the Company's financial statements pursuant to GAAP or disclosed in filings made with the Commission, (iii) the Company has not altered materially its method of accounting or the manner in which it keeps its accounting books and records, (iv) the Company has not declared or made any dividend or distribution of cash or other property to its stockholders or purchased, redeemed or made any agreements to purchase or redeem any shares of its capital stock (other than in connection with repurchases of unvested stock issued to employees or service providers of the Company), and (v) the Company has not issued any equity securities to any officer, director or Affiliate, except Common Stock issued in the ordinary course as dividends on outstanding preferred stock or issued pursuant to existing Company stock option or stock purchase plans or executive and director compensation arrangements disclosed in the SEC Reports. Except for the issuance of the Shares and Warrants contemplated by this Agreement, no event, liability or development has occurred or exists with respect to the Company or its Subsidiaries or their respective business, properties, operations or financial condition, that would be required to be disclosed by the

Company under applicable securities laws at the time this representation is made that has not been publicly disclosed at least one (1) Trading Day prior to the date that this representation is made.

(k) Litigation. There is no Action which (i) adversely affects or challenges the legality, validity or enforceability of any of the Transaction Documents or the Securities or (ii) except as specifically disclosed in the SEC Reports, would, if there were an unfavorable decision, individually or in the aggregate, have or reasonably be expected to result in a Material Adverse Effect. Neither the Company nor any Subsidiary, nor to the Company's Knowledge any director or officer thereof, is or has been the subject of any Action involving a claim of violation of or liability under federal or state securities laws or a claim of breach of fiduciary duty. There has not been, and to the Company's Knowledge there is not pending or contemplated, any investigation by the Commission involving the Company or any current or former director or officer of the Company. The Commission has not issued any stop order or other order suspending the effectiveness of any registration statement filed by the Company or any of its Subsidiaries under the Exchange Act or the Securities Act.

(l) Employment Matters. No material labor dispute exists or, to the Company's Knowledge, is imminent with respect to any of the employees of the Company which would have or reasonably be expected to result in a Material Adverse Effect. None of the Company's or any Subsidiary's employees is a member of a union that relates to such employee's relationship with the Company, and neither the Company nor any of its Subsidiaries is a party to a collective bargaining agreement, and the Company and each Subsidiary believes that its relationship with its employees is good. No executive officer of the Company (as defined in Rule 501(f) of the Securities Act) has notified the Company or any such Subsidiary that such officer intends to leave the Company or any such Subsidiary or otherwise terminate such officer's employment with the Company or any such Subsidiary. To the Company's Knowledge, no executive officer, is, or is now expected to be, in violation of any material term of any employment contract, confidentiality, disclosure or proprietary information agreement or non-competition agreement, or any other contract or agreement or any restrictive covenant in favor of a third party, and to the Company's Knowledge, the continued employment of each such executive officer does not subject the Company or any Subsidiary to any liability with respect to any of the foregoing matters. The Company and its Subsidiaries are in compliance with all U.S. federal, state, local and foreign laws and regulations relating to employment and employment practices, terms and conditions of employment and wages and hours, except where the failure to be in compliance would not, individually or in the aggregate, have or reasonably be expected to result in a Material Adverse Effect.

(m) Compliance. Neither the Company nor any of its Subsidiaries (i) is in default under or in violation of, nor has the Company or any of its Subsidiaries received written notice of a claim that it is in default under or that it is in violation of, any Material Contract (whether or not such default or violation has been waived), (ii) is in violation of any order of any court, arbitrator or governmental body having jurisdiction over the Company or its properties or assets, or (iii) is in violation of, or in receipt of written notice that it is in violation of, any statute, rule or regulation of any governmental authority applicable to the Company, except in each case as would not, individually or in the aggregate, have or reasonably be expected to result in a Material Adverse Effect.

(n) Regulatory Permits. The Company and each of its Subsidiaries possess all certificates, authorizations and permits issued by the appropriate federal, state, local or foreign regulatory authorities necessary to conduct its respective business as currently conducted and as described in the SEC Reports, except where the failure to possess such permits, individually or in the aggregate, has not and would not have or reasonably be expected to result in a Material Adverse Effect ("*Material Permits*"), and neither the Company nor any of its Subsidiaries has received any notice of Proceedings relating to the revocation or modification of any such Material Permits.

(o) Title to Assets. The Company and its Subsidiaries have good and marketable title in fee simple to all real property owned by them. The Company and its Subsidiaries have good and marketable title to all tangible personal property owned by them that is material to the business of the Company and its Subsidiaries, taken as whole, in each case free and clear of all Liens except such as do not materially affect the value of such property and do not interfere with the use made and proposed to be made of such property by the Company and any of its Subsidiaries. Any real property and facilities held under lease by the Company and any of its Subsidiaries are held by them under valid, subsisting and enforceable leases with such exceptions as are not material and do not interfere with the use made and proposed to be made of such property and buildings by the Company and its Subsidiaries.

(p) Patents and Trademarks. To the Company's Knowledge, the Company and the Subsidiaries own, possess, license or have other rights to use, all patents, patent applications, trade and service marks, trade and service mark applications and registrations, trade names, trade secrets, inventions, copyrights, licenses, technology, know-how and other intellectual property rights and similar rights described in the SEC Reports as necessary or material for use in connection with their respective businesses and which the failure to so have would have or reasonably be expected to result in a Material Adverse Effect (collectively, the "*Intellectual Property Rights*"). Neither the Company nor any Subsidiary has received a notice (written or otherwise) that any of the Intellectual Property Rights used by the Company or any Subsidiary violates or infringes upon the rights of any Person. There is no pending or, to the Company's Knowledge, threatened action, suit, proceeding or claim by any Person that the Company's business as now conducted infringes or otherwise violates any patent, trademark, copyright, trade secret or other proprietary rights of another. To the Company's Knowledge, there is no existing infringement by another Person of any of the Intellectual Property Rights that would have or would reasonably be expected to have a Material Adverse Effect. The Company and its Subsidiaries have taken reasonable security measures to protect the secrecy, confidentiality and value of all of their Intellectual Property Rights, except where failure to do so could not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect.

(q) Insurance. Except as otherwise described in the SEC Reports, the Company and each of the Subsidiaries are insured by insurers of recognized financial responsibility against such losses and risks and in such amounts as the Company believes to be prudent and customary in the businesses and locations in which the Company and the Subsidiaries are engaged, including, but not limited to, directors and officers insurance coverage. The Company has no reason to believe it or any Subsidiary will be unable to renew their respective existing insurance coverage as and when such coverage expires or to obtain similar coverage from similar insurers as may be necessary to continue its business without a significant increase in cost that would result in a Material Adverse Effect.

(r) Transactions With Affiliates. Except as set forth in the SEC Reports, none of the executive officers or directors of the Company is presently a party to any transaction with the Company or any Subsidiary (other than for services as executive officers and directors), that would be required to be disclosed pursuant to Item 404 of Regulation S-K promulgated under the Securities Act.

(s) Internal Accounting Controls. The Company maintains a system of internal accounting controls sufficient to provide reasonable assurance that (i) transactions are executed in accordance with management's general or specific authorizations, (ii) transactions are recorded as necessary to permit preparation of financial statements in conformity with GAAP and to maintain asset and liability accountability, (iii) access to assets or incurrence of liabilities is permitted only in accordance with management's general or specific authorization, and (iv) the recorded accountability for assets and liabilities is compared with the existing assets and liabilities at reasonable intervals and appropriate action is taken with respect to any differences.

(t) Sarbanes-Oxley; Disclosure Controls. The Company is in compliance in all material respects with all of the provisions of the Sarbanes-Oxley Act of 2002 which are applicable to it as of the

Closing Date. The Company has established disclosure controls and procedures (as such term is defined in Rule 13a-15(e) and 15d-15(e) under the Exchange Act) for the Company and designed such disclosure controls and procedures to ensure that information required to be disclosed by the Company in the reports it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the Commission's rules and forms. The Company's certifying officers have evaluated the effectiveness of the Company's disclosure controls and procedures as of the end of the period covered by the Company's most recently filed periodic report under the Exchange Act (such date, the "Evaluation Date"). The Company presented in its most recently filed periodic report under the Exchange Act the conclusions of the certifying officers about the effectiveness of the disclosure controls and procedures based on their evaluations as of the Evaluation Date. Since the Evaluation Date, there have been no changes in the Company's internal control over financial reporting (as such term is defined in the Exchange Act) that has materially affected, or is reasonably likely to materially affect, the Company's internal control over financial reporting.

(u) Certain Fees. No person or entity will have, as a result of the transactions contemplated by this Agreement, any valid right, interest or claim against or upon the Company or a Purchaser for any commission, fee or other compensation pursuant to any agreement, arrangement or understanding entered into by or on behalf of the Company, other than the Placement Agent with respect to the offer and sale of the Shares and Warrants (which placement agent fees are being paid by the Company). The Purchasers shall have no obligation with respect to any fees or with respect to any claims made by or on behalf of other Persons for fees of a type contemplated in this paragraph (u) that may be due in connection with the transactions contemplated by the Transaction Documents. The Company shall indemnify, pay, and hold each Purchaser harmless against, any liability, loss or expense (including, without limitation, attorneys' fees and out-of-pocket expenses) arising in connection with any such right, interest or claim.

(v) Private Placement. Assuming the accuracy of the Purchasers' representations and warranties set forth in Section 3.2 of this Agreement and the accuracy of the information disclosed in the Accredited Investor Questionnaires provided by the Purchasers, no registration under the Securities Act is required for the offer and sale of the Securities by the Company to the Purchasers under the Transaction Documents. The issuance and sale of the Securities hereunder does not contravene the rules and regulations of the Trading Market.

(w) Investment Company. The Company is not, and immediately after receipt of payment for the Shares and Warrants, will not be an "investment company" within the meaning of the Investment Company Act of 1940, as amended. The Company shall conduct its business in a manner so that it will not become subject to the Investment Company Act of 1940, as amended.

(x) Registration Rights. Other than each of the Purchasers or as set forth in the SEC Reports, no Person has any right to cause the Company to effect the registration under the Securities Act of any securities of the Company other than those securities which are currently registered on an effective registration statement on file with the Commission, and such rights have been duly waived.

(y) Listing and Maintenance Requirements. The Company's Common Stock is registered pursuant to Section 12(b) or 12(g) of the Exchange Act, and the Company has taken no action designed to terminate the registration of the Common Stock under the Exchange Act nor has the Company received any notification that the Commission is contemplating terminating such registration. The Company has not, in the twelve (12) months preceding the date hereof, received written notice from any Trading Market on which the Common Stock is listed or quoted to the effect that the Company is not in compliance with the listing or maintenance requirements of such Trading Market. The Company is in compliance in all material respects with all listing and maintenance requirements of the Principal Trading Market on the date hereof.

(z) Application of Takeover Protections; Rights Agreements. The Company and the Board of Directors have taken all necessary action, if any, in order to render inapplicable any control share acquisition, business combination, poison pill (including any distribution under a rights agreement) or other similar anti-takeover provision under the Company's charter documents or the laws of its state of incorporation that is or could reasonably be expected to become applicable to any of the Purchasers as a result of the Purchasers and the Company fulfilling their obligations or exercising their rights under the Transaction Documents, including, without limitation, the Company's issuance of the Securities and each Purchaser's ownership of the Securities.

(aa) Disclosure. Certain information has been disclosed to the Purchasers that may constitute material non-public information of the Company, including the terms and conditions of the transactions contemplated by the Transaction Documents. The Company confirms that following the filing of the Pricing 8-K no later than 9:00 A.M., New York City time, on the Trading Day immediately following the date hereof, no Purchaser will be deemed to be in possession of material, non-public information concerning the Company (to the extent that such information was provided by the Company prior to the filing of the Pricing 8-K). To the extent a Purchaser is party to any confidentiality or similar agreement with the Company, the confidentiality obligations with respect to other confidential information that the Company may have provided will be governed per the terms of such agreement. The Company agrees that neither it, nor any Person acting on its behalf, shall provide any Purchaser with any material, non-public information regarding the Company or its Subsidiary from and after the date hereof without the express prior written consent of such Purchaser. The Company understands and confirms that the Purchasers and their Affiliates will rely on the foregoing representations in effecting transactions in securities of the Company.

(bb) No Integrated Offering. Assuming the accuracy of the Purchasers' representations and warranties set forth in Section 3.2, none of the Company, its Subsidiaries nor, to the Company's Knowledge, any of its Affiliates or any Person acting on its behalf has, directly or indirectly, at any time within the past six (6) months, made any offers or sales of any Company security or solicited any offers to buy any security under circumstances that would (i) eliminate the availability of the exemption from registration under Regulation D under the Securities Act in connection with the offer and sale by the Company of the Securities as contemplated hereby or (ii) cause the offering of the Securities pursuant to the Transaction Documents to be integrated with prior offerings by the Company for purposes of any applicable law, regulation or stockholder approval provisions, including, without limitation, under the rules and regulations of any Trading Market on which any of the securities of the Company are listed or designated.

(cc) Tax Matters. The Company and each of its Subsidiaries (i) has filed all foreign, federal and state income and all other tax returns, reports and declarations required by any jurisdiction to which it is subject, (ii) has paid all taxes and other governmental assessments and charges that are material in amount, shown or determined to be due on such returns, reports and declarations, except those being contested in good faith, with respect to which adequate reserves have been set aside on the books of the Company and (iii) has set aside on its books provisions reasonably adequate for the payment of all taxes for periods subsequent to the periods to which such returns, reports or declarations apply, except, in the case of clauses (i) and (ii) above, where the failure to so pay or file any such tax, assessment, charge or return would not have or reasonably be expected to result in a Material Adverse Effect. There are no unpaid taxes in any material amount claimed to be due by the Company or any of its Subsidiaries by the taxing authority of any jurisdiction.

(dd) Environmental Matters. To the Company's Knowledge and except as disclosed in the SEC Reports, neither the Company nor any of its Subsidiaries (i) is in violation of any statute, rule, regulation, decision or order of any governmental agency or body or any court, domestic or foreign, relating to the use, disposal or release of hazardous or toxic substances or relating to the protection or restoration of the environment or human exposure to hazardous or toxic substances (collectively, "*Environmental Laws*"), (ii) owns or operates any real property contaminated with any substance that is in violation of any

Environmental Laws, (iii) is liable for any off-site disposal or contamination pursuant to any Environmental Laws, or (iv) is subject to any claim relating to any Environmental Laws; which violation, contamination, liability or claim has had or would have, individually or in the aggregate, a Material Adverse Effect; and there is no pending investigation or, to the Company's Knowledge, investigation threatened in writing that might lead to such a claim.

(ee) No General Solicitation. Neither the Company nor, to the Company's Knowledge, any person acting on behalf of the Company has offered or sold any of the Securities by any form of general solicitation or general advertising.

(ff) Foreign Corrupt Practices. Neither the Company, nor to the Company's Knowledge, any agent or other person acting on behalf of the Company, has: (i) directly or indirectly, used any funds for unlawful contributions, gifts, entertainment or other unlawful expenses related to foreign or domestic political activity, (ii) made any unlawful payment to foreign or domestic government officials or employees or to any foreign or domestic political parties or campaigns from corporate funds, (iii) failed to disclose fully any contribution made by the Company (or made by any person acting on its behalf of which the Company is aware) which is in violation of law or (iv) violated in any material respect any provision of the Foreign Corrupt Practices Act of 1977, as amended.

(gg) Off Balance Sheet Arrangements. There is no transaction, arrangement, or other relationship between the Company (or any Subsidiary) and an unconsolidated or other off balance sheet entity that is required to be disclosed by the Company in SEC Reports and is not so disclosed and would have or reasonably be expected to result in a Material Adverse Effect.

(hh) Acknowledgment Regarding Purchasers' Purchase of Securities. The Company acknowledges and agrees that each of the Purchasers is acting solely in the capacity of an arm's length purchaser with respect to the Transaction Documents and the transactions contemplated hereby and thereby. The Company further acknowledges that no Purchaser is acting as a financial advisor or fiduciary of the Company (or in any similar capacity) with respect to the Transaction Documents and the transactions contemplated thereby and any advice given by any Purchaser or any of their respective representatives or agents in connection with the Transaction Documents and the transactions contemplated thereby is merely incidental to the Purchasers' purchase of the Securities. The Company further represents to each Purchaser that the Company's decision to enter into this Agreement and the other Transaction Documents has been based solely on the independent evaluation of the transactions contemplated hereby by the Company and its representatives.

(ii) Regulation M Compliance. The Company has not, and to the Company's Knowledge no one acting on its behalf has, (i) taken, directly or indirectly, any action designed to cause or to result in the stabilization or manipulation of the price of any security of the Company to facilitate the sale or resale of any of the Securities, (ii) sold, bid for, purchased, or paid any compensation for soliciting purchases of, any of the securities of the Company or (iii) paid or agreed to pay to any Person any compensation for soliciting another to purchase any other securities of the Company, other than, in the case of clauses (ii) and (iii), compensation paid to the Placement Agent in connection with the placement of the Shares and Warrants.

(jj) PFIC. Neither the Company nor any Subsidiary is or intends to become a "passive foreign investment company" within the meaning of Section 1297 of the U.S. Internal Revenue Code of 1986, as amended (the "Code").

(kk) OFAC. Neither the Company nor any Subsidiary nor, to the Company's Knowledge, any director, officer, agent, employee, Affiliate or Person acting on behalf of the Company or any Subsidiary is currently subject to any U.S. sanctions administered by the Office of Foreign Assets Control of the U.S. Treasury Department ("OFAC"); and the Company will not directly or indirectly use the proceeds of the sale

of the Securities, or lend, contribute or otherwise make available such proceeds to any Subsidiary, joint venture partner or other Person or entity, towards any sales or operations in Cuba, Iran, Syria, Sudan, Myanmar or any other country sanctioned by OFAC or for the purpose of financing the activities of any Person currently subject to any U.S. sanctions administered by OFAC.

(ll) FDA. As to each product subject to the jurisdiction of the U.S. Food and Drug Administration (“*FDA*”) under the Federal Food, Drug and Cosmetic Act, as amended, and the regulations thereunder (“*FDCA*”) that is manufactured, packaged, labeled, tested, distributed, and/or sold by the Company or any of its Subsidiaries (each such product, a “*Pharmaceutical Product*”), such Pharmaceutical Product is being manufactured, packaged, labeled, tested, distributed, and/or sold by the Company in compliance with all applicable requirements under FDCA and similar laws, rules and regulations relating to registration, investigational use, licensure or approval, good manufacturing practices, good laboratory practices, good clinical practices, product listing, labeling, advertising, record keeping and filing of reports, except where the failure to be in compliance would not have or reasonably be expected to result in a Material Adverse Effect. There is no pending, completed or, to the Company’s Knowledge, threatened, action (including any lawsuit, arbitration, or legal or administrative or regulatory proceeding, charge, complaint, or investigation) against the Company or any of its Subsidiaries, and none of the Company or any of its Subsidiaries has received any notice, warning letter or other communication from the FDA or any other governmental entity, which (i) contests the uses of, the distribution of, the manufacturing or packaging of, the testing of, the sale of, or the labeling and promotion of any Pharmaceutical Product, (ii) requests the recall, suspension, or seizure of, or withdraws or orders the withdrawal of advertising or sales promotional materials relating to, any Pharmaceutical Product, (iii) imposes a clinical hold on any clinical investigation by the Company or any of its Subsidiaries, except as disclosed in the SEC reports, (iv) enjoins production at any facility of the Company or any of its Subsidiaries, (v) enters or proposes to enter into a consent decree of permanent injunction with the Company or any of its Subsidiaries, or (vi) otherwise alleges any violation of any laws, rules or regulations by the Company or any of its Subsidiaries, and which, either individually or in the aggregate, would have or reasonably be expected to result in a Material Adverse Effect. The properties, business and operations of the Company have been and are being conducted in all material respects in accordance with all applicable laws, rules and regulations of the FDA. The Company has not been informed by the FDA that the FDA will prohibit the marketing, sale, license or use in the United States of any product proposed to be developed, produced or marketed by the Company nor has the FDA expressed any concern as to approving for marketing any product being developed or proposed to be developed by the Company.

(mm) Shell Company. The Company is not, and was not in the past, an “ineligible issuer” (as defined in Rule 405 promulgated under the Securities Act).

(nn) No Additional Agreements. The Company does not have any agreement or understanding with any Purchaser with respect to the transactions contemplated by the Transaction Documents other than as specified in the Transaction Documents.

(oo) Use of Form S-3. The Company meets the registration and transaction requirements for use of Form S-3 for the registration of the Common Shares, the Warrant Shares and the Underlying Shares for resale by the Purchasers.

(pp) Reservations of Shares of Common Stock. So long any of the Warrants are outstanding, the Company shall take all action necessary to reserve and keep available out of its authorized and unissued capital stock, solely for the purpose of effecting the exercise of the Warrants, the number of shares of Common Stock issuable upon exercise of the Warrants (without taking into account any limitations on the exercise of the Warrants set forth in the Warrants). So long as the Preferred Stock remains outstanding, the Company shall take all action necessary to at all times have authorized, and reserved for the purpose of issuance, the maximum number of shares of Common Stock to effect the conversion of the Preferred Stock.

(qq) Conversion and Exercise Procedures. The form of Notice of Conversion included in the Certificate of Designation sets forth the totality of the procedures required of the Purchasers in order to convert the Preferred Stock. No additional legal opinion, other information or instructions shall be required of the Purchasers to convert their Preferred Stock. The Company shall honor conversions of the Preferred Stock and shall deliver the Underlying Shares in accordance with the terms, conditions and time periods set forth in the Transaction Documents; *provided, however*, that the Company shall not be required to issue any shares of Common Stock to a Purchaser upon conversion by such Purchaser (or its assigns) of any shares of the Preferred Stock to the extent (and only to the extent) that such conversion would result in the Purchaser (including its predecessors-in-interest) beneficially owning shares of Common Stock in excess of the applicable Threshold Amount unless approved by the Company's stockholders in accordance with the applicable stockholder approval requirements of Nasdaq Marketplace Rule 5635.

(rr) No Change of Control. Prior to the time at which the Company has received the Requisite Approval (as defined in the Certificate of Designation), the execution, delivery and performance by the Company of the Transaction Documents to which it is a party and the consummation by the Company of the transactions contemplated hereby or thereby do not and will not result in a change of control as such term is defined in the Company's Material Contracts.

(ss) Real Property Holding Corporation. The Company is not now, has never been and does not expect to become a "United States real property holding corporation" as defined in the Code and any applicable regulations promulgated thereunder. The Company has filed with the Internal Revenue Service all statements, if any, with its U.S. income tax returns that are required under such regulations.

3.2 Representations and Warranties of the Purchasers. Each Purchaser hereby, for itself and for no other Purchaser, represents and warrants as of the date hereof and as of the Closing Date to the Company and the Placement Agent as follows:

(a) Organization; Authority. Such Purchaser is an entity duly organized, validly existing and in good standing under the laws of the jurisdiction of its organization with the requisite corporate or partnership power and authority to enter into and to consummate the transactions contemplated by the applicable Transaction Documents and otherwise to carry out its obligations hereunder and thereunder. The execution and delivery of this Agreement by such Purchaser and performance by such Purchaser of the transactions contemplated by this Agreement have been duly authorized by all necessary corporate or, if such Purchaser is not a corporation, such partnership, limited liability company or other applicable like action, on the part of such Purchaser. Each Transaction Document to which it is a party has been duly executed by such Purchaser, and when delivered by such Purchaser in accordance with the terms hereof, will constitute the valid and legally binding obligation of such Purchaser, enforceable against it in accordance with its terms, except as such enforceability may be limited by applicable bankruptcy, insolvency, reorganization, moratorium, liquidation or similar laws relating to, or affecting generally the enforcement of, creditors' rights and remedies or by other equitable principles of general application.

(b) No Conflicts. The execution, delivery and performance by such Purchaser of this Agreement and the Registration Rights Agreement (if applicable) and the consummation by such Purchaser of the transactions contemplated hereby and thereby will not (i) result in a violation of the organizational documents of such Purchaser, (ii) conflict with, or constitute a default (or an event which with notice or lapse of time or both would become a default) under, or give to others any rights of termination, amendment, acceleration or cancellation of, any agreement, indenture or instrument to which such Purchaser is a party, or (iii) result in a violation of any law, rule, regulation, order, judgment or decree (including federal and state securities laws) applicable to such Purchaser, except in the case of clauses (ii) and (iii) above, for such conflicts, defaults, rights or violations which would not, individually or in the aggregate, reasonably be expected to have a material adverse effect on the ability of such Purchaser to perform its obligations hereunder.

(c) Investment Intent. Such Purchaser understands that the Securities are “restricted securities” and have not been registered under the Securities Act or any applicable state securities law and is acquiring the Shares and Warrants and, upon exercise of the Warrants and/or conversion of the Preferred Stock, will acquire the Warrant Shares and/or Underlying Shares issuable upon exercise or conversion thereof as principal for its own account and not with a view to, or for distributing or reselling such Securities or any part thereof in violation of the Securities Act or any applicable state securities laws, *provided, however*, that by making the representations herein, such Purchaser does not agree to hold any of the Securities for any minimum period of time and reserves the right, subject to the provisions of this Agreement and the Registration Rights Agreement, at all times to sell or otherwise dispose of all or any part of such Securities pursuant to an effective registration statement under the Securities Act or under an exemption from such registration and in compliance with applicable federal and state securities laws. Such Purchaser is acquiring the Securities hereunder in the ordinary course of its business. Such Purchaser does not presently have any agreement, plan or understanding, directly or indirectly, with any Person to distribute or effect any distribution of any of the Securities (or any securities which are derivatives thereof) to or through any person or entity; such Purchaser is not a registered broker-dealer under Section 15 of the Exchange Act or an entity engaged in a business that would require it to be so registered as a broker-dealer.

(d) Purchaser Status. At the time such Purchaser was offered the Shares and Warrants, it was, and at the date hereof it is, and on each date on which it exercises its Warrants or converts its Preferred Stock it will be, an “accredited investor” as defined in Rule 501(a) under the Securities Act. Purchaser hereby represents that neither it nor any of its Rule 506(d) Related Parties is a “bad actor” within the meaning of Rule 506(d) promulgated under the Securities Act. For purposes of this Agreement, “*Rule 506(d) Related Party*” shall mean a person or entity covered by the “Bad Actor disqualification” provision of Rule 506(d) of the Securities Act.

(e) General Solicitation. Such Purchaser is not purchasing the Securities as a result of any advertisement, article, notice or other communication regarding the Securities published in any newspaper, magazine or similar media or broadcast over television or radio or presented at any seminar or any other general advertisement.

(f) Experience of Such Purchaser. Such Purchaser, either alone or together with its representatives, has such knowledge, sophistication and experience in business and financial matters so as to be capable of evaluating the merits and risks of the prospective investment in the Securities, and has so evaluated the merits and risks of such investment. Such Purchaser is able to bear the economic risk of an investment in the Securities and, at the present time, is able to afford a complete loss of such investment.

(g) Access to Information. Such Purchaser acknowledges that it has had the opportunity to review the Disclosure Materials and has been afforded (i) the opportunity to ask such questions as it has deemed necessary of, and to receive answers from, representatives of the Company concerning the terms and conditions of the offering of the Securities and the merits and risks of investing in the Securities; (ii) access to information about the Company and the Subsidiaries and their respective financial condition, results of operations, business, properties, management and prospects sufficient to enable it to evaluate its investment; and (iii) the opportunity to obtain such additional information that the Company possesses or can acquire without unreasonable effort or expense that is necessary to make an informed investment decision with respect to the investment. Neither such inquiries nor any other investigation conducted by or on behalf of such Purchaser or its representatives or counsel shall modify, amend or affect such Purchaser’s right to rely on the truth, accuracy and completeness of the Disclosure Materials and the Company’s representations and warranties contained in the Transaction Documents. Such Purchaser has sought such accounting, legal and tax advice as it has considered necessary to make an informed decision with respect to its acquisition of the Securities.

(h) Certain Trading Activities. Other than with respect to the transactions contemplated herein, since the time that such Purchaser was first contacted by the Company, the Placement Agent or any other Person regarding the transactions contemplated hereby, neither the Purchaser nor any Affiliate of such Purchaser which (x) had knowledge of the transactions contemplated hereby, (y) has or shares discretion relating to such Purchaser's investments or trading or information concerning such Purchaser's investments, including in respect of the Securities, and (z) is subject to such Purchaser's review or input concerning such Affiliate's investments or trading (collectively, "*Trading Affiliates*") has directly or indirectly, nor has any Person acting on behalf of or pursuant to any understanding with such Purchaser or Trading Affiliate, effected or agreed to effect any purchases or sales of the securities of the Company (including, without limitation, any Short Sales involving the Company's securities). Notwithstanding the foregoing, in the case of a Purchaser and/or Trading Affiliate that is, individually or collectively, a multi-managed investment bank or vehicle whereby separate portfolio managers manage separate portions of such Purchaser's or Trading Affiliate's assets and the portfolio managers have no direct knowledge of the investment decisions made by the portfolio managers managing other portions of such Purchaser's or Trading Affiliate's assets, the representation set forth above shall apply only with respect to the portion of assets managed by the portfolio manager that have knowledge about the financing transaction contemplated by this Agreement. Other than to other Persons party to this Agreement, such Purchaser has maintained the confidentiality of all disclosures made to it in connection with this transaction (including the existence and terms of this transaction).

(i) Brokers and Finders. No Person will have, as a result of the transactions contemplated by this Agreement, any valid right, interest or claim against or upon the Company or any Purchaser for any commission, fee or other compensation pursuant to any agreement, arrangement or understanding entered into by or on behalf of the Purchaser.

(j) Independent Investment Decision. Such Purchaser has independently evaluated the merits of its decision to purchase Securities pursuant to the Transaction Documents, and such Purchaser confirms that it has not relied on the advice of any other Purchaser's business and/or legal counsel in making such decision. Such Purchaser understands that nothing in this Agreement or any other materials presented by or on behalf of the Company to the Purchaser in connection with the purchase of the Securities constitutes legal, tax or investment advice. Such Purchaser has consulted such legal, tax and investment advisors as it, in its sole discretion, has deemed necessary or appropriate in connection with its purchase of the Securities. Such Purchaser understands that the Placement Agent has acted solely as the agent of the Company in this placement of the Shares and Warrants and such Purchaser has not relied on the business or legal advice of the Placement Agent or any of its agents, counsel or Affiliates in making its investment decision hereunder, and confirms that none of such Persons has made any representations or warranties to such Purchaser in connection with the transactions contemplated by the Transaction Documents.

(k) Reliance on Exemptions. Such Purchaser understands that the Securities being offered and sold to it in reliance on specific exemptions from the registration requirements of United States federal and state securities laws and that the Company is relying in part upon the truth and accuracy of, and such Purchaser's compliance with, the representations, warranties, agreements, acknowledgements and understandings of such Purchaser set forth herein in order to determine the availability of such exemptions and the eligibility of such Purchaser to acquire the Securities.

(l) No Governmental Review. Such Purchaser understands that no United States federal or state agency or any other government or governmental agency has passed on or made any recommendation or endorsement of the Securities or the fairness or suitability of the investment in the Securities nor have such authorities passed upon or endorsed the merits of the offering of the Securities.

(m) Regulation M. Such Purchaser is aware that the anti-manipulation rules of Regulation M under the Exchange Act may apply to sales of Common Stock and other activities with respect to the Common Stock by the Purchasers.

(n) Beneficial Ownership. As of the date hereof, Viking Global Investors (“Viking”) (individually or together with any other Persons with whom Viking has identified, or will have identified, itself as part of a “group” in a public filing made with the Commission involving the Company’s securities) does not own any equity securities of the Company. With the exception of Viking, the purchase by such Purchaser of the Shares and Warrants issuable to it at the Closing will not result in such Purchaser (individually or together with any other Person with whom such Purchaser has identified, or will have identified, itself as part of a “group” in a public filing made with the Commission involving the Company’s securities) acquiring, or obtaining the right to acquire, in excess of 19.999% of the outstanding shares of Common Stock or the voting power of the Company on a post transaction basis that assumes that the Closing shall have occurred. Such Purchaser does not presently intend to, alone or together with others, make a public filing with the Commission to disclose that it has (or that it together with such other Persons have) acquired, or obtained the right to acquire, as a result of the Closing (when added to any other securities of the Company that it or they then own or have the right to acquire), in excess of 19.999% of the outstanding shares of Common Stock or the voting power of the Company on a post transaction basis that assumes that the Closing shall have occurred. A Purchaser shall not be deemed to have acquired, or have the right to acquire, any shares of Common Stock in excess of the Beneficial Ownership Limitation (as defined in the Certificate of Designation) prior to the sixty-first (61st) day after the Purchaser’s delivery of a Notice of Conversion under the Certificate of Designation. Notwithstanding the foregoing, the Company shall at all times be required to issue the applicable number of shares of Common Stock to a given Purchaser upon the valid conversion by such Purchaser (or its assigns) of shares of Class X Preferred Stock unless and only to the extent that such conversion and related issuance: (i) would result in the aggregate issuance to a given Purchaser (including its predecessors-in-interest) of a number of shares of Common Stock in excess of the applicable Threshold Amount, and (ii) has not been approved by the Company’s stockholders in accordance with the stockholder approval requirements of Nasdaq Marketplace Rule 5635.

(o) Residency. Such Purchaser’s residence (if an individual) or offices in which its investment decision with respect to the Securities was made (if an entity) are located at the address immediately below such Purchaser’s name on its signature page hereto.

(p) Accuracy of Accredited Investor Questionnaire. The Accredited Investor Questionnaire delivered by such Purchaser in connection with this Agreement is complete and accurate in all respects as of the date of this Agreement, and such Accredited Investor Questionnaire delivered to the Company by such Purchaser will each be complete and accurate as of the Closing Date and the effective date of the Registration Statement; provided, that such Purchaser shall be entitled to update such information by providing written notice thereof to the Company.

The Company and each of the Purchasers acknowledge and agree that no party to this Agreement has made or makes any representations or warranties with respect to the transactions contemplated hereby other than those specifically set forth in this Article III and the Transaction Documents.

ARTICLE IV.
OTHER AGREEMENTS OF THE PARTIES

4.1 Transfer Restrictions.

(a) Compliance with Laws. Notwithstanding any other provision of this Article IV, each Purchaser covenants that the Securities may be disposed of only pursuant to an effective registration statement under, and in compliance with the requirements of, the Securities Act, or pursuant to an available exemption from, or in a transaction not subject to, the registration requirements of the Securities Act, and in compliance with any applicable state and federal securities laws. In connection with any transfer of the Securities other than (i) pursuant to an effective registration statement, (ii) to the Company, or (iii) pursuant to Rule 144 (*provided* that the Purchaser provides the Company with reasonable assurances (in the form of seller and, if applicable, broker representation letters) that the securities may be sold pursuant to such rule), the Company may require the transferor thereof to provide to the Company an opinion of counsel selected by the transferor and reasonably acceptable to the Company, the form and substance of which opinion shall be reasonably satisfactory to the Company, to the effect that such transfer does not require registration of such transferred Securities under the Securities Act. As a condition of transfer, any such transferee shall agree in writing to be bound by the terms of this Agreement and the Registration Rights Agreement and shall have the rights of a Purchaser under this Agreement and the Registration Rights Agreement with respect to such transferred Securities.

(b) Legends. Any certificates or book entry notations evidencing the Securities shall bear any legend as required by the “blue sky” laws of any state and a restrictive legend in substantially the following form, until such time as they are not required under Section 4.1(c):

NEITHER THESE SECURITIES NOR THE SECURITIES ISSUABLE UPON EXERCISE OR CONVERSION OF THESE SECURITIES HAVE BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933, AS AMENDED (THE “SECURITIES ACT”), OR APPLICABLE STATE SECURITIES LAWS. THE SECURITIES MAY NOT BE OFFERED FOR SALE, SOLD, TRANSFERRED OR ASSIGNED (I) IN THE ABSENCE OF (A) AN EFFECTIVE REGISTRATION STATEMENT FOR THE SECURITIES UNDER THE SECURITIES ACT OR (B) AN AVAILABLE EXEMPTION FROM, OR IN A TRANSACTION NOT SUBJECT TO, THE REGISTRATION REQUIREMENTS OF THE SECURITIES ACT AND IN ACCORDANCE WITH APPLICABLE STATE SECURITIES LAWS OR BLUE SKY LAWS AS EVIDENCED BY A LEGAL OPINION OF COUNSEL REASONABLY SATISFACTORY TO THE COMPANY AND ITS TRANSFER AGENT OR (II) UNLESS SOLD PURSUANT TO RULE 144 UNDER THE SECURITIES ACT.

(c) Removal of Legends. The legend set forth in Section 4.1(b) above shall be removed and the Company shall issue a certificate (or book entry notation, as applicable) without such legend or any other legend to the holder of the applicable Securities upon which it is stamped or issue to such holder by electronic delivery at the applicable balance account at the Depository Trust Company (“DTC”), if (i) such Securities are registered for resale under the Securities Act (provided that, if the Purchaser is selling pursuant to the effective registration statement registering the Securities for resale, the Purchaser agrees to only sell such Securities during such time that such registration statement is effective and not withdrawn or suspended, and only as permitted by such registration statement), (ii) such Securities are sold or transferred pursuant to Rule 144, or (iii) such Securities are eligible for sale under Rule 144, without the requirement for the Company to be in compliance with the current public information required under Rule 144 as to such securities and without volume or manner-of-sale restrictions. Following the earlier of (i) the Effective Date or (ii) Rule 144 becoming available for the resale of Securities, without the requirement for the Company to

be in compliance with the current public information required under Rule 144 as to such securities and without volume or manner-of-sale restrictions, the Company shall cause Company Counsel to issue to the Transfer Agent the legal opinion referred to in the Irrevocable Transfer Agent Instructions (disregarding for purposes of the legal opinion for clause (ii) hereof whether the Purchaser is an “affiliate” for purposes of Rule 144). Any fees (with respect to the Transfer Agent, Company Counsel or otherwise) associated with the issuance of such opinion or the removal of such legend shall be borne by the Company. Following the Effective Date, or at such earlier time as a legend is no longer required for certain Securities, the Company will no later than two (2) Trading Days following the delivery by a Purchaser to the Company (with notice to the Company) of (i) a legended certificate (or book entry notation) representing Shares, Warrant Shares or Underlying Shares (endorsed or with stock powers attached, signatures guaranteed, and otherwise in form necessary to affect the reissuance and/or transfer), (ii) an Exercise Notice in the manner stated in the Warrants to effect the exercise of such Warrant in accordance with its terms or (iii) a Notice of Conversion in the manner stated in the Certificate of Designation to effect the conversion of such Preferred Shares in accordance with their terms, and an opinion of counsel to the extent required by Section 4.1(a) (such second (2nd) Trading Day, the “*Legend Removal Date*”), deliver or cause to be delivered to such Purchaser a certificate or book entry notations representing such Securities that is free from all restrictive and other legends. The Company may not make any notation on its records or give instructions to the Transfer Agent that enlarge the restrictions on transfer set forth in this Section 4.1(c). Certificates (or book entry notations) for Securities subject to legend removal hereunder may be transmitted by the Transfer Agent to the Purchasers by crediting the account of the Purchaser’s prime broker with DTC as directed by such Purchaser.

(d) Irrevocable Transfer Agent Instructions. The Company shall issue irrevocable instructions to its transfer agent, and any subsequent transfer agent, in substantially the form of Exhibit E-1 and E-2 attached hereto (the “*Irrevocable Transfer Agent Instructions*”). The Company represents and warrants that no instruction other than the Irrevocable Transfer Agent Instructions referred to in this Section 4.1(d) (or instructions that are consistent therewith) will be given by the Company to its transfer agent in connection with this Agreement, other than with respect to the issuance of the Underlying Shares upon a valid conversion of the Preferred Stock, and that the Securities shall otherwise be freely transferable on the books and records of the Company as and to the extent provided in this Agreement and the other Transaction Documents and applicable law. The Company acknowledges that a breach by it of its obligations under this Section 4.1(d) will cause irreparable harm to a Purchaser. Accordingly, the Company acknowledges that the remedy at law for a breach of its obligations under this Section 4.1(d) will be inadequate and agrees, in the event of a breach or threatened breach by the Company of the provisions of this Section 4.1(d), that a Purchaser shall be entitled, in addition to all other available remedies, to an order and/or injunction restraining any breach and requiring immediate issuance and transfer, without the necessity of showing economic loss and without any bond or other security being required.

4.2 Reservation of Common Stock. The Company shall take all action necessary to at all times have authorized, and reserved for the purpose of issuance from and after the Closing Date, the number of shares of Common Stock issuable upon exercise of the Warrants issued at the Closing (without taking into account any limitations on exercise of the Warrants set forth in the Warrants). From the date hereof to the date on which the Purchasers have exercised their rights in full under the Certificate of Designation, the Company shall reserve for issuance to the Purchasers a number of shares of Common Stock at least equal to the number of Underlying Shares.

4.3 Furnishing of Information. In order to enable the Purchasers to sell the Securities under Rule 144, for a period of twelve (12) months from the Closing, the Company shall use its commercially reasonable efforts to timely file (or obtain extensions in respect thereof and file within the applicable grace period) all reports required to be filed by the Company after the date hereof pursuant to the Exchange Act. During such twelve (12) month period, if the Company is not required to file reports pursuant to the

Exchange Act, it will prepare and furnish to the Purchasers and make publicly available in accordance with Rule 144(c) such information as is required for the Purchasers to sell the Securities under Rule 144.

4.4 Integration. The Company shall not, and shall use its commercially reasonable efforts to ensure that no Affiliate of the Company shall, sell, offer for sale or solicit offers to buy or otherwise negotiate in respect of any security (as defined in Section 2 of the Securities Act) that will be integrated with the offer or sale of the Securities in a manner that would require the registration under the Securities Act of the sale of the Securities to the Purchasers, or that will be integrated with the offer or sale of the Securities for purposes of the rules and regulations of any Trading Market such that it would require stockholder approval prior to the closing of such other transaction unless stockholder approval is obtained before the closing of such subsequent transaction.

4.5 Securities Laws Disclosure; Publicity. By 9:00 A.M., New York City time, on the Trading Day immediately following the date hereof, the Company shall issue a press release (the “*Press Release*”) reasonably acceptable to the Placement Agent disclosing all material terms of the transactions contemplated hereby. On or before 9:00 A.M., New York City time, on the Trading Day immediately following the execution of this Agreement, the Company will file a Current Report on Form 8-K with the Commission describing, among other things, the terms of the Transaction Documents (and including as exhibits to such Current Report on Form 8-K the material Transaction Documents (including, without limitation, this Agreement, the form of Warrant and the Registration Rights Agreement)) (the “*Pricing 8-K*”). Notwithstanding the foregoing, the Company shall not publicly disclose the name of any Purchaser or an Affiliate of any Purchaser, or include the name of any Purchaser or an Affiliate of any Purchaser in any press release or filing with the Commission (other than the Registration Statement) or any regulatory agency or Trading Market, without the prior written consent of such Purchaser, except (i) as required by federal securities law in connection with (A) any registration statement contemplated by the Registration Rights Agreement and (B) the filing of final Transaction Documents (including signature pages thereto) with the Commission and (ii) to the extent such disclosure is required by law, request of the Staff of the Commission or Trading Market regulations, in which case the Company shall provide the Purchasers with prior written notice of such disclosure permitted under this subclause (ii). Each Purchaser, severally and not jointly with the other Purchasers, covenants that until such time as the transactions contemplated by this Agreement are required to be publicly disclosed by the Company as described in this Section 4.5, such Purchaser will maintain the confidentiality of the existence and terms of this transaction. After the Closing Date, the Company shall furnish to Viking copies of any press release or filing with the Commission or any regulatory agency or Trading Market that names Viking therein (excluding the Press Release and the Pricing 8-K) not less than one (1) Trading Day prior to the filing, furnishing or issuing of such press release or filing for Viking’s review (it being acknowledged and agreed that if Viking does not object to or comment on the aforementioned documents within such one (1) Trading Day, then Viking shall be deemed to have consented to and approved the use of such documents).

4.6 Shareholder Rights Plan. No claim will be made or enforced by the Company or, with the consent of the Company, any other Person, that any Purchaser is an “*Acquiring Person*” under any control share acquisition, business combination, poison pill (including any distribution under a rights agreement) or similar anti-takeover plan or arrangement in effect or hereafter adopted by the Company, or that any Purchaser could be deemed to trigger the provisions of any such plan or arrangement, in either case solely by virtue of receiving Securities under the Transaction Documents or under any other written agreement between the Company and the Purchasers; provided, however, that no such Purchaser owns any equity in the Company prior to its purchase of the Securities hereunder.

4.7 [Reserved].

4.8 Use of Proceeds. The Company shall use the net proceeds from the sale of the Shares and Warrants hereunder for working capital and general corporate purposes and shall not use such proceeds for:

(a) the satisfaction of any portion of the Company's debt (other than payment of trade payables in the ordinary course of the Company's business and prior practices, and any regularly scheduled payments under the Loan and Security Agreement with Silicon Valley Bank and Solar Capital Ltd. (the "Lenders") between the Company and the Lenders, dated as of November 18, 2016, as amended), (b) the redemption of any Common Stock or Common Stock Equivalents (other than in the ordinary course pursuant to contractual repurchase provisions in connection with the termination of service providers) or (c) the settlement of any outstanding litigation.

4.9 Indemnification of Purchasers. Subject to the provisions of this Section 4.9, the Company will indemnify and hold each Purchaser and its directors, officers, shareholders, members, partners, employees and agents (and any other Persons with a functionally equivalent role of a Person holding such titles notwithstanding a lack of such title or any other title), each Person who controls such Purchaser (within the meaning of Section 15 of the Securities Act and Section 20 of the Exchange Act), and the directors, officers, shareholders, agents, members, partners or employees (and any other Persons with a functionally equivalent role of a Person holding such titles notwithstanding a lack of such title or any other title) of such controlling persons (each, a "*Purchaser Party*") harmless from any and all losses, liabilities, obligations, claims, contingencies, damages, costs and expenses, including all judgments, amounts paid in settlements, court costs and reasonable attorneys' fees and costs of investigation that any such Purchaser Party may suffer or incur as a result of or relating to (a) any breach of any of the representations, warranties, covenants or agreements made by the Company in this Agreement or in the other Transaction Documents or (b) any action instituted against a Purchaser in any capacity, or any of them or their respective Affiliates, by any stockholder of the Company who is not an Affiliate of such Purchaser, with respect to any of the transactions contemplated by the Transaction Documents (unless such action is based upon a breach of such Purchaser's representations, warranties or covenants under the Transaction Documents or any agreements or understandings such Purchaser may have with any such stockholder or any violations by the Purchaser of state or federal securities laws or any conduct by such Purchaser which constitutes fraud, gross negligence, willful misconduct or malfeasance). Promptly after receipt by any Person (the "*Indemnified Person*") of notice of any demand, claim or circumstances which would or might give rise to a claim or the commencement of any action, proceeding or investigation in respect of which indemnity may be sought pursuant to this Section 4.9, such Indemnified Person shall promptly notify the Company in writing and the Company shall assume the defense thereof, including the employment of counsel reasonably satisfactory to such Indemnified Person, and shall assume the payment of all reasonable fees and expenses; provided, however, that the failure of any Indemnified Person so to notify the Company shall not relieve the Company of its obligations hereunder except to the extent that the Company is actually and materially prejudiced by such failure to notify. In any such proceeding, any Indemnified Person shall have the right to retain its own counsel, but the reasonable and documented fees and expenses of such counsel shall be at the expense of such Indemnified Person unless: (i) the Company and the Indemnified Person shall have mutually agreed to the retention of such counsel; (ii) the Company shall have failed promptly to assume the defense of such proceeding and to employ counsel reasonably satisfactory to such Indemnified Person in such proceeding; or (iii) in the reasonable judgment of counsel to such Indemnified Person, representation of both parties by the same counsel would be inappropriate due to actual or potential differing interests between them. The Company shall not be liable for any settlement of any proceeding effected without its written consent, which consent shall not be unreasonably withheld, delayed or conditioned. Without the prior written consent of the Indemnified Person, which consent shall not be unreasonably withheld, delayed or conditioned, the Company shall not effect any settlement of any pending or threatened proceeding in respect of which any Indemnified Person is or could have been a party and indemnity could have been sought hereunder by such Indemnified Party, unless such settlement includes an unconditional release of such Indemnified Person from all liability arising out of such proceeding.

4.10 Principal Trading Market Listing. In the time and manner required by the Principal Trading Market, the Company shall prepare and file with such Principal Trading Market an additional shares listing

application covering all of the Common Shares, Warrant Shares and Underlying Shares and shall use its commercially reasonable efforts to take all steps necessary to cause all of the Common Shares, Warrant Shares and Underlying Shares to be approved for listing on the Principal Trading Market as promptly as possible thereafter.

4.11 Form D; Blue Sky. The Company agrees to timely file a Form D with respect to the Securities as required under Regulation D and to provide a copy thereof, promptly upon the written request of any Purchaser. The Company, on or before the Closing Date, shall take such action as the Company shall reasonably determine is necessary in order to obtain an exemption for or to qualify the Securities for sale to the Purchasers under applicable securities or “Blue Sky” laws of the states of the United States (or to obtain an exemption from such qualification) and shall provide evidence of such actions promptly upon the written request of any Purchaser.

4.12 Delivery of Shares and Warrants After Closing. The Company shall deliver, or cause to be delivered, a book entry statement evidencing the Shares purchased by each Purchaser to such Purchaser within three (3) Trading Days of the Closing Date.

4.13 Short Sales and Confidentiality After The Date Hereof. Such Purchaser shall not, and shall cause its Trading Affiliates not to, engage, directly or indirectly, in any transactions in the Company’s securities (including, without limitation, any Short Sales involving the Company’s securities) during the period from the date hereof until the earlier of such time as (i) the transactions contemplated by this Agreement are first publicly announced as required by and described in Section 4.5 or (ii) this Agreement is terminated in full pursuant to Section 6.18. Each Purchaser, severally and not jointly with the other Purchasers, covenants that until such time as the transactions contemplated by this Agreement are publicly disclosed by the Company as described in Section 4.5, such Purchaser will maintain the confidentiality of the existence and terms of this transaction and the information included in the Transaction Documents. Notwithstanding the foregoing, in the event that a Purchaser is a multi-managed investment vehicle whereby separate portfolio managers manage separate portions of such Purchaser’s assets and the portfolio managers have no direct knowledge of the investment decisions made by the portfolio managers managing other portions of such Purchaser’s assets, the representation set forth above shall apply only with respect to the portion of assets managed by the portfolio manager that have knowledge about the financing transaction contemplated by this Agreement.

4.14 Subsequent Equity Sales. From the date hereof until the earlier of (i) ninety (90) days following the Closing Date or (ii) thirty (30) days after the Effective Date, neither the Company nor any Subsidiary shall issue shares of Common Stock or Common Stock Equivalents, other than (i) the 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 the any stock option, stock bonus, employee stock purchase or other stock plan or arrangement or pursuant to any qualifying inducement award under NASDAQ rules, (ii) the issuance of securities in connection with an acquisition, merger or sale or purchase of assets, (iii) the issuance of 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 (iv) the issuance or sale of shares of Common Stock, or securities convertible into or exercisable for Common Stock, issued in connection with a transaction with an unaffiliated third party that includes a bona fide commercial relationship (including joint ventures, credit agreements, marketing or distribution arrangements, collaboration agreements or intellectual property license agreements); *provided, however*, the thirty (30) day period set forth in this Section 4.14 shall be extended for the number of Trading Days during such period in which (i) trading in the Common Stock is suspended by any Trading Market, or (ii) following the Effective Date, the Registration Statement is not effective or the prospectus included in the Registration Statement may not be used by the Purchasers for the resale of the Shares and Warrant Shares.

4.15 Proxy Statement.

(a) In connection with its 2018 annual meeting of stockholders, the Company shall prepare and file with the Commission a definitive proxy statement (the “Proxy Statement”).

(b) The Proxy Statement shall include a proposal to permit the Preferred Stock to become convertible into shares of Common Stock as set forth in, and to the extent permitted by the Certificate of Designation, and the issuance of the Underlying Shares upon such conversion, which issuance of shares, when aggregated with the Common Stock, may exceed 20% of the outstanding Common Stock prior to the date of this Agreement (the “Proposal”). The Proxy Statement shall include the recommendation of the Board to its stockholders that they vote in favor of adoption of the foregoing proposal.

(c) The Company shall give counsel to the Purchasers a reasonable opportunity to review and comment on the Proxy Statement each time before that document (or any amendment or supplement thereto) is filed with the Commission, and reasonable and good faith consideration shall be given to any comments made by counsel. The Company shall (i) promptly provide such counsel with any comments or other communications, whether written or oral, that the Company may receive from the Commission or its staff with respect to the Proxy Statement promptly after receipt of those comments or other communications and (ii) provide such counsel with a reasonable opportunity to participate in the response to those comments and to provide comments on that response (to which reasonable and good faith consideration shall be given), including by participating in any discussions or meetings with the Commission. Thereafter, the Company shall promptly respond to such comments and file any amendments thereto.

(d) If the stockholders do not approve such Proposal at the 2018 annual meeting of stockholders, then in connection with each subsequent annual meeting of stockholders until the Proposal is approved by the Company’s stockholders, the Company shall prepare and file with the Commission a definitive proxy statement which includes the Proposal, and give Purchasers’ counsel opportunity to review and comment on such definitive proxy statement as set forth in subsection (c) above.

ARTICLE V. CONDITIONS PRECEDENT TO CLOSING

5.1 Conditions Precedent to the Obligations of the Purchasers to Purchase Securities. The obligation of each Purchaser to acquire Shares and Warrants at the Closing is subject to the fulfillment to such Purchaser’s satisfaction, on or prior to the Closing Date, of each of the following conditions, any of which may be waived by such Purchaser (as to itself only):

(a) Representations and Warranties. The representations and warranties of the Company contained herein shall be true and correct in all material respects (except for those representations and warranties which are qualified as to materiality, in which case such representations and warranties shall be true and correct in all respects) as of the date when made and as of the Closing Date, as though made on and as of such date, except for such representations and warranties that speak as of a specific date.

(b) Performance. The Company shall have performed, satisfied and complied in all material respects with all covenants, agreements and conditions required by the Transaction Documents to be performed, satisfied or complied with by it at or prior to the Closing.

(c) No Injunction. No statute, rule, regulation, executive order, decree, ruling or injunction shall have been enacted, entered, promulgated or endorsed by any court or governmental authority of competent jurisdiction that prohibits the consummation of any of the transactions contemplated by the Transaction Documents.

(d) Consents. The Company shall have obtained in a timely fashion any and all consents, permits, approvals, registrations and waivers necessary for consummation of the purchase and sale of the Securities (including all Required Approvals), all of which shall be and remain so long as necessary in full force and effect.

(e) Adverse Changes. Since the date of execution of this Agreement, no event or series of events shall have occurred that has had or would reasonably be expected to have a Material Adverse Effect.

(f) Listing. The NASDAQ Global Select Market shall have approved the listing of additional shares application for the Common Shares, Warrant Shares and Underlying Shares.

(g) No Suspensions of Trading in Common Stock. The Common Stock shall not have been suspended, as of the Closing Date, by the Commission or the Principal Trading Market from trading on the Principal Trading Market nor shall suspension by the Commission or the Principal Trading Market have been threatened, as of the Closing Date, either (A) in writing by the Commission or the Principal Trading Market or (B) by falling below the minimum listing maintenance requirements of the Principal Trading Market.

(h) Company Deliverables. The Company shall have delivered the Company Deliverables in accordance with Section 2.2(a).

(i) Compliance Certificate. The Company shall have delivered to each Purchaser a certificate, dated as of the Closing Date and signed by its Chief Executive Officer or its Senior Vice President, Finance, dated as of the Closing Date, certifying to the fulfillment of the conditions specified in Sections 5.1(a) and (b) in substantially the form attached hereto as Exhibit G.

(j) Termination. This Agreement shall not have been terminated as to such Purchaser in accordance with Section 6.18 herein.

(k) Reservation of Shares of Common Stock. As of the Closing Date, the Company shall have reserved out of its authorized and unissued Common Stock, solely for the purpose of effecting the exercise of the Warrants, the number of shares of Common Stock issuable upon exercise of the Warrants (without taking into account any limitations on the exercise of the Warrants set forth in the Warrants). Further, as of the Closing Date, the Company shall have reserved out of its authorized and unissued Common Stock, solely for the purpose of effecting the conversion of the Preferred Stock, a number of shares of Common Stock equal to the number of Underlying Shares issuable upon conversion of the Preferred Stock.

5.2 Conditions Precedent to the Obligations of the Company to sell Securities. The Company's obligation to sell and issue the Shares and Warrants at the Closing to the Purchasers is subject to the fulfillment to the satisfaction of the Company on or prior to the Closing Date of the following conditions, any of which may be waived by the Company:

(a) Representations and Warranties. The representations and warranties made by the Purchasers in Section 3.2 hereof shall be true and correct in all material respects (except for those representations and warranties which are qualified as to materiality, in which case such representations and warranties shall be true and correct in all respects) as of the date when made, and as of the Closing Date as though made on and as of such date, except for representations and warranties that speak as of a specific date.

(b) Performance. Such Purchaser shall have performed, satisfied and complied in all material respects with all covenants, agreements and conditions required by the Transaction Documents to be performed, satisfied or complied with by such Purchaser at or prior to the Closing Date.

(c) No Injunction. No statute, rule, regulation, executive order, decree, ruling or injunction shall have been enacted, entered, promulgated or endorsed by any court or governmental authority of competent jurisdiction that prohibits the consummation of any of the transactions contemplated by the Transaction Documents.

(d) Consents. The Company shall have obtained in a timely fashion any and all consents, permits, approvals, registrations and waivers necessary for consummation of the purchase and sale of the Securities, all of which shall be and remain so long as necessary in full force and effect.

(e) Purchasers Deliverables. Such Purchaser shall have delivered its Purchaser Deliverables in accordance with Section 2.2(b).

(f) Listing. The NASDAQ Global Select Market shall have approved the listing of additional shares application for the Common Shares, Warrant Shares and Underlying Shares.

(g) Termination. This Agreement shall not have been terminated as to such Purchaser in accordance with Section 6.18 herein.

ARTICLE VI. MISCELLANEOUS

6.1 Fees and Expenses. The Company and the Purchasers shall each pay the fees and expenses of their respective advisers, counsel, accountants and other experts, if any, and all other expenses incurred by such party in connection with the negotiation, preparation, execution, delivery and performance of this Agreement. The Company shall pay all Transfer Agent fees, stamp taxes and other taxes and duties levied in connection with the sale and issuance of the Securities to the Purchasers.

6.2 Entire Agreement. With the exception of any written confidentiality agreement by and between the Company and any Purchaser, the Transaction Documents, together with the exhibits and schedules thereto, contain the entire understanding of the parties with respect to the subject matter hereof and supersede all prior agreements, understandings, discussions and representations, oral or written, with respect to such matters, which the parties acknowledge have been merged into such documents, exhibits and schedules. At or after the Closing, and without further consideration, the Company and the Purchasers will execute and deliver to the other such further documents as may be reasonably requested in order to give practical effect to the intention of the parties under the Transaction Documents.

6.3 Notices. Any and all notices or other communications or deliveries required or permitted to be provided hereunder shall be in writing and shall be deemed given and effective on the earliest of (a) the date of transmission, if such notice or communication is delivered via electronic mail or facsimile (provided the sender receives a machine-generated confirmation of successful transmission) at the e-mail address or facsimile number specified in this Section 6.3 prior to 5:00 P.M., New York City time, on a Trading Day, (b) the next Trading Day after the date of transmission, if such notice or communication is delivered via electronic mail or facsimile at the e-mail address or facsimile number specified in this Section 6.3 on a day that is not a Trading Day or later than 5:00 P.M., New York City time, on any Trading Day, (c) the Trading Day following the date of mailing, if sent by U.S. nationally recognized overnight courier service with next day delivery specified, or (d) upon actual receipt by the party to whom such notice is required to be given. The address for such notices and communications shall be as follows:

If to the Company:	aTyr Pharma, Inc. 3545 John Hopkins Court, Suite #250 San Diego, CA Telephone No.: [redacted]
--------------------	--

Facsimile No.: [redacted]
Attention: Nancy Krueger
[E-mail]

With a copy to:

Goodwin Procter LLP
Three Embarcadero Center, 28th Floor
San Francisco, CA 94111
Telephone No.: [redacted]
Facsimile No.: [redacted]
Attention: Mitzi Chang
[E-mail]

If to a Purchaser:

To the address set forth under such Purchaser's name on the signature page hereof;

or such other address as may be designated in writing hereafter, in the same manner, by such Person.

6.4 Amendments; Waivers; No Additional Consideration. No provision of this Agreement may be waived, modified, supplemented or amended except in a written instrument signed, in the case of an amendment, by the Company and the Purchasers of at least a majority in interest of the Securities still held by Purchasers or, in the case of a waiver, by the party against whom enforcement of any such waiver is sought. No waiver of any default with respect to any provision, condition or requirement of this Agreement shall be deemed to be a continuing waiver in the future or a waiver of any subsequent default or a waiver of any other provision, condition or requirement hereof, nor shall any delay or omission of either party to exercise any right hereunder in any manner impair the exercise of any such right. No consideration shall be offered or paid to any Purchaser to amend or consent to a waiver or modification of any provision of any Transaction Document unless the same consideration is also offered to all Purchasers who then hold Securities.

6.5 Construction. The headings herein are for convenience only, do not constitute a part of this Agreement and shall not be deemed to limit or affect any of the provisions hereof. The language used in this Agreement will be deemed to be the language chosen by the parties to express their mutual intent, and no rules of strict construction will be applied against any party. This Agreement shall be construed as if drafted jointly by the parties, and no presumption or burden of proof shall arise favoring or disfavoring any party by virtue of the authorship of any provisions of this Agreement or any of the Transaction Documents.

6.6 Successors and Assigns. The provisions of this Agreement shall inure to the benefit of and be binding upon the parties and their successors and permitted assigns. This Agreement, or any rights or obligations hereunder, may not be assigned by the Company without the prior written consent of each Purchaser. Any Purchaser may assign its rights hereunder in whole or in part to any Person to whom such Purchaser assigns or transfers any Securities in compliance with the Transaction Documents and applicable law, provided such transferee shall agree in writing to be bound, with respect to the transferred Securities, by the terms and conditions of this Agreement that apply to the "Purchasers".

6.7 No Third-Party Beneficiaries. This Agreement is intended for the benefit of the parties hereto and their respective successors and permitted assigns and is not for the benefit of, nor may any provision hereof be enforced by, any other Person, except (i) the Placement Agent is an intended third party beneficiary of Article III hereof and (ii) each Purchaser Party is an intended third party beneficiary of Section 4.9.

6.8 Governing Law. All questions concerning the construction, validity, enforcement and interpretation of this Agreement shall be governed by and construed and enforced in accordance with the

internal laws of the State of New York, without regard to the principles of conflicts of law thereof. Each party agrees that all Proceedings concerning the interpretations, enforcement and defense of the transactions contemplated by this Agreement and any other Transaction Documents (whether brought against a party hereto or its respective Affiliates, employees or agents) shall be commenced exclusively in the New York Courts. Each party hereto hereby irrevocably submits to the exclusive jurisdiction of the New York Courts for the adjudication of any dispute hereunder or in connection herewith or with any transaction contemplated hereby or discussed herein (including with respect to the enforcement of any of the Transaction Documents), and hereby irrevocably waives, and agrees not to assert in any Proceeding, any claim that it is not personally subject to the jurisdiction of any such New York Court, or that such Proceeding has been commenced in an improper or inconvenient forum. Each party hereto hereby irrevocably waives personal service of process and consents to process being served in any such Proceeding by mailing a copy thereof via registered or certified mail or overnight delivery (with evidence of delivery) 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. **EACH PARTY HERETO HEREBY IRREVOCABLY WAIVES, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, ANY AND ALL RIGHT TO TRIAL BY JURY IN ANY LEGAL PROCEEDING ARISING OUT OF OR RELATING TO THIS AGREEMENT OR THE TRANSACTIONS CONTEMPLATED HEREBY.**

6.9 Survival. Subject to applicable statute of limitations, the representations, warranties, agreements and covenants contained herein shall survive the Closing and the delivery of the Securities.

6.10 Execution. This Agreement may be executed in two or more counterparts, all of which when taken together shall be considered one and the same agreement and shall become effective when counterparts have been signed by each party and delivered to the other party, it being understood that both parties need not sign the same counterpart. In the event that any signature is delivered by facsimile transmission, or by e-mail delivery of a “.pdf” format data file, such signature shall create a valid and binding obligation of the party executing (or on whose behalf such signature is executed) with the same force and effect as if such facsimile signature page were an original thereof.

6.11 Severability. If any provision of this Agreement is held to be invalid or unenforceable in any respect, the validity and enforceability of the remaining terms and provisions of this Agreement shall not in any way be affected or impaired thereby and the parties will attempt to agree upon a valid and enforceable provision that is a reasonable substitute therefor, and upon so agreeing, shall incorporate such substitute provision in this Agreement.

6.12 Rescission and Withdrawal Right. Notwithstanding anything to the contrary contained in (and without limiting any similar provisions of) the Transaction Documents, whenever any Purchaser exercises a right, election, demand or option under a Transaction Document and the Company does not timely perform its related obligations within the periods therein provided, then such Purchaser may rescind or withdraw, in its sole discretion from time to time upon written notice to the Company, any relevant notice, demand or election in whole or in part without prejudice to its future actions and rights.

6.13 Replacement of Securities. If any certificate or instrument evidencing any Securities is mutilated, lost, stolen or destroyed, the Company shall issue or cause to be issued in exchange and substitution for and upon cancellation thereof, or in lieu of and substitution therefor, a new certificate or instrument, but only upon receipt of evidence reasonably satisfactory to the Company and the Transfer Agent of such loss, theft or destruction and the execution by the holder thereof of a customary lost certificate affidavit of that fact and an agreement to indemnify and hold harmless the Company and the Transfer Agent for any losses in connection therewith or, if required by the Transfer Agent, a bond in such form and amount as is required by the Transfer Agent. The applicants for a new certificate or instrument under such circumstances shall also pay any reasonable third-party costs associated with the issuance of such

replacement Securities. If a replacement certificate or instrument evidencing any Securities is requested due to a mutilation thereof, the Company may require delivery of such mutilated certificate or instrument as a condition precedent to any issuance of a replacement.

6.14 Remedies. In addition to being entitled to exercise all rights provided herein or granted by law, including recovery of damages, each of the Purchasers and the Company will be entitled to specific performance under the Transaction Documents. The parties agree that monetary damages may not be adequate compensation for any loss incurred by reason of any breach of obligations described in the foregoing sentence and hereby agree to waive in any action for specific performance of any such obligation (other than in connection with any action for a temporary restraining order) the defense that a remedy at law would be adequate.

6.15 Payment Set Aside. To the extent that the Company makes a payment or payments to any Purchaser pursuant to any Transaction Document or a Purchaser enforces or exercises its rights thereunder, and such payment or payments or the proceeds of such enforcement or exercise or any part thereof are subsequently invalidated, declared to be fraudulent or preferential, set aside, recovered from, disgorged by or are required to be refunded, repaid or otherwise restored to the Company, a trustee, receiver or any other person under any law (including, without limitation, any bankruptcy law, state or federal law, common law or equitable cause of action), then to the extent of any such restoration the obligation or part thereof originally intended to be satisfied shall be revived and continued in full force and effect as if such payment had not been made or such enforcement or setoff had not occurred.

6.16 Adjustments in Share Numbers and Prices. In the event of any stock split, subdivision, dividend or distribution payable in shares of Common Stock (or other securities or rights convertible into, or entitling the holder thereof to receive directly or indirectly shares of Common Stock), combination or other similar recapitalization or event occurring after the date hereof and prior to the Closing, each reference in any Transaction Document to a number of shares or a price per share shall be deemed to be amended to appropriately account for such event.

6.17 Independent Nature of Purchasers' Obligations and Rights. The obligations of each Purchaser under any Transaction Document are several and not joint with the obligations of any other Purchaser, and no Purchaser shall be responsible in any way for the performance of the obligations of any other Purchaser under any Transaction Document. The decision of each Purchaser to purchase Securities pursuant to the Transaction Documents has been made by such Purchaser independently of any other Purchaser and independently of any information, materials, statements or opinions as to the business, affairs, operations, assets, properties, liabilities, results of operations, condition (financial or otherwise) or prospects of the Company or any Subsidiary which may have been made or given by any other Purchaser or by any agent or employee of any other Purchaser, and no Purchaser and any of its agents or employees shall have any liability to any other Purchaser (or any other Person) relating to or arising from any such information, materials, statement or opinions. Nothing contained herein or in any Transaction Document, and no action taken by any Purchaser pursuant thereto, shall be deemed to constitute the Purchasers as a partnership, an association, a joint venture or any other kind of entity, or create a presumption that the Purchasers are in any way acting in concert or as a group with respect to such obligations or the transactions contemplated by the Transaction Documents. Each Purchaser acknowledges that no other Purchaser has acted as agent for such Purchaser in connection with making its investment hereunder and that no Purchaser will be acting as agent of such Purchaser in connection with monitoring its investment in the Securities or enforcing its rights under the Transaction Documents. Each Purchaser shall be entitled to independently protect and enforce its rights, including without limitation the rights arising out of this Agreement or out of the other Transaction Documents, and it shall not be necessary for any other Purchaser to be joined as an additional party in any proceeding for such purpose. Each Purchaser has been represented by its own separate legal counsel in its review and negotiation of the Transaction Documents. For reasons of administrative convenience only, Purchasers and their respective counsels have chosen to communicate with the Company through Dechert

LLP, counsel to the Placement Agent. Each Purchaser acknowledges that Dechert LLP has rendered legal advice to the Placement Agent and not to such Purchaser in connection with the transactions contemplated hereby, and that each such Purchaser has relied for such matters on the advice of its own respective counsel. The Company has elected to provide all Purchasers with the same terms and Transaction Documents for the convenience of the Company and not because it was required or requested to do so by any Purchaser.

6.18 Termination. This Agreement may be terminated and the sale and purchase of the Shares and the Warrants abandoned at any time prior to the Closing by either the Company or any Purchaser (with respect to itself only) upon written notice to the other, if the Closing has not been consummated on or prior to 5:00 P.M., New York City time, on the Outside Date; *provided, however*, that the right to terminate this Agreement under this Section 6.18 shall not be available to any Person whose failure to comply with its obligations under this Agreement has been the cause of or resulted in the failure of the Closing to occur on or before such time. Nothing in this Section 6.18 shall be deemed to release any party from any liability for any breach by such party of the terms and provisions of this Agreement or the other Transaction Documents or to impair the right of any party to compel specific performance by any other party of its obligations under this Agreement or the other Transaction Documents. In the event of a termination pursuant to this Section 6.18, the Company shall promptly notify all non-terminating Purchasers. Upon a termination in accordance with this Section 6.18, the Company and the terminating Purchaser(s) shall not have any further obligation or liability (including arising from such termination) to the other, and no Purchaser will have any liability to any other Purchaser under the Transaction Documents as a result therefrom.

6.19 Waiver of Conflicts. Each Purchaser acknowledges that Goodwin Procter LLP, outside general counsel to the Company, has in the past performed and is or may now or in the future represent one or more Purchasers or their affiliates in matters unrelated to the transactions contemplated by this Agreement, including representation of such Purchasers or their affiliates in matters of a similar nature to the transactions contemplated by this Agreement. The applicable rules of professional conduct require that Goodwin Procter LLP inform the Purchasers hereunder of this representation and obtain their consent. Goodwin Procter LLP has served as outside general counsel to the Company and has negotiated the terms of this Agreement solely on behalf of the Company. Each Purchaser hereby (a) acknowledges that they have had an opportunity to ask for and have obtained information relevant to such representation; (b) acknowledges that with respect to the transactions contemplated by this Agreement, Goodwin Procter has represented solely the Company, and not any Purchaser or any stockholder, director or employee of the Company or any Purchaser; and (c) gives its informed consent to Goodwin Procter LLP's representation of the Company in the transactions contemplated by this Agreement.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, the parties hereto have caused this Securities Purchase Agreement to be duly executed by their respective authorized signatories as of the date first indicated above.

ATYR PHARMA, INC.

By: /s/ John Blake
Name: John Blake
Title: Senior Vice President, Finance

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

PURCHASER:

Viking Global Opportunities Illiquid Investments Sub-Master LP

By: Viking Global Opportunities Portfolio GP LLC, its general partner

By: /s/ Matthew Bloom
Name: Matthew Bloom
Title: Authorized Signatory

(1) Purchase of Common Shares and related Warrants:

(a) Common Stock Subscription Amount:	\$4,711,127.60
(b) Common Unit Purchase Price:	\$2.65
(c) Number of Common Shares to be Acquired (Quotient of (1)(a) and (1)(b) rounded down to the nearest whole Common Share)	1,777,784
(d) Underlying Shares Subject to Warrant Relating to Common Shares (37.5% of the number of Common Shares to be acquired):	666,669

(2) Purchase of Preferred Shares and related Warrants:

(a) Preferred Stock Subscription Amount:	\$30,288,864.00
(b) Preferred Unit Purchase Price:	\$13.25
(c) Number of Preferred Shares to be Acquired (Quotient of (2)(a) and (2)(b) rounded down to the nearest whole Common Share):	2,285,952
(d) Underlying Shares Subject to Warrant Relating to Preferred Shares 187.5% of the number of Preferred Shares to be acquired):	4,286,160

(3) TOTAL SUBSCRIPTION AMOUNT (Sum of (1)(a) and (2)(b)): \$34,999,991.60

Tax ID No.: [redacted]

Address for Notice:
55 Railroad Avenue
Greenwich, CT 06830

Telephone No.: [redacted]
Facsimile No.: [redacted]
E-mail Address: [redacted]
Attention: General Counsel

Delivery Instructions (if different than left)

c/o: The Depository Trust Company
Street: 570 Washington Blvd – 5th Floor

City/State/Zip: Jersey City, NJ 07310

Attention: BNY Mellon/Branch Deposit Department

PURCHASER:

EcoR1 Capital Fund, LP

By: /s/ Oleg Nodelman
Name: Oleg Nodelman
Title: Founder, EcoR1 Capital LLC, as GP

(4) Purchase of Common Shares and related Warrants:

- (e) Common Stock Subscription Amount: \$4,999,998.80
- (f) Common Unit Purchase Price: \$2.65
- (g) Number of Common Shares to be Acquired (Quotient of (1)(a) and (1)(b) rounded down to the nearest whole Common Share) 1,886,792
- (h) Underlying Shares Subject to Warrant Relating to Common Shares (37.5% of the number of Common Shares to be acquired): 707,547

(5) Purchase of Preferred Shares and related Warrants:

- (e) Preferred Stock Subscription Amount: \$ _____
- (f) Preferred Unit Purchase Price: \$ _____
- (g) Number of Preferred Shares to be Acquired (Quotient of (2)(a) and (2)(b) rounded down to the nearest whole Common Share): _____
- (h) Underlying Shares Subject to Warrant Relating to Preferred Shares (____ % of the number of Preferred Shares to be acquired): _____

(6) TOTAL SUBSCRIPTION AMOUNT (Sum of (1)(a) and (2)(b)): \$4,999,998.80

Tax ID No.: [redacted]

Address for Notice:
EcoR1 Capital LLC
409 Illinois Street
San Francisco, CA 94158

Telephone No.: [redacted]

E-mail Address: [redacted]

Attention: Sarah Marriott

Delivery Instructions (if different than left)

c/o: _____

Street: _____

City/State/Zip: _____

Attention: _____

Telephone No.: _____

PURCHASER:

P REDMILE, LTD.

By: /s/ Jeremy Green
Name: Jeremy Green
Title: As Managing Member of Redmile Group, LLC – Investment
Adviser to P Redmile, Ltd.

(7) Purchase of Common Shares and related Warrants:

(i) Common Stock Subscription Amount: \$314,926.00
(j) Common Unit Purchase Price: \$2.65
(k) Number of Common Shares to be Acquired (Quotient of (1)(a) and (1)(b) rounded down to the nearest whole
Common Share) 118,840
(l) Underlying Shares Subject to Warrant Relating to Common Shares (37.5% of the number of Common Shares to be
acquired): 44,565

(8) Purchase of Preferred Shares and related Warrants:

(i) Preferred Stock Subscription Amount: \$ _____
(j) Preferred Unit Purchase Price: \$ _____
(k) Number of Preferred Shares to be Acquired (Quotient of (2)(a) and (2)(b) rounded down to the nearest whole
Common Share): _____
(l) Underlying Shares Subject to Warrant Relating to Preferred Shares (____% of the number of Preferred Shares to be
acquired): _____

(9) TOTAL SUBSCRIPTION AMOUNT (Sum of (1)(a) and (2)(b)): \$314,926

Tax ID No.: N/A

Address for Notice:
One Letterman Drive
Building D Suite D3-300
San Francisco, CA 94129

Telephone No.: [redacted]

E-mail Address: [redacted]

Attention: Josh Garcia

Delivery Instructions (if different than left)

c/o: _____

Street: _____

City/State/Zip: _____

Attention: _____

Telephone No.: _____

PURCHASER:

REDMILE CAPITAL OFFSHORE FUND (ERISA), LTD.

By: /s/ Jeremy Green
Name: Jeremy Green
Title: Managing Member of the Investment Manager

(10) Purchase of Common Shares and related Warrants:

(m) Common Stock Subscription Amount:	\$215,180.00
(n) Common Unit Purchase Price:	\$2.65
(o) Number of Common Shares to be Acquired (Quotient of (1)(a) and (1)(b) rounded down to the nearest whole Common Share)	81,200
(p) Underlying Shares Subject to Warrant Relating to Common Shares (37.5% of the number of Common Shares to be acquired):	30,450

(11) Purchase of Preferred Shares and related Warrants:

(m) Preferred Stock Subscription Amount:	\$ _____
(n) Preferred Unit Purchase Price:	\$ _____
(o) Number of Preferred Shares to be Acquired (Quotient of (2)(a) and (2)(b) rounded down to the nearest whole Common Share):	_____
(p) Underlying Shares Subject to Warrant Relating to Preferred Shares (____% of the number of Preferred Shares to be acquired):	_____

(12) TOTAL SUBSCRIPTION AMOUNT (Sum of (1)(a) and (2)(b)): \$215,180.00

Tax ID No.: N/A

Address for Notice:
One Letterman Drive
Building D Suite D3-300
San Francisco, CA 94129

Telephone No.: [redacted]

E-mail Address: [redacted]

Attention: Josh Garcia

Delivery Instructions (if different than left)

c/o: _____

Street: _____

City/State/Zip: _____

Attention: _____

Telephone No.: _____

PURCHASER:

REDMILE CAPITAL OFFSHORE FUND, LTD.

By: /s/ Jeremy Green
Name: Jeremy Green
Title: Managing Member of the Investment Manager

(13) Purchase of Common Shares and related Warrants:

(q) Common Stock Subscription Amount: \$2,515,168.00
(r) Common Unit Purchase Price: \$2.65
(s) Number of Common Shares to be Acquired (Quotient of (1)(a) and (1)(b) rounded down to the nearest whole Common Share) 949,120
(t) Underlying Shares Subject to Warrant Relating to Common Shares (37.5% of the number of Common Shares to be acquired): 355,920

(14) Purchase of Preferred Shares and related Warrants:

(q) Preferred Stock Subscription Amount: \$ _____
(r) Preferred Unit Purchase Price: \$ _____
(s) Number of Preferred Shares to be Acquired (Quotient of (2)(a) and (2)(b) rounded down to the nearest whole Common Share): _____
(t) Underlying Shares Subject to Warrant Relating to Preferred Shares (____% of the number of Preferred Shares to be acquired): _____

(15) TOTAL SUBSCRIPTION AMOUNT (Sum of (1)(a) and (2)(b)): \$2,515,168.00

Tax ID No.: N/A

Address for Notice:
One Letterman Drive
Building D Suite D3-300
San Francisco, CA 94129

Telephone No.: [redacted]

E-mail Address: [redacted]

Attention: Josh Garcia

Delivery Instructions (if different than left)

c/o: _____

Street: _____

City/State/Zip: _____

Attention: _____

Telephone No.: _____

PURCHASER:

REDMILE CAPITAL FUND, LP

By: /s/ Jeremy Green
Name: Jeremy Green
Title: Managing Member of the General Partner and the Investment Manager

(16) Purchase of Common Shares and related Warrants:

(u) Common Stock Subscription Amount: \$1,440,434.00
(v) Common Unit Purchase Price: \$2.65
(w) Number of Common Shares to be Acquired (Quotient of (1)(a) and (1)(b) rounded down to the nearest whole Common Share) 543,560
(x) Underlying Shares Subject to Warrant Relating to Common Shares (37.5% of the number of Common Shares to be acquired): 203,835

(17) Purchase of Preferred Shares and related Warrants:

(u) Preferred Stock Subscription Amount: \$ _____
(v) Preferred Unit Purchase Price: \$ _____
(w) Number of Preferred Shares to be Acquired (Quotient of (2)(a) and (2)(b) rounded down to the nearest whole Common Share): _____
(x) Underlying Shares Subject to Warrant Relating to Preferred Shares (____ % of the number of Preferred Shares to be acquired): _____

(18) TOTAL SUBSCRIPTION AMOUNT (Sum of (1)(a) and (2)(b)): \$1,440,434.00

Tax ID No.: N/A

Address for Notice:
One Letterman Drive
Building D Suite D3-300
San Francisco, CA 94129

Telephone No.: [redacted]

E-mail Address: [redacted]

Attention: Josh Garcia

Delivery Instructions (if different than left)

c/o: _____

Street: _____

City/State/Zip: _____

Attention: _____

Telephone No.: _____

PURCHASER:

REDMILE CAPITAL OFFSHORE FUND II, LTD.

By: /s/ Jeremy Green
Name: Jeremy Green
Title: Managing Member of the Investment Manager

(19) Purchase of Common Shares and related Warrants:

(y) Common Stock Subscription Amount: \$514,290.80
(z) Common Unit Purchase Price: \$2.65
(aa) Number of Common Shares to be Acquired (Quotient of (1)(a) and (1)(b) rounded down to the nearest whole Common Share) 194,072
(bb) Underlying Shares Subject to Warrant Relating to Common Shares (37.5% of the number of Common Shares to be acquired): 72,777

(20) Purchase of Preferred Shares and related Warrants:

(y) Preferred Stock Subscription Amount: \$ _____
(z) Preferred Unit Purchase Price: \$ _____
(aa) Number of Preferred Shares to be Acquired (Quotient of (2)(a) and (2)(b) rounded down to the nearest whole Common Share): _____
(bb) Underlying Shares Subject to Warrant Relating to Preferred Shares (____% of the number of Preferred Shares to be acquired): _____

(21) TOTAL SUBSCRIPTION AMOUNT (Sum of (1)(a) and (2)(b)): \$514,290.80

Tax ID No.: N/A

Address for Notice:
One Letterman Drive
Building D Suite D3-300
San Francisco, CA 94129

Telephone No.: [redacted]

E-mail Address: [redacted]

Attention: Josh Garcia

Delivery Instructions (if different than left)

c/o: _____

Street: _____

City/State/Zip: _____

Attention: _____

Telephone No.: _____

PURCHASER:

Hudson Bay Master Fund Ltd.

By: /s/ Yoav Roth
Name: Yoav Roth
Title: Authorized Signatory

(22) Purchase of Common Shares and related Warrants:

(cc) Common Stock Subscription Amount:	\$500,002.00
(dd) Common Unit Purchase Price:	\$2.65
(ee) Number of Common Shares to be Acquired (Quotient of (1)(a) and (1)(b) rounded down to the nearest whole Common Share)	188,680
(ff) Underlying Shares Subject to Warrant Relating to Common Shares (37.5% of the number of Common Shares to be acquired):	70,755

(23) Purchase of Preferred Shares and related Warrants:

(cc) Preferred Stock Subscription Amount:	\$ _____
(dd) Preferred Unit Purchase Price:	\$ _____
(ee) Number of Preferred Shares to be Acquired (Quotient of (2)(a) and (2)(b) rounded down to the nearest whole Common Share):	_____
(ff) Underlying Shares Subject to Warrant Relating to Preferred Shares (____% of the number of Preferred Shares to be acquired):	_____

(24) TOTAL SUBSCRIPTION AMOUNT (Sum of (1)(a) and (2)(b)): \$500,002.00

Tax ID No.: [redacted]

Address for Notice:
777 3rd Avenue, 30th Floor
New York, NY 10017

Telephone No.: [redacted]

Facsimile No.: [redacted]

E-mail Address: [redacted]

Attention: Yoav Roth

Delivery Instructions (if different than left)

c/o: UBS Securities LLC
Street: 1000 Harbor Blvd, 5th Floor
City/State/Zip: Weehawken, NJ 07086

Attention: Cristy Muller

Telephone No.: [redacted]

PURCHASER:

PAUL SCHIMMEL PROFIT SHARING PLAN

By: /s/ Paul Schimmel

Name: Paul Schimmel

(25) Purchase of Common Shares and related Warrants:

(gg) Common Stock Subscription Amount:	\$249,990.40
(hh) Common Unit Purchase Price:	\$2.65
(ii) Number of Common Shares to be Acquired (Quotient of (1)(a) and (1)(b) rounded down to the nearest whole Common Share)	94,336
(jj) Underlying Shares Subject to Warrant Relating to Common Shares (37.5% of the number of Common Shares to be acquired):	35,376

(26) Purchase of Preferred Shares and related Warrants:

(gg) Preferred Stock Subscription Amount:	\$ _____
(hh) Preferred Unit Purchase Price:	\$ _____
(ii) Number of Preferred Shares to be Acquired (Quotient of (2)(a) and (2)(b) rounded down to the nearest whole Common Share):	_____
(jj) Underlying Shares Subject to Warrant Relating to Preferred Shares (____% of the number of Preferred Shares to be acquired):	_____

(27) TOTAL SUBSCRIPTION AMOUNT (Sum of (1)(a) and (2)(b)): \$249,990.40

Tax ID No.: [redacted]

Address for Notice:
[redacted]

Telephone No.: [redacted]

Facsimile No.: [redacted]

E-mail Address: [redacted]

Attention: [redacted]

Delivery Instructions (if different than left)

c/o: _____

Street: _____

City/State/Zip: _____

Attention: _____

Telephone No.: _____

PURCHASER:

By: /s/ John Mendlein

Name: John Mendlein

(28) Purchase of Common Shares and related Warrants:

(kk) Common Stock Subscription Amount: \$100,000.40

(ll) Common Unit Purchase Price: \$2.65

(mm) Number of Common Shares to be Acquired (Quotient of (1)(a) and (1)(b) rounded down to the nearest whole Common Share) 37,736

(nn) Underlying Shares Subject to Warrant Relating to Common Shares (37.5% of the number of Common Shares to be acquired): 14,151

(29) Purchase of Preferred Shares and related Warrants:

(kk) Preferred Stock Subscription Amount: \$ _____

(ll) Preferred Unit Purchase Price: \$ _____

(mm) Number of Preferred Shares to be Acquired (Quotient of (2)(a) and (2)(b) rounded down to the nearest whole Common Share): _____

(nn) Underlying Shares Subject to Warrant Relating to Preferred Shares (____% of the number of Preferred Shares to be acquired): _____

(30) TOTAL SUBSCRIPTION AMOUNT (Sum of (1)(a) and (2)(b)): \$100,000.40

Tax ID No.: [redacted]

Address for Notice: [redacted]

Telephone No.: [redacted]

Facsimile No.: [redacted]

E-mail Address: [redacted]

Attention: [redacted]

Delivery Instructions (if different than left)

c/o: _____

Street: _____

City/State/Zip: _____

Attention: _____

Telephone No.: _____

EXHIBITS:

- A: Form of Warrant
- B: Form of Registration Rights Agreement
- C-1: Accredited Investor Questionnaire
- C-2: Book Entry Questionnaire
- D: Form of Opinion of Company Counsel
- E: Form of Irrevocable Transfer Agent Instructions
- F: Form of Secretary's Certificate
- G: Form of Officer's Certificate
- H: Wire Instructions
- I: Form of Lock-Up Agreement
- J: List of Directors and Executive Officers Executing Lock-Up Agreements
- K: Form of Certificate of Designation

EXHIBIT A
FORM OF WARRANT

A-1

EXHIBIT B

FORM OF REGISTRATION RIGHTS AGREEMENT

B-1

ACCREDITED INVESTOR QUESTIONNAIRE

(ALL INFORMATION WILL BE TREATED CONFIDENTIALLY)

To: aTyr Pharma, Inc.

This Investor Questionnaire ("Questionnaire") must be completed by each potential investor in connection with the offer and sale of the shares of the common stock, par value \$0.001 per share and the shares of common stock that may be issued upon exercise of certain warrants or upon conversion of the Class X preferred stock (collectively, the "Securities"), of aTyr Pharma, Inc., a Delaware corporation (the "Corporation"). The Securities are being offered and sold by the Corporation without registration under the Securities Act of 1933, as amended (the "Act"), and the securities laws of certain states, in reliance on the exemptions contained in Section 4(a)(2) of the Act and on Regulation D promulgated thereunder and in reliance on similar exemptions under applicable state laws. The Corporation must determine that a potential investor meets certain suitability requirements before offering or selling Securities to such investor. The purpose of this Questionnaire is to assure the Corporation that each investor will meet the applicable suitability requirements. The information supplied by you will be used in determining whether you meet such criteria, and reliance upon the private offering exemptions from registration is based in part on the information herein supplied.

This Questionnaire does not constitute an offer to sell or a solicitation of an offer to buy any security. By signing this Questionnaire, you will be authorizing the Corporation to provide a completed copy of this Questionnaire to such parties as the Corporation deems appropriate in order to ensure that the offer and sale of the Securities will not result in a violation of the Act or the securities laws of any state and that you otherwise satisfy the suitability standards applicable to purchasers of the Securities. All potential investors must answer all applicable questions and complete, date and sign this Questionnaire. Please print or type your responses and attach additional sheets of paper if necessary to complete your answers to any item.

PART A. BACKGROUND INFORMATION

Name of Beneficial Owner of the Securities: _____

Business Address: _____
(Number and Street)

(City) (State) (Zip Code)

Telephone Number: (____)

If a corporation, partnership, limited liability company, trust or other entity:

Type of entity:

State of formation: _____ Approximate Date of formation: _____

Were you formed for the purpose of investing in the securities being offered?

Yes ___ No ___

If an individual:

Residence Address: _____
(Number and Street)

(City) (State) (Zip Code)

Telephone Number: (____) _____

Age: _____ Citizenship: _____ Where registered to vote: _____

Set forth in the space provided below the state(s), if any, in the United States in which you maintained your residence during the past two years and the dates during which you resided in each state:

Are you a director or executive officer of the Corporation?

Yes ___ No ___

Social Security or Taxpayer Identification No. _____

PART B. ACCREDITED INVESTOR QUESTIONNAIRE

In order for the Company to offer and sell the Securities in conformance with state and federal securities laws, the following information must be obtained regarding your investor status. Please initial each category applicable to you as a Purchaser of Securities of the Company.

- ___ (1) A bank as defined in Section 3(a)(2) of the Securities Act, or any savings and loan association or other institution as defined in Section 3(a)(5)(A) of the Securities Act whether acting in its individual or fiduciary capacity;
- ___ (2) A broker or dealer registered pursuant to Section 15 of the Securities Exchange Act of 1934;
- ___ (3) An insurance company as defined in Section 2(13) of the Securities Act;
- ___ (4) An investment company registered under the Investment Company Act of 1940 or a business development company as defined in Section 2(a)(48) of that Act;
- ___ (5) A Small Business Investment Company licensed by the U.S. Small Business Administration under Section 301(c) or (d) of the Small Business Investment Act of 1958;
- ___ (6) A plan established and maintained by a state, its political subdivisions, or any agency or instrumentality of a state or its political subdivisions, for the benefit of its employees, if such plan has total assets in excess of \$5,000,000;
- ___ (7) An employee benefit plan within the meaning of the Employee Retirement Income Security Act of 1974, if the investment decision is made by a plan fiduciary, as defined in Section 3(21) of such act, which is either a bank, savings and loan

association, insurance company, or registered investment adviser, or if the employee benefit plan has total assets in excess of \$5,000,000 or, if a self-directed plan, with investment decisions made solely by persons that are accredited investors;

- ___ (8) A private business development company as defined in Section 202(a)(22) of the Investment Advisers Act of 1940;
- ___ (9) An organization described in Section 501(c)(3) of the Internal Revenue Code, a corporation, Massachusetts or similar business trust, or partnership, not formed for the specific purpose of acquiring the Securities, with total assets in excess of \$5,000,000;
- ___ (10) A trust, with total assets in excess of \$5,000,000, not formed for the specific purpose of acquiring the Securities, whose purchase is directed by a sophisticated person who has such knowledge and experience in financial and business matters that such person is capable of evaluating the merits and risks of investing in the Company;
- ___ (11) A natural person whose individual net worth, or joint net worth with that person's spouse, at the time of his purchase exceeds \$1,000,000;
- ___ (12) A natural person who had an individual income in excess of \$200,000 in each of the two most recent years, or joint income with that person's spouse in excess of \$300,000, in each of those years, and has a reasonable expectation of reaching the same income level in the current year;
- ___ (13) An executive officer or director of the Company;
- ___ (14) An entity in which all of the equity owners qualify under any of the above subparagraphs. If the undersigned belongs to this investor category only, list the equity owners of the undersigned, and the investor category which each such equity owner satisfies.

A. FOR EXECUTION BY AN INDIVIDUAL:

_____ By _____
Date Print Name: _____

B. FOR EXECUTION BY AN ENTITY:

Entity Name: _____
_____ By _____
Date Print Name: _____
Title: _____

C. ADDITIONAL SIGNATURES (if required by partnership, corporation or trust document):

Entity Name: _____

By _____

Date

Print Name: _____

Title: _____

Entity Name: _____

By _____

Date

Print Name: _____

Title: _____

EXHIBIT C-2

BOOK ENTRY QUESTIONNAIRE

Pursuant to Section 2.2(b) of the Agreement, please provide us with the following information:

1. The exact name that the Securities are to be registered in (this is the name that will appear in the book entry notation(s)). You may use a nominee name if appropriate: _____
2. The relationship between the Purchaser of the Securities and the Registered Holder listed in response to Item 1 above: _____
3. The mailing address, telephone and telecopy number of the Registered Holder listed in response to Item 1 above: _____

4. The Tax Identification Number (or, if an individual, the Social Security Number) of the Registered Holder listed in response to Item 1 above: _____

EXHIBIT D

FORM OF OPINION OF COMPANY COUNSEL

D-1

FORM OF IRREVOCABLE TRANSFER AGENT INSTRUCTIONS
FOR COMMON STOCK AND RELATED WARRANTS

As of _____, _____

American Stock Transfer & Trust Company, LLC
6201 15th Avenue
Brooklyn, NY 11219

Attn: _____

Ladies and Gentlemen:

Reference is made to that certain Securities Purchase Agreement, dated as of August 27, 2017 (the "*Agreement*"), by and among aTyr Pharma, Inc., a Delaware corporation (the "*Company*"), and the purchasers named on the signature pages thereto (collectively, and including permitted transferees, the "*Holder*s"), pursuant to which the Company is issuing to the Holders, *inter alia*, shares (the "*Shares*") of Common Stock of the Company, par value \$0.001 per share (the "*Common Stock*"), and warrants (the "*Warrants*"), which are exercisable into shares of Common Stock.

This letter shall serve as our irrevocable authorization and direction to you (provided that you are the transfer agent of the Company at such time and the conditions set forth in this letter are satisfied), subject to any stop transfer instructions that we may issue to you from time to time, if any:

- (i) to issue certificates or book entry statements representing shares of Common Stock upon transfer or resale of the Shares; and
- (ii) to issue shares of Common Stock upon the exercise of the Warrants (the "*Warrant Shares*") to or upon the order of a Holder from time to time upon delivery to you of a properly completed and duly executed Exercise Notice, in the form attached hereto as Annex I, which has been acknowledged by the Company as indicated by the signature of a duly authorized officer of the Company thereon together with indication of receipt of the exercise price therefor.

You acknowledge and agree that so long as you have received (a) written confirmation from the Company's legal counsel that either (1) a registration statement covering resales of the Shares and the Warrant Shares has been declared effective by the Securities and Exchange Commission (the "*Commission*") under the Securities Act of 1933, as amended (the "*Securities Act*"), or (2) the Shares and the Warrant Shares have been sold in conformity with Rule 144 under the Securities Act ("*Rule 144*") or are eligible for sale under Rule 144, without the requirement for the Company to be in compliance with the current public information required under Rule 144 as to such securities and without volume or manner-of-sale restrictions and (b) if applicable, a copy of such registration statement, then, unless otherwise required by law, within two (2) Trading Days of your receipt of a notice of transfer, Shares or the Exercise Notice, you shall issue the certificates or statements representing the Shares and/or the Warrant Shares, as the case may be, registered in the names of such Holders or transferees, as the case may be, and such certificates or statements shall not bear any legend restricting transfer of the Shares or the Warrant Shares thereby and should not be subject to any stop-transfer restriction; *provided, however*, that if such Shares and Warrant Shares are not registered for resale under the Securities Act or able to be sold under Rule 144 without the requirement for the Company to be in compliance with the current public information required under Rule 144 as to such securities and without volume or manner-of-sale restrictions, then the certificates or statements for such Shares and/or Warrant Shares shall bear the following legend:

NEITHER THESE SECURITIES NOR THE SECURITIES ISSUABLE UPON EXERCISE OF THESE SECURITIES HAVE BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933, AS AMENDED (THE "SECURITIES ACT"), OR APPLICABLE STATE SECURITIES LAWS. THE SECURITIES MAY NOT BE OFFERED FOR SALE, SOLD, TRANSFERRED OR ASSIGNED (I) IN THE ABSENCE OF (A) AN EFFECTIVE REGISTRATION STATEMENT FOR THE SECURITIES UNDER THE SECURITIES ACT OR (B) AN AVAILABLE EXEMPTION FROM, OR IN A TRANSACTION NOT SUBJECT TO, THE REGISTRATION REQUIREMENTS OF THE SECURITIES ACT AND IN ACCORDANCE WITH APPLICABLE STATE SECURITIES LAWS OR BLUE SKY LAWS AS EVIDENCED BY A LEGAL OPINION OF COUNSEL REASONABLY SATISFACTORY TO THE COMPANY AND ITS TRANSFER AGENT OR (II) UNLESS SOLD PURSUANT TO RULE 144 UNDER THE SECURITIES ACT. NOTWITHSTANDING THE FOREGOING, THE SECURITIES MAY BE PLEDGED IN CONNECTION WITH A BONA FIDE MARGIN ACCOUNT OR OTHER LOAN OR FINANCING ARRANGEMENT SECURED BY THE SECURITIES.

A form of written confirmation from the Company's outside legal counsel that a registration statement covering resales of the Shares and the Warrant Shares has been declared effective by the Commission under the Securities Act is attached hereto as Annex II.

Please be advised that the Holders are relying upon this letter as an inducement to enter into the Agreement and, accordingly, each Holder is a third party beneficiary to these instructions.

Please execute this letter in the space indicated to acknowledge your agreement to act in accordance with these instructions.

[Signature Page Follows]

Very truly yours,

ATYR PHARMA, INC.

By: _____
Name: _____
Title: _____

Acknowledged and Agreed:

AMERICAN STOCK TRANSFER & TRUST COMPANY, LLC

By: _____
Name: _____
Title: _____

Date: _____, _____

Annex I

FORM OF EXERCISE NOTICE

[To be executed by the Holder to purchase shares of Common Stock under the Warrant]

Ladies and Gentlemen:

(1) The undersigned is the Holder of Warrant No. _____ (the “Warrant”) issued by aTyr Pharma, Inc., a Delaware corporation (the “Company”). Capitalized terms used herein and not otherwise defined herein have the respective meanings set forth in the Warrant.

(2) The undersigned hereby exercises its right to purchase _____ Warrant Shares pursuant to the Warrant.

(3) The Holder intends that payment of the Exercise Price shall be made as (check one):

Cash Exercise

“Cashless Exercise” under Section 10 of the Warrant

(4) If the Holder has elected a Cash Exercise, the Holder shall pay the sum of \$_____ in immediately available funds to the Company in accordance with the terms of the Warrant.

(5) Pursuant to this Exercise Notice, the Company shall deliver to the Holder Warrant Shares determined in accordance with the terms of the Warrant.

(6) The Holder and its Attribution Parties (as defined in the Warrant) together beneficially own an aggregate of ____ shares of Common Stock (as defined in the Warrant), as determined in accordance with Section 13(d) of the Securities Exchange Act of 1934 and the applicable regulations of the Securities and Exchange Commission.

Dated: _____

Name of Holder: _____

By: _____

Name: _____

Title: _____

(Signature must conform in all respects to name of Holder as specified on the face of the Warrant)

ACKNOWLEDGEMENT

The Company hereby acknowledges this Exercise Notice and receipt of the appropriate exercise price and hereby directs American Stock Transfer & Trust Company, LLC to issue the above indicated number of shares of Common Stock in accordance with the Irrevocable Transfer Agent Instructions dated _____, _____, from the Company and acknowledged and agreed to by American Stock Transfer & Trust Company, LLC.

ATYR PHARMA, INC.

By: _____
Name: _____
Title: _____

FORM OF NOTICE OF EFFECTIVENESS OF REGISTRATION STATEMENT

American Stock Transfer & Trust Company, LLC
6201 15th Avenue
Brooklyn, NY 11219
Attn: _____

Re: aTyr Pharma, Inc.

Ladies and Gentlemen:

We are counsel to aTyr Pharma, Inc., a Delaware corporation (the “Company”), and have represented the Company in connection with that certain Securities Purchase Agreement, dated as of August 27, 2017, entered into by and among the Company and the purchasers named therein (collectively, the “Purchasers”) pursuant to which the Company issued to the Purchasers, *inter alia*, shares of the Company’s common stock, \$0.001 par value per share (the “Common Stock”), and warrants exercisable for shares of Common Stock (the “Warrants”). Pursuant to that certain Registration Rights Agreement of even date, the Company agreed to register the resale of the Common Stock, including, *inter alia*, the shares of Common Stock issuable upon exercise of the Warrants (collectively, the “Registrable Securities”), under the Securities Act of 1933, as amended (the “Securities Act”). In connection with the Company’s obligations under the Registration Rights Agreement, on _____, _____, the Company filed a Registration Statement on Form S-3 (File No. 333-_____) (the “Registration Statement”) with the Securities and Exchange Commission (the “Commission”) relating to the Registrable Securities which names each of the Purchasers as a selling stockholder thereunder.

In connection with the foregoing, we advise you that a member of the Commission’s staff has advised us by telephone that the Commission has entered an order declaring the Registration Statement effective under the Securities Act at ____ [a.m.][p.m.] on _____, _____, and we have no knowledge, after telephonic inquiry of a member of the staff, that any stop order suspending its effectiveness has been issued or that any proceedings for that purpose are pending before, or threatened by, the Commission and the Registrable Securities are available for resale under the Securities Act pursuant to the Registration Statement.

This letter shall serve as our standing notice to you that the Common Stock may be freely transferred by the Purchasers pursuant to the Registration Statement. You need not require further letters from us to effect any future legend-free issuance or reissuance of shares of Common Stock to the Purchasers or the transferees of the Purchasers, as the case may be, as contemplated by the Company’s Irrevocable Transfer Agent Instructions dated _____, _____, provided at the time of such reissuance, the Company has not otherwise notified you that the Registration Statement is unavailable for the resale of the Registrable Securities. This letter shall serve as our standing instructions with regard to this matter.

Very truly yours,

Goodwin Procter LLP

By: _____

FORM OF IRREVOCABLE TRANSFER AGENT INSTRUCTIONS
FOR PREFERRED STOCK AND RELATED WARRANTS

As of _____, _____

American Stock Transfer & Trust Company, LLC
6201 15th Avenue
Brooklyn, NY 11219

Attn: _____

Ladies and Gentlemen:

Reference is made to that certain Securities Purchase Agreement, dated as of August 27, 2017 (the "*Agreement*"), by and among aTyr Pharma, Inc., a Delaware corporation (the "*Company*"), and the purchasers named on the signature pages thereto (collectively, and including permitted transferees, the "*Holder*s"), pursuant to which the Company is issuing to the Holders, *inter alia*, (i) shares (the "*Shares*") of Class X Preferred Stock of the Company, par value \$0.001 per share (the "*Preferred Stock*") and in the future may issue shares of the Company's Common Stock, par value \$0.001 per share (the "*Common Stock*"), which is subject to adjustment, upon conversion of the Preferred Stock (the "*Underlying Shares*"), and (ii) warrants (the "*Warrants*"), which are exercisable into shares of Common Stock.

This letter shall serve as our irrevocable authorization and direction to you (provided that you are the transfer agent of the Company at such time and the conditions set forth in this letter are satisfied), subject to any stop transfer instructions that we may issue to you from time to time, if any:

(i) to issue certificates or book entry statements representing shares of Preferred Stock upon transfer or resale of the Shares; and

(ii) to issue shares of Common Stock upon the exercise of the Warrants (the "*Warrant Shares*") to or upon the order of a Holder from time to time upon delivery to you of a properly completed and duly executed Exercise Notice, in the form attached hereto as Annex I, which has been acknowledged by the Company as indicated by the signature of a duly authorized officer of the Company thereon together with indication of receipt of the exercise price therefor.

Upon the Company's receipt of a Holder's duly completed and executed Notice of Conversion as set forth in Annex A to the Company's Certificate of Designation of Preferences, Rights and Limitations of Class X Convertible Stock dated August __, 2017, the Company shall issue to American Stock Transfer & Trust Company, LLC (the "*Transfer Agent*") a legal opinion signed by its counsel authorizing the issuance of the certain number of shares of the Company's Class X Preferred Stock set forth in the Notice of Conversion to be converted into the Company's Common Stock and setting forth the transfer restrictions and legends, if any, to be attached to the Underlying Shares (the "*Legal Opinion*"). If the converting Holder has been issued a physical stock certificate for its Class X Preferred Stock (the "*Stock Certificate*"), such Holder shall mail the physical copy of such Stock Certificate to the Transfer Agent along with an instruction letter specifying (i) the number of shares of Class X Preferred Stock to be converted into Underlying Shares and (ii) whether they would like their remaining Class X Preferred Stock (if any) kept in book entry or certificated form (the "*Instruction Letter*"). Once the Company has received such Notice of Conversion from the Holder, and the Transfer Agent has received the Legal Opinion from the Company's legal counsel and the Stock Certificate (if any) and the Instruction Letter from the Holder, the Transfer Agent shall process such Underlying Shares consistent with the conversion mechanics and timing outlined in Section 6(e) of the Certificate of Designation.

You acknowledge and agree that so long as you have received (a) written confirmation from the Company's legal counsel that either (1) a registration statement covering resales of the Shares, the Underlying Shares and the Warrant Shares has been declared effective by the Securities and Exchange Commission (the "Commission") under the Securities Act of 1933, as amended (the "Securities Act"), or (2) the Shares, the Underlying Shares and the Warrant Shares have been sold in conformity with Rule 144 under the Securities Act ("Rule 144") or are eligible for sale under Rule 144, without the requirement for the Company to be in compliance with the current public information required under Rule 144 as to such securities and without volume or manner-of-sale restrictions and (b) if applicable, a copy of such registration statement, then, unless otherwise required by law, within two (2) Trading Days of your receipt of written confirmation of (1) or (2) above or the Exercise Notice, you shall remove any restrictive legend or stop transfer order and/or transfer the Shares, Underlying Shares and Warrant Shares registered in the names of Purchasers to the applicable transferee and such Shares, Underlying Shares and Warrant Shares shall not bear any legend restricting transfer of the Shares, Underlying Shares and Warrant Shares thereby and should not be subject to any stop-transfer restriction; *provided, however*, that if such Shares, Underlying Shares and Warrant Shares are not registered for resale under the Securities Act or able to be sold under Rule 144 without the requirement for the Company to be in compliance with the current public information required under Rule 144 as to such securities and without volume or manner-of-sale restrictions, then the certificates or statements for such Shares, Underlying Shares and/or Warrant Shares shall bear the following legend:

NEITHER THESE SECURITIES NOR THE SECURITIES ISSUABLE UPON EXERCISE OR CONVERSION OF THESE SECURITIES HAVE BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933, AS AMENDED (THE "SECURITIES ACT"), OR APPLICABLE STATE SECURITIES LAWS. THE SECURITIES MAY NOT BE OFFERED FOR SALE, SOLD, TRANSFERRED OR ASSIGNED (I) IN THE ABSENCE OF (A) AN EFFECTIVE REGISTRATION STATEMENT FOR THE SECURITIES UNDER THE SECURITIES ACT OR (B) AN AVAILABLE EXEMPTION FROM, OR IN A TRANSACTION NOT SUBJECT TO, THE REGISTRATION REQUIREMENTS OF THE SECURITIES ACT AND IN ACCORDANCE WITH APPLICABLE STATE SECURITIES LAWS OR BLUE SKY LAWS AS EVIDENCED BY A LEGAL OPINION OF COUNSEL REASONABLY SATISFACTORY TO THE COMPANY AND ITS TRANSFER AGENT OR (II) UNLESS SOLD PURSUANT TO RULE 144 UNDER THE SECURITIES ACT. NOTWITHSTANDING THE FOREGOING, THE SECURITIES MAY BE PLEDGED IN CONNECTION WITH A BONA FIDE MARGIN ACCOUNT OR OTHER LOAN OR FINANCING ARRANGEMENT SECURED BY THE SECURITIES.

A form of written confirmation from the Company's outside legal counsel that a registration statement covering resales of the Shares, Underlying Shares and Warrant Shares has been declared effective by the Commission under the Securities Act is attached hereto as Annex II.

Please be advised that the Holders are relying upon this letter as an inducement to enter into the Agreement and, accordingly, each Holder is a third party beneficiary to these instructions.

Please execute this letter in the space indicated to acknowledge your agreement to act in accordance with these instructions.

[Signature Page Follows]

E-2-3

Very truly yours,

ATYR PHARMA, INC.

By: _____
Name: _____
Title: _____

Acknowledged and Agreed:

AMERICAN STOCK TRANSFER & TRUST COMPANY, LLC

By: _____
Name: _____
Title: _____

Date: _____, _____

Annex I

FORM OF EXERCISE NOTICE

[To be executed by the Holder to purchase shares of Common Stock under the Warrant]

Ladies and Gentlemen:

- (1) The undersigned is the Holder of Warrant No. _____ (the “Warrant”) issued by aTyr Pharma, Inc., a Delaware corporation (the “Company”). Capitalized terms used herein and not otherwise defined herein have the respective meanings set forth in the Warrant.
- (2) The undersigned hereby exercises its right to purchase _____ Warrant Shares pursuant to the Warrant.
- (3) The Holder intends that payment of the Exercise Price shall be made as (check one):
- Cash Exercise
- “Cashless Exercise” under Section 10 of the Warrant
- (4) If the Holder has elected a Cash Exercise, the Holder shall pay the sum of \$_____ in immediately available funds to the Company in accordance with the terms of the Warrant.
- (5) Pursuant to this Exercise Notice, the Company shall deliver to the Holder Warrant Shares determined in accordance with the terms of the Warrant.
- (6) The Holder and its Attribution Parties (as defined in the Warrant) together beneficially own an aggregate of ____ shares of Common Stock (as defined in the Warrant), as determined in accordance with Section 13(d) of the Securities Exchange Act of 1934 and the applicable regulations of the Securities and Exchange Commission.

Dated: _____

Name of Holder: _____

By: _____

Name: _____

Title: _____

(Signature must conform in all respects to name of Holder as specified on the face of the Warrant)

ACKNOWLEDGEMENT

The Company hereby acknowledges this Exercise Notice and receipt of the appropriate exercise price and hereby directs American Stock Transfer & Trust Company, LLC to issue the above indicated number of shares of Common Stock in accordance with the Irrevocable Transfer Agent Instructions dated _____, _____, from the Company and acknowledged and agreed to by American Stock Transfer & Trust Company, LLC.

ATYR PHARMA, INC.

By: _____
Name: _____
Title: _____

Annex II

FORM OF NOTICE OF EFFECTIVENESS OF REGISTRATION STATEMENT

American Stock Transfer & Trust Company, LLC
6201 15th Avenue
Brooklyn, NY 11219
Attn: _____

Re: aTyr Pharma, Inc.

Ladies and Gentlemen:

We are counsel to aTyr Pharma, Inc., a Delaware corporation (the "*Company*"), and have represented the Company in connection with that certain Securities Purchase Agreement, dated as of August 27, 2017, entered into by and among the Company and the purchasers named therein (collectively, the "*Purchasers*") pursuant to which the Company issued to the Purchasers, *inter alia*, shares of the Company's Class X Preferred Stock, \$0.001 par value per share (the "*Preferred Stock*"), and warrants exercisable for shares of Common Stock (the "*Warrants*"). Pursuant to that certain Registration Rights Agreement of even date (the "*Registration Rights Agreement*"), the Company agreed to register the resale of, *inter alia*, certain shares of the Company's common stock, \$0.001 par value per share (the "*Common Stock*") issued or issuable upon conversion of the Preferred Stock (the "*Underlying Shares*") and certain shares of the Common Stock issuable upon exercise of the Warrants (collectively, the "*Registrable Securities*"), under the Securities Act of 1933, as amended (the "*Securities Act*"). In connection with the Company's obligations under the Registration Rights Agreement, on _____, _____, the Company filed a Registration Statement on Form S-3 (File No. 333-_____) (the "*Registration Statement*") with the Securities and Exchange Commission (the "*Commission*") relating to the Registrable Securities which names each of the Purchasers party to the Registration Rights Agreement as a selling stockholder thereunder.

In connection with the foregoing, we advise you that a member of the Commission's staff has advised us by telephone that the Commission has entered an order declaring the Registration Statement effective under the Securities Act at ____ [a.m.][p.m.] on _____, _____, and we have no knowledge, after telephonic inquiry of a member of the staff, that any stop order suspending its effectiveness has been issued or that any proceedings for that purpose are pending before, or threatened by, the Commission and the Registrable Securities are available for resale under the Securities Act pursuant to the Registration Statement.

This letter shall serve as our standing notice to you that the Common Stock may be freely transferred by the Purchasers pursuant to the Registration Statement. You need not require further letters from us to effect any future legend-free issuance or reissuance of shares of Common Stock to the Purchasers or the transferees of the Purchasers, as the case may be, as contemplated by the Company's Irrevocable Transfer Agent Instructions dated _____, _____, provided at the time of such reissuance, the Company has not otherwise notified you that the Registration Statement is unavailable for the resale of the Registrable Securities. This letter shall serve as our standing instructions with regard to this matter.

Very truly yours,

Goodwin Procter LLP

By: _____

EXHIBIT F

FORM OF SECRETARY'S CERTIFICATE

The undersigned hereby certifies that she is the duly elected, qualified and acting Secretary of aTyr Pharma, Inc., a Delaware corporation (the "*Company*"), and that as such she is authorized to execute and deliver this certificate in the name and on behalf of the Company and in connection with the Securities Purchase Agreement, dated as of August 27, 2017, by and among the Company and the investors party thereto (the "*Securities Purchase Agreement*"), and further certifies in her official capacity, in the name and on behalf of the Company, the items set forth below. Capitalized terms used but not otherwise defined herein shall have the meaning set forth in the Securities Purchase Agreement.

1. Attached hereto as Exhibit A-1 is a true, correct and complete copy of the resolutions duly adopted by the Board of Directors of the Company by unanimous written consent on August 22, 2017, attached hereto as Exhibit A-2 is a true, correct and complete copy of the resolutions duly adopted by the Board of Directors of the Company by unanimous written consent on August 23, 2017, and attached hereto as Exhibit A-3 is a true, correct and complete copy of the resolutions duly adopted by the Pricing Committee of the Board of Directors of the Company by unanimous written consent on August 27, 2017. Such resolutions have not in any way been amended, modified, revoked or rescinded, have been in full force and effect since their adoption to and including the date hereof and are now in full force and effect.
2. Attached hereto as Exhibit B is a true, correct and complete copy of the Certificate of Incorporation of the Company, together with any and all amendments thereto currently in effect, and no action has been taken to further amend, modify or repeal such Certificate of Incorporation, the same being in full force and effect in the attached form as of the date hereof.
3. Attached hereto as Exhibit C is a true, correct and complete copy of the Bylaws of the Company and any and all amendments thereto currently in effect, and no action has been taken to further amend, modify or repeal such Bylaws, the same being in full force and effect in the attached form as of the date hereof.
4. Each person listed below has been duly elected or appointed to the position(s) indicated opposite his name and is duly authorized to sign the Securities Purchase Agreement and each of the Transaction Documents on behalf of the Company, and the signature appearing opposite such person's name below is such person's genuine signature.

<u>Name</u>	<u>Position</u>	<u>Signature</u>
John Blake	Senior Vice President, Finance	_____

IN WITNESS WHEREOF, the undersigned has hereunto set her hand as of this ____ day of _____, ____.

Secretary

I, John Blake, Senior Vice President, Finance, hereby certify that Nancy Krueger is the duly elected, qualified and acting Secretary of the Company and that the signature set forth above is her true signature.

Senior Vice President, Finance

Certificate of Incorporation

Bylaws

EXHIBIT G

FORM OF OFFICER'S CERTIFICATE

The undersigned, the Senior Vice President, Finance of aTyr Pharma, Inc., a Delaware corporation (the "*Company*"), pursuant to Section 5.1(i) of the Securities Purchase Agreement, dated as of August 27, 2017, by and among the Company and the investors signatory thereto (the "*Securities Purchase Agreement*"), hereby represents, warrants and certifies as follows (capitalized terms used but not otherwise defined herein shall have the meaning set forth in the Securities Purchase Agreement):

1. The representations and warranties of the Company contained in the Securities Purchase Agreement are true and correct in all material respects (except for those representations and warranties which are qualified as to materiality, in which case, such representations and warranties shall be true and correct in all respects) as of the date when made and as of the date hereof, as though made on and as of such date, except for such representations and warranties that speak as of a specific date.
2. The Company has performed, satisfied and complied in all material respects with all covenants, agreements and conditions required by the Transaction Documents to be performed, satisfied or complied with by it at or prior to the date hereof.

IN WITNESS WHEREOF, the undersigned has executed this certificate this ___ day of _____, _____.

Name: John Blake
Title: Senior Vice President, Finance

EXHIBIT H

WIRE INSTRUCTIONS

H-1

EXHIBIT I

FORM OF LOCK-UP AGREEMENT

_____, _____
Piper Jaffray & Co.
345 Park Avenue, 12th Floor
New York, NY 10154

Re: Private Placement of Securities

Ladies and Gentlemen:

The undersigned understands that Piper Jaffray & Co. proposes to act as the exclusive placement agent (the "*Placement Agent*"), for aTyr Pharma, Inc., a Delaware corporation (the "*Company*"), in connection with a proposed private placement (the "*Offering*") of shares of common stock, par value \$0.001 per share (the "*Common Stock*"), shares of Class X Preferred Stock, par value \$0.001 per share (the "*Preferred Stock*") and warrants to purchase Common Stock (the "*Warrants*" and together with the Common Stock and Preferred Stock, the "*Placement Securities*"), of the Company. Pursuant to that certain Registration Rights Agreement dated as of August 27, 2017, the Company agreed to register the resale of certain of the shares of the Common Stock and the Common Stock issued or issuable upon conversion of the Preferred Stock (the "*Underlying Shares*") and upon exercise of the Warrants (the "*Warrant Shares*" and together with the Common Stock and the Underlying Shares, the "*Registrable Securities*").

In order to induce the Placement Agent to continue its efforts in connection with the Offering, the undersigned hereby agrees that for a period (the "*Lock-Up Period*") of thirty (30) days following the date of effectiveness of the registration statement registering the resale of the Registrable Securities filed by the Company with the Securities and Exchange Commission in connection with such Offering, the undersigned will not, without the prior written consent of the Placement Agent, directly or indirectly, (1) offer, sell, contract to sell, pledge, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, lend, or otherwise transfer or dispose of any shares of the Common Stock, or any securities convertible into or exercisable or exchangeable for the Common Stock (including, without limitation, shares of Common Stock or any such securities which may be deemed to be beneficially owned by the undersigned in accordance with the rules and regulations promulgated under the Securities Act of 1933, as the same may be amended or supplemented from time to time (such shares or securities, the "*Beneficially Owned Shares*")); (2) enter into any swap or other arrangement that transfers to another, in whole or in part, any of the economic consequences of ownership of the Beneficially Owned Shares, Common Stock, or any securities convertible into or exchangeable for the Common Stock, regardless of whether any such transaction described herein is to be settled by delivery of the Common Stock or such other securities, or by delivery of cash or otherwise; (3) make any demand for, or exercise any right with respect to, the registration of any shares of the Beneficially Owned Shares, Common Stock or any security convertible into or exercisable of exchangeable for the Common Stock; or (4) publicly announce any intention to do any of the foregoing; *provided, however*, that the obligations under this letter agreement (the "*Lock-Up Agreement*") shall not apply to any Placement Securities acquired in connection with the Offering.

Notwithstanding the foregoing, the restrictions set forth in clause (1) and (2) above shall not apply to (a) transfers (i) as a bona fide gift or gifts, provided that the donee or donees thereof agree to be bound in writing by the restrictions set forth herein, (ii) to any trust for the direct or indirect benefit of the undersigned or the immediate family of the undersigned, provided that the trustee of the trust agrees to be bound in writing by the restrictions set forth herein, and provided further that any such transfer shall not involve a

disposition for value, (iii) with the prior written consent of the Placement Agent, (iv) effected pursuant to any exchange of “underwater” options with the Company, (v) by will, other testamentary document or intestate succession to the legal representative, heir, beneficiary or member of the immediate family of the undersigned, provided that any recipient of such transfer agrees to be bound in writing by the restrictions set forth herein, (vi) to any affiliate of the undersigned or any investment fund or other entity controlled or managed by the undersigned or the immediate family of the undersigned in a transaction not involving a disposition for value, provided that any such affiliate, investment fund or other entity agrees to be bound in writing by the restrictions set forth herein, (vii) if the undersigned is an investment company registered under the Investment Company Act of 1940, as amended (a “*Mutual Fund*”), pursuant to a merger or reorganization with or into another Mutual Fund that shares the same investment adviser registered pursuant to the requirements of the Investment Advisers Act of 1940, as amended, (viii) by operation of law, including pursuant to a qualified domestic relations order or in connection with a divorce settlement, provided that any recipient of such a transfer agrees to be bound in writing by the restrictions set forth herein or (ix) to the Company pursuant to agreements under which the Company has the right to repurchase such shares or securities upon termination of service of the undersigned, (b) the acquisition or exercise of an option or warrant to purchase shares of Common Stock (or any securities convertible into or exercisable or exchangeable for Common Stock), including the sale of a portion of stock to be issued in connection with such exercise to finance a “cashless” exercise, provided that any such shares issued upon exercise of such option or warrant (or any securities convertible into or exercisable or exchangeable for Common Stock) shall continue to be subject to the applicable provisions of this Lock-Up Agreement, (c) the purchase or sale of the Company’s securities pursuant to a plan, contract or instruction that satisfies all of the requirements of Rule 10b5-1(c)(1)(i)(B) that was in effect prior to the date hereof, or (d) the disposition of shares of Common Stock to satisfy any tax withholding obligations upon the vesting of shares of restricted Common Stock held by the undersigned. For purposes of this Lock-Up Agreement, “immediate family” shall mean any relationship by blood, marriage or adoption, not more remote than first cousin. None of the restrictions set forth in this Lock-Up Agreement shall apply to Common Stock acquired in open market transactions. In addition, if the undersigned is a partnership, limited liability company, trust, corporation or similar entity, it may distribute the Common Stock or Beneficially Owned Shares to its partners, members or stockholders; provided, however, that in each such case, prior to any such transfer, each transferee shall execute a duplicate form of this Lock-Up Agreement or execute an agreement, reasonably satisfactory to the Placement Agent, pursuant to which each transferee shall agree to receive and hold such Common Stock or Beneficially Owned Shares subject to the provisions hereof, and there shall be no further transfer except in accordance with the provisions hereof.

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

The undersigned hereby agrees and consents to the entry of stop transfer instructions with the Company’s transfer agent against the transfer of securities of the Company held by the undersigned during the Lock-Up Period (as may have been extended pursuant hereto), except in compliance with this Lock-Up Agreement.

The undersigned understands that, if the Securities Purchase Agreement executed by Purchasers in connection with the Offering does not become effective, or if the Offering shall terminate or be terminated

prior to payment for and delivery of the Placement Securities to be sold thereunder, or if the Purchase Agreement has not been executed within thirty (30) days of the date hereof, this Lock-Up Agreement shall be terminated and the undersigned shall be released from all obligations under this Lock-Up Agreement.

The undersigned hereby represents and warrants that the undersigned has full power and authority to enter into this Lock-Up Agreement. This Lock-Up Agreement is irrevocable and all authority herein conferred or agreed to be conferred shall survive the death or incapacity of the undersigned and any obligations of the undersigned shall be binding upon the heirs, personal representatives, successors and assigns of the undersigned. The undersigned agrees that Purchasers of the Placement Securities in the Offering shall be intended third-party beneficiaries of the undersigned's obligations under this Lock-Up Agreement.

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

Very truly yours,

Print Name: _____

Print Title: _____

Signature: _____

EXHIBIT J

LIST OF PERSONS OR ENTITIES
EXECUTING LOCK-UP AGREEMENTS

EXHIBIT K

FORM OF CERTIFICATE OF DESIGNATION

**ATYR PHARMA, INC.
CERTIFICATE OF DESIGNATION OF PREFERENCES,
RIGHTS AND LIMITATIONS
OF
CLASS X CONVERTIBLE PREFERRED STOCK**

PURSUANT TO SECTION 151 OF THE
DELAWARE GENERAL CORPORATION LAW

ATYR PHARMA, INC., Delaware corporation (the “**Corporation**”), in accordance with the provisions of Section 103 of the Delaware General Corporation Law (the “**DGCL**”) does hereby certify that, in accordance with Sections 141(c) and 151 of the DGCL, the following resolution was duly adopted by a committee of the Board of Directors of the Corporation acting upon authority delegated by the Board of Directors, on August 27, 2017:

RESOLVED, pursuant to authority expressly set forth in the Restated Certificate of Incorporation of the Corporation (the “**Certificate of Incorporation**”), the issuance of a series of Preferred Stock designated as the Class X Convertible Preferred Stock, par value \$0.001 per share, of the Corporation is hereby authorized and the designation, number of shares, powers, preferences, rights, qualifications, limitations and restrictions thereof (in addition to any provisions set forth in the Certificate of Incorporation that are applicable to the Preferred Stock of all classes and series) are hereby fixed, and the Certificate of Designation of Preferences, Rights and Limitations of Class X Convertible Preferred Stock is hereby approved as follows:

CLASS X CONVERTIBLE PREFERRED STOCK

Section 1. Definitions. For the purposes hereof, the following terms shall have the following meanings:

“**Affiliate**” means any person or entity that, directly or indirectly through one or more intermediaries, controls or is controlled by or is under common control with a person or entity, as such terms are used in and construed under Rule 144 under the Securities Act of 1933. With respect to a Holder, any investment fund or managed account that is managed on a discretionary basis by the same investment manager as such Holder will be deemed to be an Affiliate of such Holder.

“**Business Day**” means any day except Saturday, Sunday, any day which shall be a federal legal holiday in the United States or any day on which banking institutions in the State of New York are authorized or required by law or other governmental action to close.

“**Commission**” means the U.S. Securities and Exchange Commission.

“**Common Stock**” means the Corporation’s common stock, par value \$0.001 per share, and stock of any other class of securities into which such securities may hereafter be reclassified into.

“**Conversion Price**” for the Class X Preferred Stock shall be \$2.65, subject to adjustment as provided herein.

“**Conversion Shares**” means, collectively, the shares of Common Stock issuable upon conversion of the shares of Class X Preferred Stock in accordance with the terms hereof.

“**DGCL**” shall mean the Delaware General Corporation Law.

“**Exchange Act**” means the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder.

“**Holder**” means any holder of Class X Preferred Stock.

“**Issuance Date**” means the first date on which any shares of Class X Preferred Stock are issued by the Corporation.

“**Person**” means any individual or corporation, partnership, trust, incorporated or unincorporated association, joint venture, limited liability company, joint stock company, government (or an agency or subdivision thereof) or other entity of any kind.

“**Purchase Agreement**” means the Securities Purchase Agreement, dated as of August 27, 2017 by and among aTyr Pharma, Inc., a Delaware corporation, and each purchaser identified on the signature pages thereto.

“**Stated Value**” means \$13.25 per share, subject to increase as set forth in Section 3 below.

“**Threshold Amount**” means 19.99% of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock pursuant to an applicable Notice of Conversion.

“**Trading Day**” means a day on which the Common Stock is traded for any period on a principal securities exchange or if the Common Stock is not traded on a principal securities exchange, on a day that the Common Stock is traded on another securities market on which the Common Stock is then being traded.

Section 2. Designation, Amount and Par Value; Assignment.

(a) The series of preferred stock designated by this Certificate of Designation shall be designated as the Corporation’s Class X Convertible Preferred Stock (the “**Class X Preferred Stock**”) and the number of shares so designated shall be 2,285,952. The Class X Preferred Stock shall have a par value of \$0.001 per share.

(b) The Corporation shall register shares of the Class X Preferred Stock, upon records to be maintained by the Corporation for that purpose (the “**Class X Preferred Stock Register**”), in the name of the Holders thereof from time to time. The Corporation may deem and treat the registered Holder of shares of Class X Preferred Stock as the absolute owner thereof for the purpose of any conversion thereof and for all other purposes. Shares of Class X Preferred Stock may be issued solely in book-entry form or, if requested by any Holder, such Holder’s shares may be issued in certificated form. The Corporation shall register the transfer of any shares of Class X Preferred Stock in the Class X Preferred Stock Register, upon surrender of the certificates (if applicable) evidencing such shares to be transferred, duly endorsed by the Holder thereof, to the Corporation at its address specified herein. Upon any such registration or transfer, a new certificate (or book-entry notation, if applicable) evidencing the shares of Class X Preferred Stock so transferred shall be issued to the transferee and a new certificate (or book-entry notation, if applicable) evidencing the remaining portion of the shares not so transferred, if any, shall be issued to the transferring Holder, in each case, within three Business Days. The provisions of this Certificate of Designation are intended to be for the benefit of all Holders from time to time and shall be enforceable by any such Holder.

Section 3. Dividends. Holders shall be entitled to receive, and the Corporation shall pay, dividends on shares of Class X Preferred Stock equal (on an as-if-converted-to-Common-Stock basis) to and in the same form as dividends (other than dividends in the form of Common Stock, which shall be made in accordance with Section 7(a)) actually paid on shares of the Common Stock when, as and if such dividends (other than dividends in the form of Common Stock, which shall be made in accordance with Section 7(a)) are paid on shares of the Common Stock. Other than as set forth in the previous sentence, no other dividends shall be paid on shares of Class X Preferred Stock; and the Corporation shall pay no dividends (other than dividends in the form of Common Stock) on shares of the Common Stock unless it simultaneously complies with the previous sentence. All declared but unpaid dividends on shares of Class X Preferred Stock shall increase the Stated Value of such shares, but when such dividends are actually paid any such increase in the Stated Value shall be rescinded.

Section 4. Voting Rights. Except as otherwise provided herein or as otherwise required by the DGCL, the Class X Preferred Stock shall have no voting rights. However, as long as any shares of Class X Preferred Stock are outstanding, the Corporation shall not, without the affirmative vote of the Holders of a majority of the then outstanding shares of the Class X Preferred Stock, (i) alter or change adversely the powers, preferences or rights given to the Class X Preferred Stock or alter or amend this Certificate of Designation, amend or repeal any provision of, or add any provision to, the Certificate of Incorporation or bylaws of the Corporation, or file any articles of amendment, certificate of designations, preferences, limitations and relative rights of any series of preferred stock, if such action would adversely alter or change the preferences, rights, privileges or powers of, or restrictions provided for the benefit of the Class X Preferred Stock in a manner materially different than the effect on the Common Stock, regardless of whether any of the foregoing actions shall be by means of amendment to the Certificate of Incorporation or by merger, consolidation or otherwise, (ii) issue further shares of Class X Preferred Stock or increase or decrease (other than

by conversion) the number of authorized shares of Class X Preferred Stock, or (iii) enter into any agreement with respect to any of the foregoing.

Section 5. Liquidation. Upon any liquidation, dissolution or winding up of the Corporation, whether voluntary or involuntary (a "**Liquidation**"), the assets of the Corporation available for distribution to its stockholders shall be distributed *pari passu* among the holders of the shares of Common Stock and Class X Preferred Stock, pro rata based on the number of shares held by each such holder, treating for this purpose all such securities as if they had been converted to Common Stock pursuant to the terms of the Certificate of Incorporation (without regard to the Beneficial Ownership Limitation) immediately prior to such Liquidation. The Corporation shall mail written notice of any such Liquidation not less than 45 days prior to the payment date stated therein, to each Holder of shares of Class X Preferred Stock.

Section 6. Conversion.

(a) **Conversions at Option of Holder.** Each share of Class X Preferred Stock shall be convertible, at any time and from time to time from and after the Issuance Date, at the option of the Holder thereof, into a number of shares of Common Stock equal to the product of the Conversion Ratio and the number of shares of Class X Preferred Stock to be converted. Holders shall effect conversions by providing the Corporation with the form of conversion notice attached hereto as **Annex A** (a "**Notice of Conversion**"), duly completed and executed. Other than a conversion following a Fundamental Transaction or following a notice provided for under Section 7(d)(ii) hereof, the Notice of Conversion must specify at least a number of shares of Class X Preferred Stock to be converted equal to the lesser of (x) 100 shares (such number subject to appropriate adjustment following the occurrence of an event specified in Section 7(a) hereof) and (y) the number of shares of Class X Preferred Stock then held by the Holder. Provided the Corporation's transfer agent is participating in the Depository Trust Company ("**DTC**") Fast Automated Securities Transfer program, the Notice of Conversion may specify, at the Holder's election, whether the applicable Conversion Shares shall be credited to the DTC participant account nominated by the Holder through DTC's Deposit Withdrawal Agent Commission system (a "**DWAC Delivery**"). The "**Conversion Date**", or the date on which a conversion shall be deemed effective, shall be defined as the Trading Day that the Notice of Conversion, completed and executed, is sent by facsimile or other electronic transmission to, and received during regular business hours by, the Corporation; provided that the original certificate(s) (if any) representing such shares of Class X Preferred Stock being converted, duly endorsed, and the accompanying Notice of Conversion, are received by the Corporation within three (3) Trading Days thereafter. In all other cases, the Conversion Date shall be defined as the Trading Day on which the original shares of Class X Preferred Stock being converted, duly endorsed, and the accompanying Notice of Conversion, are received by the Corporation. The calculations set forth in the Notice of Conversion shall control in the absence of manifest or mathematical error.

(b) **Conversion Ratio.** The "**Conversion Ratio**" for each share of Class X Preferred Stock shall be equal to the Stated Value divided by the Conversion Price.

(c) **Beneficial Ownership Limitation.** Notwithstanding anything herein to the contrary, the Corporation shall not effect any conversion of the Class X Preferred Stock, and a Holder shall not have the right to convert, and shall be deemed not to have converted, any portion of the Class X Preferred Stock, to the extent that, after giving effect to an attempted conversion set forth on an applicable Notice of Conversion, such Holder (together with any other Persons whose beneficial ownership of Common Stock would be aggregated with the Holder's for purposes of Section 13(d) or Section 16 of the Exchange Act and the applicable regulations of the Commission, including any "group" of which the Holder is a member (the foregoing, "**Attribution Parties**") would beneficially own a number of shares of Common Stock in excess of the Beneficial Ownership Limitation (as defined below). For purposes of the foregoing sentence, the number of shares of Common Stock beneficially owned by such Holder and its Attribution Parties shall include the number of shares of Common Stock issuable upon conversion of the Class X Preferred Stock subject to the Notice of Conversion with respect to which such determination is being made, but shall exclude the number of shares of Common Stock which are issuable upon (A) conversion of the remaining, unconverted shares of Class X Preferred Stock beneficially owned by such Holder or any of its Attribution Parties, and (B) exercise or conversion of the unexercised or unconverted portion of any other securities of the Corporation (including any warrants) beneficially owned by such Holder or any of its Attribution Parties that, in the case of both (A) and (B), are subject to a limitation on conversion or exercise similar to the limitation contained herein. For purposes of this Section 6(c), beneficial ownership shall be calculated in accordance with Section 13(d) of the Exchange Act and the applicable regulations of the Commission. In addition, for purposes hereof, "group" has the meaning set forth in Section 13(d) of the Exchange Act and the applicable regulations of the Commission. In order to ensure that a Holder and its Attribution Parties do not exceed the Beneficial Ownership Limitation in connection with any Notice of Conversion, upon delivery of any Notice of Conversion, such Holder shall inform the Company in such Notice of Conversion of the number of shares of Common Stock then beneficially owned by such Holder and its Attribution Parties as determined in accordance with Section 13(d) of the Exchange Act and the applicable regulations of the Commission, and such notice shall be deemed not to be delivered to the extent (and only to the extent) such Beneficial Ownership Limitation would be exceeded. The Corporation shall be entitled to rely on representations made to it by the Holder in any Notice of Conversion regarding beneficial ownership of shares of Common Stock. Upon the written request of a Holder (which may be by email), the Corporation shall, within three (3) Trading Days thereof, confirm in writing to such Holder (which may be via email) the number of shares of Common Stock then outstanding. The "**Beneficial Ownership Limitation**" shall initially be 9.50% of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock pursuant to such Notice of Conversion (to the extent permitted pursuant to this Section 6(c)). Notwithstanding the foregoing, by written notice to the Corporation, which will not be effective until the sixty-first (61st) day after such notice is delivered to the Corporation, the Holder may reset the Beneficial Ownership Limitation percentage to a higher or lower percentage, not to exceed 19.99% of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock pursuant to such Notice of Conversion unless the Proposal (as defined in the Purchase Agreement) has been approved by the stockholders of the Corporation, in which case the Beneficial Ownership Limitation percentage may exceed 19.99%. Upon such a change by a Holder of the Beneficial

Ownership Limitation, the Beneficial Ownership Limitation may not be further amended by such Holder without first providing the minimum 61-day notice required by this Section 6(c). Notwithstanding the foregoing, at any time following notice of a Fundamental Transaction, the Holder may waive and/or change the Beneficial Ownership Limitation effective immediately upon written notice to the Corporation and may reinstitute a Beneficial Ownership Limitation at any time thereafter effective immediately upon written notice to the Corporation.

(d) Nasdaq Conversion Limits; Solicitation of Stockholder Approval. Notwithstanding Section 6(a) and 6(c) of this Certificate of Designation, the Corporation shall not be required to issue any shares of Common Stock to a given Holder upon conversion by such Holder (or its assigns) of any shares of Class X Preferred Stock to the extent (and only to the extent) that such conversion would result in a given Holder (including its predecessors-in-interest) beneficially owning a number of shares of Common Stock in excess of the applicable Threshold Amount that has been approved by the Corporation's stockholders in accordance with the stockholder approval requirements of Nasdaq Marketplace Rule 5635 (a "**Blocked Conversion**"). The Corporation shall solicit the approval required under Nasdaq Marketplace Rule 5635 of its stockholders for the issuance of the full amount of shares of Common Stock otherwise issuable upon the conversion of all shares of Class X Preferred Stock authorized and designated under this Certificate of Designation in the absence of the Beneficial Ownership Limitation and without regard to the Blocked Conversion (the "**Requisite Approval**") at its first annual meeting of stockholders after the Issuance Date and at each annual meeting of the Corporation's stockholders thereafter to the extent the Requisite Approval has not then been obtained.

(e) Mechanics of Conversion

(i) Delivery of Certificate or Electronic Issuance Upon Conversion. Not later than two (2) Trading Days after the applicable Conversion Date, or if the Holder requests the issuance of physical certificate(s), two (2) Trading Days after receipt by the Corporation of the original certificate(s) representing such shares of Class X Preferred Stock being converted, duly endorsed, and the accompanying Notice of Conversion (the "**Share Delivery Date**"), the Corporation shall (a) deliver, or cause to be delivered, to the converting Holder a physical certificate or certificates representing the number of Conversion Shares being acquired upon the conversion of shares of Class X Preferred Stock, or (b) in the case of a DWAC Delivery (if so requested by the Holder), electronically transfer such Conversion Shares by crediting the DTC participant account nominated by the Holder through DTC's DWAC system. If in the case of any Notice of Conversion such certificate or certificates are not delivered to or as directed by or, in the case of a DWAC Delivery, such shares are not electronically delivered to or as directed by, the applicable Holder by the Share Delivery Date, the applicable Holder shall be entitled to elect to rescind such Conversion Notice by written notice to the Corporation at any time on or before its receipt of such certificate or certificates for Conversion Shares or electronic receipt of such shares, as applicable, in which event the Corporation shall promptly return to such Holder any original Class X Preferred Stock certificate delivered to the Corporation and such Holder shall promptly return to the Corporation any Common Stock certificates or otherwise direct the return of any shares of Common Stock delivered to the Holder through the DWAC system,

representing the shares of Class X Preferred Stock unsuccessfully tendered for conversion to the Corporation.

(ii) Obligation Absolute. Subject to Sections 6(c) and 6(d) hereof and subject to Holder's right to rescind a Conversion Notice pursuant to Section 6(e)(i) above, the Corporation's obligation to issue and deliver the Conversion Shares upon conversion of Class X Preferred Stock in accordance with the terms hereof are absolute and unconditional, irrespective of any action or inaction by a Holder to enforce the same, any waiver or consent with respect to any provision hereof, the recovery of any judgment against any Person or any action to enforce the same, or any setoff, counterclaim, recoupment, limitation or termination, or any breach or alleged breach by such Holder or any other Person of any obligation to the Corporation or any violation or alleged violation of law by such Holder or any other Person, and irrespective of any other circumstance which might otherwise limit such obligation of the Corporation to such Holder in connection with the issuance of such Conversion Shares. Subject to Sections 6(c) and 6(d) hereof and subject to Holder's right to rescind a Conversion Notice pursuant to Section 6(e)(i) above, in the event a Holder shall elect to convert any or all of its Class X Preferred Stock, the Corporation may not refuse conversion based on any claim that such Holder or anyone associated or affiliated with such Holder has been engaged in any violation of law, agreement or for any other reason, unless an injunction from a court, on notice to Holder, restraining and/or enjoining conversion of all or part of the Class X Preferred Stock of such Holder shall have been sought and obtained by the Corporation, and the Corporation posts a surety bond for the benefit of such Holder in the amount of 150% of the value of the Conversion Shares into which would be converted the Class X Preferred Stock which is subject to such injunction, which bond shall remain in effect until the completion of arbitration/litigation of the underlying dispute and the proceeds of which shall be payable to such Holder to the extent it obtains judgment. In the absence of such injunction, the Corporation shall, subject to Sections 6(c) and 6(d) hereof and subject to Holder's right to rescind a Conversion Notice pursuant to Section 6(e)(i) above, issue Conversion Shares upon a properly noticed conversion. Nothing herein shall limit a Holder's right to pursue actual damages for the Corporation's failure to deliver Conversion Shares within the period specified herein and such Holder shall have the right to pursue all remedies available to it hereunder, at law or in equity including, without limitation, a decree of specific performance and/or injunctive relief; provided that Holder shall not receive duplicate damages for the Corporation's failure to deliver Conversion Shares within the period specified herein. The exercise of any such rights shall not prohibit a Holder from seeking to enforce damages pursuant to any other Section hereof or under applicable law.

(iii) Reservation of Shares Issuable Upon Conversion. The Corporation covenants that it will at all times reserve and keep available out of its authorized and unissued shares of Common Stock for the sole purpose of issuance upon conversion of the Class X Preferred Stock, free from preemptive rights or any other actual contingent purchase rights of Persons other than the Holders of the Class X Preferred Stock, not less than such aggregate number of shares of the Common Stock as shall be issuable (taking into account the adjustments of Section 7) upon the conversion of all outstanding shares of Class X Preferred Stock. The Corporation covenants that

all shares of Common Stock that shall be so issuable shall, upon issue, be duly authorized, validly issued, fully paid and non-assessable.

(iv) Fractional Shares. No fractional shares or scrip representing fractional shares of Common Stock shall be issued upon the conversion of the Class X Preferred Stock. As to any fraction of a share which a Holder would otherwise be entitled to receive upon such conversion, the Corporation shall pay a cash adjustment in respect of such final fraction in an amount equal to such fraction multiplied by the Conversion Price.

(v) Transfer Taxes. The issuance of certificates (or book entry notations) for shares of the Common Stock upon conversion of the Class X Preferred Stock shall be made without charge to any Holder for any documentary stamp or similar taxes that may be payable in respect of the issue or delivery of such certificates (or such book entry notation), provided that the Corporation shall not be required to pay any tax that may be payable in respect of any transfer involved in the issuance and delivery of any such certificate (or such book entry notation) upon conversion in a name other than that of the registered Holder(s) of such shares of Class X Preferred Stock and the Corporation shall not be required to issue or deliver such certificates (or such book entry notation) unless or until the Person or Persons requesting the issuance thereof shall have paid to the Corporation the amount of such tax or shall have established to the satisfaction of the Corporation that such tax has been paid.

(f) Status as Stockholder. Upon each Conversion Date: (i) the shares of Class X Preferred Stock being converted shall be deemed converted into shares of Common Stock; and (ii) the Holder's rights as a holder of such converted shares of Class X Preferred Stock shall cease and terminate, excepting only the right to receive certificates (or book entry notations) for such shares of Common Stock and to any remedies provided herein or otherwise available at law or in equity to such Holder because of a failure by the Corporation to comply with the terms of this Certificate of Designation. In all cases, the holder shall retain all of its rights and remedies for the Corporation's failure to convert Class X Preferred Stock.

Section 7. Certain Adjustments.

(a) Stock Dividends and Stock Splits. If the Corporation, at any time while any shares of Class X Preferred Stock are outstanding: (i) pays a stock dividend or otherwise makes a distribution or distributions payable in shares of Common Stock with respect to the then outstanding shares of Common Stock; (ii) subdivides outstanding shares of Common Stock into a larger number of shares; or (iii) combines (including by way of a reverse stock split) outstanding shares of Common Stock into a smaller number of shares, then the Conversion Price shall be multiplied by a fraction of which the numerator shall be the number of shares of Common Stock (excluding any treasury shares of the Corporation) outstanding immediately before such event and of which the denominator shall be the number of shares of Common Stock outstanding immediately after such event (excluding any treasury shares of the Corporation). Any adjustment made pursuant to this Section 7(a) shall become effective immediately after the record date for the determination of stockholders entitled to receive such dividend or distribution and shall become effective immediately after the effective date in the case of a subdivision or combination.

(b) **Fundamental Transaction.** If, at any time while any shares of Class X Preferred Stock are outstanding, (i) the Corporation effects any merger or consolidation of the Corporation with or into another Person, in which the Corporation is not the survivor or the stockholders of the Corporation immediately prior to such merger or consolidation do not own, directly or indirectly, at least 50% of the voting securities of the surviving entity, (ii) the Corporation effects any sale of all or substantially all of its assets or a majority of its Common Stock is acquired by a third party, in each case, in one or a series of related transactions, (iii) any tender offer or exchange offer (whether by the Corporation or another Person) is completed pursuant to which all or substantially all of the holders of Common Stock are permitted to tender or exchange their shares for other securities, cash or property, or (iv) the Corporation effects any reclassification of the Common Stock or any compulsory share exchange pursuant to which the Common Stock is effectively converted into or exchanged for other securities, cash or property (other than as a result of a subdivision or combination of shares of Common Stock covered by Section 7(a) above) (each, a “**Fundamental Transaction**”), then (X) if the Requisite Approval has previously been obtained, each share of Class X Preferred Stock outstanding immediately prior to such Fundamental Transaction shall, without any further action of the Holders thereof, automatically convert into shares of Common Stock at the applicable Conversion Ratio, upon the effective date and time (“**Fundamental Transaction Effective Time**”) of such Fundamental Transaction, and (Y) if the Requisite Approval has not previously been obtained, then as of the Fundamental Transaction Effective Time, each outstanding share of Class X Preferred Stock shall be canceled without any further action on the part of the Corporation or the Holder thereof, and in consideration for such cancellation, each Holder shall automatically receive, for each Conversion Share that would have been issuable had such cancelled shares of Class X Preferred Stock been converted immediately prior to the occurrence of such Fundamental Transaction, the same kind and amount of securities, cash and other property receivable upon the effectiveness of such Fundamental Transaction (the “**Exchange Property**”) as it would have been entitled to receive upon the occurrence of such Fundamental Transaction if it had been, immediately prior to such Fundamental Transaction, the holder of one share of Common Stock (the “**Alternate Consideration**”). The amount of Exchange Property receivable upon any Fundamental Transaction shall be determined based upon the Conversion Ratio in effect on such Fundamental Transaction Effective Time.

If holders of Common Stock are given any choice as to the securities, cash or property to be received in a Fundamental Transaction, then the Holders shall be given the same choice as to the Alternate Consideration it receives upon any conversion of their shares of Class X Preferred Stock following such Fundamental Transaction should such shares of Class X Preferred Stock remain outstanding after such Fundamental Transaction. To the extent necessary to effectuate the foregoing provisions should any shares of Class X Preferred Stock remain outstanding after a Fundamental Transaction, any successor to the Corporation or surviving entity in such Fundamental Transaction shall file a new Certificate of Designation with the same terms and conditions and issue to the Holders new preferred stock consistent with the foregoing provisions and evidencing the Holders’ right to convert such preferred stock into Alternate Consideration. The terms of any agreement to which the Corporation is a party and pursuant to which a Fundamental Transaction is effected shall include terms requiring any such successor or surviving entity to comply with the provisions of this Section 7(b) and ensuring that the outstanding shares

of Class X Preferred Stock (or any such replacement security) will be similarly adjusted upon any subsequent transaction analogous to a Fundamental Transaction.

The Corporation (or any successor) shall, within 20 days of the Effective Time of any Fundamental Transaction, provide written notice to the Holders of the occurrence of such event and of the kind and amount of the cash, securities or other property that constitute the Exchange Property. Failure to deliver such notice shall not affect the operation of this Section 7.

The Corporation shall not enter into any agreement for a transaction constituting a Fundamental Transaction that would interfere with or prevent (as applicable) conversion of the Class X Preferred Stock into the Exchange Property in a manner that is consistent with and gives effect to this Section 7.

(c) Calculations. All calculations under this Section 7 shall be made to the nearest cent or the nearest 1/100th of a share, as the case may be. For purposes of this Section 7, the number of shares of Common Stock deemed to be issued and outstanding as of a given date shall be the number of shares of Common Stock issued and outstanding (excluding any treasury shares of the Corporation).

(d) Notice to the Holders.

(i) Adjustment to Conversion Price. Whenever the Conversion Price is adjusted pursuant to any provision of this Section 7, the Corporation shall promptly deliver to each Holder a notice setting forth the Conversion Ratio after such adjustment and setting forth a brief statement of the facts requiring such adjustment.

(ii) Other Notices. If (A) the Corporation shall declare a dividend (or any other distribution in whatever form) on the Common Stock, (B) the Corporation shall declare a special nonrecurring cash dividend on or a redemption of the Common Stock, (C) the Corporation shall authorize the granting to all holders of the Common Stock of rights or warrants to subscribe for or purchase any shares of capital stock of any class or of any rights, (D) the approval of any stockholders of the Corporation shall be required in connection with any reclassification of the Common Stock, any consolidation or merger to which the Corporation is a party, any sale or transfer of all or substantially all of the assets of the Corporation, or any compulsory share exchange whereby the Common Stock is converted into other securities, cash or property, or (E) the Corporation shall authorize the voluntary or involuntary dissolution, liquidation or winding up of the affairs of the Corporation, then, in each case, the Corporation shall cause to be filed at each office or agency maintained for the purpose of conversion of the shares of Class X Preferred Stock, and shall cause to be delivered to each Holder at its last address as it shall appear upon the stock books of the Corporation, at least 20 calendar days prior to the applicable record or effective date hereinafter specified, a notice stating (x) the date on which a record is to be taken for the purpose of such dividend, distribution, redemption, rights or warrants, or if a record is not to be taken, the date as of which the holders of the Common Stock of record to be entitled to such dividend, distributions, redemption, rights or warrants are to be determined or (y) the date on which such reclassification, consolidation, merger, sale, transfer or share exchange is expected to become effective or close, and the date as

of which it is expected that holders of the Common Stock of record shall be entitled to exchange their shares of the Common Stock for securities, cash or other property deliverable upon such reclassification, consolidation, merger, sale, transfer or share exchange, provided that the failure to deliver such notice or any defect therein or in the delivery thereof shall not affect the validity of the corporate action required to be specified in such notice. To the extent that any notice provided hereunder constitutes, or contains, material, non-public information regarding the Company or any of its subsidiaries, the Company shall simultaneously file such notice with the Commission on a Current Report on Form 8-K.

Section 8. Miscellaneous.

(a) Notices. Any and all notices or other communications or deliveries to be provided by the Holders hereunder including, without limitation, any Notice of Conversion, shall be in writing and delivered personally, by facsimile, via email, or sent by a nationally recognized overnight courier service, addressed to the Corporation, at 3545 John Hopkins Court, Suite #250, San Diego, California 92121, Attention: Nancy Krueger, Vice President, Legal Affairs, email: [redacted], with a copy (which shall not constitute notice) to: Goodwin Procter LLP, Three Embarcadero Center, 28th Floor, San Francisco, California 94111, Attention: Mitzi Chang, email: [redacted], fax: [redacted]; or such other facsimile number, email address, or mailing address as the Corporation may specify for such purposes by notice to the Holders delivered in accordance with this Section. Any and all notices or other communications or deliveries to be provided by the Corporation hereunder shall be in writing and delivered personally, by facsimile, email, or sent by a nationally recognized overnight courier service addressed to each Holder at the facsimile number, email address or mailing address of such Holder appearing on the books of the Corporation, or if no such facsimile number, email address, or mailing address appears on the books of the Corporation, at the principal place of business of such Holder. Any notice or other communication or deliveries hereunder shall be deemed given and effective on the earliest of: (i) the date of transmission, if such notice or communication is delivered via facsimile or email prior to 5:30 p.m. (New York City time) on any date, (ii) the date immediately following the date of transmission, if such notice or communication is delivered via facsimile or email between 5:30 p.m. and 11:59 p.m. (New York City time) on any date, (iii) the second Business Day following the date of mailing, if sent by nationally recognized overnight courier service, or (iv) upon actual receipt by the party to whom such notice is required to be given.

(b) Lost or Mutilated Class X Preferred Stock Certificate. If a Holder's Class X Preferred Stock certificate, if applicable, shall be mutilated, lost, stolen or destroyed, the Corporation shall execute and deliver, if requested by the Holder, in exchange and substitution for and upon cancellation of a mutilated certificate, or in lieu of or in substitution for a lost, stolen or destroyed certificate, a new certificate for the shares of Class X Preferred Stock so mutilated, lost, stolen or destroyed, but only upon receipt of evidence of such loss, theft or destruction of such certificate, and of the ownership thereof, reasonably satisfactory to the Corporation and, in each case, customary and reasonable indemnity, if requested. Applicants for a new certificate under such circumstances shall also comply with such other reasonable regulations and procedures and pay such other reasonable third-party costs as the Corporation may prescribe.

(c) Waiver. Any waiver by the Corporation or a Holder of a breach of any provision of this Certificate of Designation shall not operate as or be construed to be a waiver of any other breach of such provision or of any breach of any other provision of this Certificate of Designation or a waiver by any other Holders. The failure of the Corporation or a Holder to insist upon strict adherence to any term of this Certificate of Designation on one or more occasions shall not be considered a waiver or deprive that party (or any other Holder) of the right thereafter to insist upon strict adherence to that term or any other term of this Certificate of Designation. Any waiver by the Corporation or a Holder must be in writing. Notwithstanding any provision in this Certificate of Designation to the contrary, any provision contained herein and any right of the Holders of Class X Preferred Stock granted hereunder may be waived as to all shares of Class X Preferred Stock (and the Holders thereof) upon the written consent of the Holders of a majority of the shares of Class X Preferred Stock then outstanding, unless a higher percentage is required by the DGCL, in which case the written consent of the Holders of not less than such higher percentage shall be required.

(d) Severability. If any provision of this Certificate of Designation is invalid, illegal or unenforceable, the balance of this Certificate of Designation shall remain in effect, and if any provision is inapplicable to any Person or circumstance, it shall nevertheless remain applicable to all other Persons and circumstances. If it shall be found that any interest or other amount deemed interest due hereunder violates the applicable law governing usury, the applicable rate of interest due hereunder shall automatically be lowered to equal the maximum rate of interest permitted under applicable law.

(e) Next Business Day. Whenever any payment or other obligation hereunder shall be due on a day other than a Business Day, such payment shall be made on the next succeeding Business Day.

(f) Headings. The headings contained herein are for convenience only, do not constitute a part of this Certificate of Designation and shall not be deemed to limit or affect any of the provisions hereof.

(g) Status of Converted Class X Preferred Stock. If any shares of Class X Preferred Stock shall be converted by the Corporation, such shares shall resume the status of authorized but unissued shares of preferred stock and shall no longer be designated as Class X Preferred Stock.

(h) Redemption by the Corporation. The Class X Preferred Stock shall not be redeemable by the Corporation.

(i) Transfer Agent, Registrar and Conversion Agent. The duly appointed transfer agent, registrar, conversion and dividend paying agent for shares of Class X Preferred Stock shall be American Stock Transfer & Trust Company, LLC (the "**Transfer Agent**"). The Corporation may, in its sole discretion, remove the Transfer Agent in accordance with the agreement between the Corporation and the Transfer Agent; *provided that* the Corporation shall appoint a successor transfer agent who shall accept such appointment prior to the effectiveness of such removal.

(j) Form. To the extent issued in certificated form, the Class X Preferred Stock shall be issued in the form of one or more definitive shares in fully registered form in substantially the form attached hereto as Exhibit A (each, a "**Class X Preferred Stock Certificate**"), which is hereby

incorporated in and expressly made a part of this Certificate of Designation. Each Class X Preferred Stock Certificate shall reflect the number of shares of Class X Preferred Stock represented thereby, and may have notations, legends or endorsements required by law, stock exchange rules, agreements to which the Corporation is subject, if any, or usage (provided that any such notation, legend or endorsement is in a form acceptable to the Corporation). Each Class X Preferred Stock Certificate shall be registered in the name or names of the Person or Persons specified by the depositary in a written instrument to the registrar.

The Chairman of the Board, President or Vice President and either the Treasurer or the Secretary of the Corporation shall sign each Class X Preferred Stock Certificate for the Corporation, in accordance with the Corporation's bylaws and applicable law, by manual or facsimile signature. If an officer whose signature is on a Class X Preferred Stock Certificate no longer holds that office at the time the Transfer Agent countersigned the Class X Preferred Stock Certificate, the Class X Preferred Stock Certificate shall be valid nevertheless. A Class X Preferred Stock Certificate shall not be valid until an authorized signatory of the Transfer Agent manually countersigns Class X Preferred Stock Certificate. Each Class X Preferred Stock Certificate shall be dated the date of its countersignature.

IN WITNESS WHEREOF, aTyr Pharma, Inc. has caused this Certificate of Designation of Preferences, Rights and Limitations of Class X Convertible Preferred Stock to be executed by its duly authorized officer this ____ day of August, 2017.

John Blake
Senior Vice President, Finance

ANNEX A

NOTICE OF CONVERSION

(TO BE EXECUTED BY THE REGISTERED HOLDER
IN ORDER TO CONVERT SHARES OF CLASS X PREFERRED STOCK)

The undersigned Holder hereby irrevocably elects to convert the number of shares of Class X Preferred Stock indicated below, represented by stock certificate No(s). _____ or book entry notation (the "**Preferred Stock Certificates**"), into shares of common stock, par value \$0.001 per share (the "**Common Stock**"), of aTyr Pharma, Inc., a Delaware corporation (the "**Corporation**"), as of the date written below. If securities are to be issued in the name of a person other than the undersigned, the undersigned will pay all transfer taxes payable with respect thereto. Capitalized terms utilized but not defined herein shall have the meaning ascribed to such terms in that certain Certificate of Designation of Preferences, Rights and Limitations of Class X Convertible Preferred Stock (the "**Certificate of Designation**") filed by the Corporation with the Delaware Secretary of State on August __, 2017.

The Holder and its Attribution Parties (as defined in the Certificate of Designation) together beneficially own an aggregate of _____ shares of Common Stock, as determined in accordance with Section 13(d) of the Securities Exchange Act of 1934, as amended, and the applicable regulations of the Securities and Exchange Commission.

Conversion calculations:

Date to Effect Conversion: _____

Number of shares of Class X Preferred Stock owned prior to Conversion: _____

Number of shares of Class X Preferred Stock to be Converted: _____

Number of shares of Common Stock to be Issued: _____

Address for delivery of physical certificates: _____

Or

for DWAC Delivery: _____

DWAC Instructions: _____

Broker no: _____

Account no: _____

HOLDER

By: _____

Name: _____

Title: _____

Date: _____

EXHIBIT A

FORM OF CLASS X CONVERTIBLE PREFERRED STOCK CERTIFICATE

(ATTACHED)

REGISTRATION RIGHTS AGREEMENT

This Registration Rights Agreement (this “*Agreement*”) is made and entered into as of August 27, 2017 by and among aTyr Pharma, Inc., a Delaware corporation (the “*Company*”), and the several purchasers signatory hereto (each a “*Purchaser*” and collectively, the “*Purchasers*”).

This Agreement is made pursuant to the Securities Purchase Agreement, dated as of the date hereof between the Company, each Purchaser and certain other purchasers (the “*Purchase Agreement*”).

NOW, THEREFORE, IN CONSIDERATION of the mutual covenants contained in this Agreement, and for other good and valuable consideration, the receipt and adequacy of which are hereby acknowledged, the Company and each of the Purchasers agree as follows:

1. **Definitions.** Capitalized terms used and not otherwise defined herein that are defined in the Purchase Agreement shall have the meanings given such terms in the Purchase Agreement. As used in this Agreement, the following terms shall have the following meanings:

“*Advice*” has the meaning set forth in Section 6(d).

“*Affiliate*” means, with respect to any person, any other person which directly or indirectly controls, is controlled by, or is under common control with, such person.

“*Agreement*” has the meaning set forth in the Preamble.

“*Business Day*” means a day, other than a Saturday or Sunday, on which banks in New York City are open for the general transaction of business.

“*Closing*” has the meaning set forth in the Purchase Agreement.

“*Closing Date*” has the meaning set forth in the Purchase Agreement.

“*Commission*” means the Securities and Exchange Commission.

“*Common Shares*” means the shares of Common Stock issued or issuable to the Purchasers pursuant to the Purchase Agreement.

“*Common Stock*” means the common stock of the Company, par value \$0.001 per share, and any securities into which such common stock may hereinafter be reclassified.

“*Company*” has the meaning set forth in the Preamble.

“*Effective Date*” means the date that the Registration Statement filed pursuant to Section 2(a) is first declared effective by the Commission.

“*Effectiveness Deadline*” means, with respect to the Initial Registration Statement or the New Registration Statement, the ninetieth (90th) calendar day following the Closing Date (or, in the event the Commission reviews and has written comments to the Initial Registration Statement or the New Registration Statement, the one hundred twentieth (120th) calendar day following the Closing Date); *provided, however*, that if the Company is notified by the Commission that the Initial Registration Statement or the New Registration Statement will not be reviewed or is no longer subject to further review and comments, the Effectiveness Deadline as to such Registration Statement shall be the fifth (5th)

Trading Day following the date on which the Company is so notified if such date precedes the dates otherwise required above; *provided, further*, that if the Effectiveness Deadline falls on a Saturday, Sunday or other day that the Commission is closed for business, the Effectiveness Deadline shall be extended to the next Business Day on which the Commission is open for business.

“*Effectiveness Period*” has the meaning set forth in Section 2(b).

“*Exchange Act*” means the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder.

“*Filing Deadline*” means, with respect to the Initial Registration Statement required to be filed pursuant to Section 2(a), the thirtieth (30th) calendar day following the Closing Date, *provided, however*, that if the Filing Deadline falls on a Saturday, Sunday or other day that the Commission is closed for business, the Filing Deadline shall be extended to the next business day on which the Commission is open for business.

“*Governmental Entity*” means any United States or foreign (i) federal, state, local, municipal or other government, (ii) governmental or quasi-governmental entity of any nature (including, without limitation, any governmental agency, branch, department, official or entity and any court or other tribunal) or (iii) body exercising or entitled to exercise any administrative, executive, judicial, legislative, police, regulatory or taxing authority or power of any nature, including, without limitation, any arbitral tribunal.

“*Holder*” or “*Holder*s” means the holder or holders, as the case may be, from time to time of Registrable Securities.

“*Indemnified Party*” has the meaning set forth in Section 5(c).

“*Indemnifying Party*” has the meaning set forth in Section 5(c).

“*Initial Registration Statement*” means the initial Registration Statement filed pursuant to Section 2(a) of this Agreement.

“*Losses*” has the meaning set forth in Section 5(a).

“*New Registration Statement*” has the meaning set forth in Section 2(a).

“*Person*” means an individual or corporation, partnership, trust, incorporated or unincorporated association, joint venture, limited liability company, joint stock company, government (or an agency or subdivision thereof) or other entity of any kind.

“*Placement Agent*” means Piper Jaffray & Co. and any permitted assigns.

“*Preferred Stock*” means Class X Preferred Stock, par value \$0.001 per share issued pursuant to the Purchase Agreement, and any securities into which such Class X Preferred Stock may hereinafter be reclassified.

“*Principal Market*” means the Trading Market on which the Common Stock is primarily listed on and quoted for trading, which, as of the Closing Date, shall be The NASDAQ Global Select Market.

“*Proceeding*” means an action, claim, suit, investigation or proceeding (including, without limitation, an investigation or partial proceeding, such as a deposition), whether commenced or threatened.

“*Prospectus*” means the prospectus included in a Registration Statement (including, without limitation, a prospectus that includes any information previously omitted from a prospectus filed as part of an effective registration statement in reliance upon Rule 430B promulgated under the Securities Act), as amended or supplemented by any prospectus supplement, with respect to the terms of the offering of any portion of the Registrable Securities covered by a Registration Statement, and all other amendments and supplements to the Prospectus, including post-effective amendments, and all material incorporated by reference or deemed to be incorporated by reference in such Prospectus.

“*Purchase Agreement*” has the meaning set forth in the Recitals.

“*Purchaser*” or “*Purchasers*” has the meaning set forth in the Preamble.

“*Registrable Securities*” means all of (i) the Shares and (ii) any securities issued or issuable upon any conversion, exercise, stock split, dividend or other distribution, merger, consolidation, exchange, recapitalization or similar event with respect to the foregoing, *provided*, that the Holder has completed and delivered to the Company a Selling Stockholder Questionnaire; and *provided, further*, that with respect to a particular Holder, such Holder’s Shares shall cease to be Registrable Securities upon the earlier to occur of the following: (A) a sale pursuant to a Registration Statement or Rule 144 under the Securities Act (in which case, only such securities sold by the Holder shall cease to be a Registrable Security); and (B) the sum of (i) the Common Shares held by the Holder, (ii) Warrant Shares issuable upon exercise of Warrants held by the Holder and (iii) Underlying Shares issuable upon conversion of Preferred Stock, disregarding in the case of the foregoing clauses (ii) and (iii) the effect of any provision limiting exercise or conversion of such securities, held by the Holder being equal to less than one percent (1%) of the Company’s Common Stock issued and outstanding (the “*Threshold*”), *provided*, however that with respect to any Holder whose purchase of Registrable Securities pursuant to the Purchase Agreement is less than the Threshold, the Threshold applicable to such Holder shall be the amount of Registrable Securities purchased pursuant to the Purchase Agreement.

“*Registration Statements*” means any one or more registration statements of the Company filed under the Securities Act that covers the resale of any of the Registrable Securities pursuant to the provisions of this Agreement (including without limitation the Initial Registration Statement, the New Registration Statement and any Remainder Registration Statements), amendments and supplements to such Registration Statements, including post-effective amendments, all exhibits and all material incorporated by reference or deemed to be incorporated by reference in such Registration Statements.

“*Remainder Registration Statement*” has the meaning set forth in [Section 2\(a\)](#).

“*Rule 144*” means Rule 144 promulgated by the Commission pursuant to the Securities Act, as such Rule may be amended from time to time, or any similar rule or regulation hereafter adopted by the Commission having substantially the same effect as such Rule.

“*Rule 415*” means Rule 415 promulgated by the Commission pursuant to the Securities Act, as such Rule may be amended from time to time, or any similar rule or regulation hereafter adopted by the Commission having substantially the same effect as such Rule.

“Rule 424” means Rule 424 promulgated by the Commission pursuant to the Securities Act, as such Rule may be amended from time to time, or any similar rule or regulation hereafter adopted by the Commission having substantially the same effect as such Rule.

“SEC Guidance” means (i) any publicly-available written or oral guidance, comments, requirements or requests of the Commission staff and (ii) the Securities Act.

“Securities Act” means the Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder.

“Selling Stockholder Questionnaire” means a questionnaire in the form attached as Annex B hereto, or such other form of questionnaire as may reasonably be adopted by the Company from time to time.

“Shares” means the Common Shares, the Warrant Shares and the Underlying Shares.

“Trading Day” means (i) a day on which the Common Stock is listed or quoted and traded on its Principal Market (other than the OTC Bulletin Board), or (ii) if the Common Stock is not listed on a Trading Market (other than the OTC Bulletin Board), a day on which the Common Stock is traded in the over-the-counter market, as reported by the OTC Bulletin Board, or (iii) if the Common Stock is not quoted on any Trading Market, a day on which the Common Stock is quoted in the over-the-counter market as reported in the “pink sheets” by Pink Sheets LLC (or any similar organization or agency succeeding to its functions of reporting prices); *provided*, that in the event that the Common Stock is not listed or quoted as set forth in (i), (ii) and (iii) hereof, then Trading Day shall mean a Business Day.

“Trading Market” means whichever of the New York Stock Exchange, the NYSE Amex Equities (formerly the American Stock Exchange), the NASDAQ Global Select Market, the NASDAQ Global Market, the NASDAQ Capital Market or OTC Bulletin Board on which the Common Stock is listed or quoted for trading on the date in question.

“Underlying Shares” means the shares of Common Stock issued or issuable upon conversion of the Preferred Stock.

“Warrants” means the Warrants issued pursuant to the Purchase Agreement.

“Warrant Shares” means the shares of Common Stock issued or issuable upon exercise of the Warrants.

2. Registration.

(a) On or prior to the Filing Deadline, the Company shall prepare and file with the Commission a Registration Statement covering the resale of all of the Registrable Securities not already covered by an existing and effective Registration Statement for an offering to be made on a continuous basis pursuant to Rule 415 or, if Rule 415 is not available for offers and sales of the Registrable Securities, by such other means of distribution of Registrable Securities as the Holders may reasonably specify (the “Initial Registration Statement”). The Initial Registration Statement shall be on Form S-3 (except if the Company is then ineligible to register for resale the Registrable Securities on Form S-3, in which case such registration shall be on such other form available to register for resale the Registrable Securities as a secondary offering) subject to the provisions of Section 2(e) and shall contain (except if otherwise required pursuant to written comments received from the Commission upon a review of such

Registration Statement) the “Plan of Distribution” section attached hereto as Annex A (which may be modified to respond to comments, if any, provided by the Commission). Notwithstanding the registration obligations set forth in this Section 2, in the event the Commission informs the Company that all of the Registrable Securities cannot, as a result of the application of Rule 415, be registered for resale as a secondary offering on a single registration statement, the Company agrees to promptly (i) inform each of the Holders thereof and use its commercially reasonable efforts to file amendments to the Initial Registration Statement as required by the Commission and/or (ii) withdraw the Initial Registration Statement and file a new registration statement (a “*New Registration Statement*”), in either case covering the maximum number of Registrable Securities permitted to be registered by the Commission, on Form S-3 or, if the Company is ineligible to register the Registrable Securities on Form S-3, such other form available to register for resale the Registrable Securities as a secondary offering; *provided, however*, that prior to filing such amendment or New Registration Statement, the Company shall be obligated to use its commercially reasonable efforts to advocate with the Commission for the registration of all of the Registrable Securities in accordance with the SEC Guidance, including without limitation, the Securities Act Rules Compliance and Disclosure Interpretations Question 612.09. Notwithstanding any other provision of this Agreement, if any SEC Guidance sets forth a limitation of the number of Registrable Securities permitted to be registered on a particular Registration Statement as a secondary offering (and notwithstanding that the Company used diligent efforts to advocate with the Commission for the registration of all or a greater number of Registrable Securities), unless otherwise directed in writing by a Holder as to its Registrable Securities, the number of Registrable Securities to be registered on such Registration Statement will first be reduced by Registrable Securities not acquired pursuant to the Purchase Agreement (whether pursuant to registration rights or otherwise), second by Registrable Securities represented by holders of Warrant Shares (applied, in the case that some Warrant Shares may be registered, to the Holders on a pro rata basis based on the total number of unregistered Warrant Shares held by such Holders), third by Registrable Securities represented by Underlying Shares (applied, in the case that some Underlying Shares may be registered, to the Holders on a pro rata basis based on the total number of unregistered Underlying Shares held by such Holders) and fourth by Registrable Securities represented by Common Shares (applied, in the case that some Common Shares may be registered, to the Holders on a pro rata basis based on the total number of unregistered Common Shares held by such Holders), subject to a determination by the Commission that certain Holders must be reduced first based on the number of Common Shares held by such Holders). In the event the Company amends the Initial Registration Statement or files a New Registration Statement, as the case may be, under clauses (i) or (ii) above, the Company will use its commercially reasonable efforts to file with the Commission, as promptly as allowed by Commission or SEC Guidance provided to the Company or to registrants of securities in general, one or more registration statements on Form S-3 or such other form available to register for resale those Registrable Securities that were not registered for resale on the Initial Registration Statement, as amended, or the New Registration Statement (the “*Remainder Registration Statements*”).

(b) The Company shall use its commercially reasonable efforts to cause each Registration Statement to be declared effective by the Commission as soon as practicable and, with respect to the Initial Registration Statement or the New Registration Statement, as applicable, no later than the Effectiveness Deadline (including filing with the Commission a request for acceleration of effectiveness in accordance with Rule 461 promulgated under the Securities Act), and shall use its commercially reasonable efforts to keep each Registration Statement continuously effective under the Securities Act until the earlier of (i) such time as all of the Registrable Securities covered by such Registration Statement have been publicly sold by the Holders and (ii) the date on which the Holders cease to hold Registrable Securities (the “*Effectiveness Period*”). The Company shall telephonically request effectiveness of a Registration Statement as of 5:00 P.M. New York City time on a Trading Day. The Company shall promptly notify the Holders via facsimile or electronic mail of a “.pdf” format data file of the effectiveness of a Registration Statement on the same Trading Day that the Company

telephonically confirms effectiveness with the Commission, which date of confirmation shall initially be the date requested for effectiveness of such Registration Statement.

(c) Each Holder agrees to furnish to the Company a completed Selling Stockholder Questionnaire not more than three (3) Trading Days following the date of this Agreement. At least five (5) Trading Days prior to the first anticipated filing date of a Registration Statement for any registration under this Agreement, the Company will notify each Holder of the information the Company reasonably requires from that Holder other than the information contained in the Selling Stockholder Questionnaire, if any, which shall be completed and delivered to the Company promptly upon request and, in any event, within three (3) Trading Days prior to the applicable anticipated filing date. Each Holder further agrees that it shall not be entitled to be named as a selling securityholder in the Registration Statement or use the Prospectus for offers and resales of Registrable Securities at any time, unless such Holder has returned to the Company a completed and signed Selling Stockholder Questionnaire and a response to any requests for further information as described in the previous sentence. If a Holder of Registrable Securities returns a Selling Stockholder Questionnaire or a request for further information, in either case, after its respective deadline, the Company shall use its commercially reasonable efforts to take such actions as are required to name such Holder as a selling securityholder in the Registration Statement or any pre-effective or post-effective amendment thereto and to include (to the extent not theretofore included) in the Registration Statement the Registrable Securities identified in such late Selling Stockholder Questionnaire or request for further information. Each Holder acknowledges and agrees that the information in the Selling Stockholder Questionnaire or request for further information as described in this Section 2(d) will be used by the Company in the preparation of the Registration Statement and hereby consents to the inclusion of such information in the Registration Statement.

(d) In the event that Form S-3 is not available for the registration of the resale of Registrable Securities hereunder, the Company shall (i) register the resale of the Registrable Securities on another appropriate form reasonably acceptable to the Holders and (ii) undertake to register the Registrable Securities on Form S-3 promptly after such form is available, *provided* that the Company shall maintain the effectiveness of the Registration Statement then in effect until such time as a Registration Statement on Form S-3 covering the Registrable Securities has been declared effective by the Commission.

3. Registration Procedures

In connection with the Company's registration obligations hereunder, the Company shall:

(a) Not less than three (3) Trading Days prior to the filing of each Registration Statement and not less than two (2) Trading Days prior to the filing of any related Prospectus or any amendment or supplement thereto (except for Annual Reports on Form 10-K, and Quarterly Reports on Form 10-Q and Current Reports on Form 8-K and any similar or successor reports), (i) furnish to the Holder copies of such Registration Statement, Prospectus or amendment or supplement thereto, as proposed to be filed, which documents will be subject to the review of such Holder (it being acknowledged and agreed that if a Holder does not object to or comment on the aforementioned documents within such three (3) Trading Day or two (2) Trading Day period, as the case may be, then the Holder shall be deemed to have consented to and approved the use of such documents) and (ii) use commercially reasonable efforts to cause its officers and directors, counsel and independent registered public accountants to respond to such inquiries as shall be necessary, in the reasonable opinion of respective counsel to each Holder, to conduct a reasonable investigation within the meaning of the Securities Act. The Company shall not file any Registration Statement or amendment or supplement thereto in a form to which a Holder reasonably objects in good faith, provided that, the Company is

notified of such objection in writing within the three (3) Trading Day or two (2) Trading Day period described above, as applicable.

(b) (i) Prepare and file with the Commission such amendments (including post-effective amendments) and supplements, to each Registration Statement and the Prospectus used in connection therewith as may be necessary to keep such Registration Statement continuously effective as to the applicable Registrable Securities for its Effectiveness Period; (ii) cause the related Prospectus to be amended or supplemented by any required Prospectus supplement (subject to the terms of this Agreement), and, as so supplemented or amended, to be filed pursuant to Rule 424; (iii) respond as promptly as reasonably practicable to any comments received from the Commission with respect to each Registration Statement or any amendment thereto and, as promptly as reasonably possible, provide the Holders true and complete copies of all correspondence from and to the Commission relating to such Registration Statement that pertains to the Holders as “Selling Stockholders” but not any comments that would result in the disclosure to the Holders of material and non-public information concerning the Company; and (iv) comply with the provisions of the Securities Act and the Exchange Act with respect to the disposition of all Registrable Securities covered by a Registration Statement until such time as all of such Registrable Securities shall have been disposed of (subject to the terms of this Agreement) in accordance with the intended methods of disposition by the Holders thereof as set forth in such Registration Statement as so amended or in such Prospectus as so supplemented; *provided, however*, that each Purchaser shall be responsible for the delivery of the Prospectus to the Persons to whom such Purchaser sells any of the Shares (including in accordance with Rule 172 under the Securities Act), and each Purchaser agrees to dispose of Registrable Securities in compliance with the “Plan of Distribution” described in the Registration Statement and otherwise in compliance with applicable federal and state securities laws. In the case of amendments and supplements to a Registration Statement which are required to be filed pursuant to this Agreement (including pursuant to this Section 3(b)) by reason of the Company filing a report on Form 10-K, Form 10-Q or Form 8-K or any analogous report under the Exchange Act, the Company shall have incorporated such report by reference into such Registration Statement, if applicable, or shall file such amendments or supplements with the Commission on the same day on which the Exchange Act report which created the requirement for the Company to amend or supplement such Registration Statement was filed.

(c) Notify the Holders (which notice shall, pursuant to clauses (iii) through (vi) hereof, be accompanied by an instruction to suspend the use of the Prospectus until the requisite changes have been made) as promptly as reasonably practicable (and, in the case of (i)(A) below, not less than one (1) Trading Day prior to such filing) and (if requested by any such Person) confirm such notice in writing no later than one (1) Trading Day following the day: (i)(A) when a Prospectus or any Prospectus supplement or post-effective amendment to a Registration Statement is proposed to be filed; (B) when the Commission notifies the Company whether there will be a “review” of such Registration Statement and whenever the Commission comments in writing on any Registration Statement (in which case the Company shall provide to each of the Holders true and complete copies of all comments that pertain to the Holders as a “Selling Stockholder” or to the “Plan of Distribution” and all written responses thereto, but not information that the Company believes would constitute material and non-public information); and (C) with respect to each Registration Statement or any post-effective amendment, when the same has become effective; (ii) of any request by the Commission or any other Federal or state governmental authority for amendments or supplements to a Registration Statement or Prospectus or for additional information that pertains to the Holders as “Selling Stockholders” or the “Plan of Distribution”; (iii) of the issuance by the Commission or any other federal or state governmental authority of any stop order suspending the effectiveness of a Registration Statement covering any or all of the Registrable Securities or the initiation of any Proceedings for that purpose; (iv) of the receipt by the Company of any notification with respect to the suspension of the qualification or exemption from qualification of any of the Registrable Securities for sale in any jurisdiction, or the initiation or threatening of any Proceeding for

such purpose; (v) of the occurrence of any event or passage of time that makes the financial statements included in a Registration Statement ineligible for inclusion therein or any statement made in such Registration Statement or Prospectus or any document incorporated or deemed to be incorporated therein by reference untrue in any material respect or that requires any revisions to such Registration Statement, Prospectus or other documents so that, in the case of such Registration Statement or the Prospectus, as the case may be, it will not contain any untrue statement of a material fact or omit to state any material fact required to be stated therein or necessary to make the statements therein (in the case of any Prospectus, form of prospectus or supplement thereto, in light of the circumstances under which they were made), not misleading and (vi) of the occurrence or existence of any pending corporate development with respect to the Company that the Company believes may be material and that, in the determination of the Company, makes it not in the best interest of the Company to allow continued availability of a Registration Statement or Prospectus, *provided* that, any and all such information shall remain confidential to each Holder until such information otherwise becomes public, unless disclosure by a Holder is required by law; *provided, further*, that notwithstanding each Holder's agreement to keep such information confidential, each such Holder makes no acknowledgement that any such information is material, non-public information; and *provided, further*, that any notice sent by the Company pursuant to clauses (iii)-(vi) of this paragraph shall be deemed to be an exercise by the Company of its right under Section 3(h) hereof to suspend the availability of a Registration Statement and Prospectus.

(d) Use commercially reasonable efforts to avoid the issuance of, or, if issued, obtain the withdrawal of (i) any order suspending the effectiveness of a Registration Statement, or (ii) any suspension of the qualification (or exemption from qualification) of any of the Registrable Securities for sale in any jurisdiction, as soon as practicable.

(e) If requested by a Holder, furnish to such Holder, without charge, at least one conformed copy of each Registration Statement and each amendment thereto and all exhibits to the extent requested by such Person (including those previously furnished or incorporated by reference) promptly after the filing of such documents with the Commission; *provided*, that the Company shall have no obligation to provide any document pursuant to this clause that is available on the Commission's EDGAR system.

(f) Prior to any resale of Registrable Securities by a Holder, use its commercially reasonable efforts to register or qualify or cooperate with the selling Holders in connection with the registration or qualification (or exemption from the registration or qualification) of such Registrable Securities for the resale by the Holder under the securities or Blue Sky laws of such jurisdictions within the United States as any Holder reasonably requests in writing, to keep each registration or qualification (or exemption therefrom) effective during the Effectiveness Period and to do any and all other acts or things reasonably necessary to enable the disposition in such jurisdictions of the Registrable Securities covered by each Registration Statement; *provided*, that the Company shall not be required to qualify generally to do business in any jurisdiction where it is not then so qualified, subject the Company to any material tax in any such jurisdiction where it is not then so subject or file a general consent to service of process in any such jurisdiction.

(g) If requested by a Holder, cooperate with such Holder to facilitate the timely preparation and delivery of certificates or book entry statements, as applicable, representing Registrable Securities to be delivered to a transferee pursuant to the Registration Statement, which certificates or statements shall be free, to the extent permitted by the Purchase Agreement and under law, of all restrictive legends, and to enable such Registrable Securities to be in such denominations and registered in such names as any such Holders may reasonably request.

(h) Following the occurrence of any event contemplated by Section 3(c), as promptly as reasonably practicable (taking into account the Company's good faith assessment of any adverse consequences to the Company and its stockholders of the premature disclosure of such event), prepare a supplement or amendment, including a post-effective amendment, to the affected Registration Statements or a supplement to the related Prospectus or any document incorporated or deemed to be incorporated therein by reference, and file any other required document so that, as thereafter delivered, no Registration Statement nor any Prospectus will contain an untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein (in the case of any Prospectus, form of prospectus or supplement thereto, in light of the circumstances under which they were made), not misleading. If the Company notifies the Holders in accordance with clauses (iii) through (vi) of Section 3(c) above to suspend the use of any Prospectus until the requisite changes to such Prospectus have been made, then the Holders shall suspend use of such Prospectus. The Company will use its commercially reasonable efforts to ensure that the use of the Prospectus may be resumed as promptly as is practicable. The Company shall be entitled to exercise its right under this Section 3(h) to suspend the availability of a Registration Statement and Prospectus for two (2) periods, each period not to exceed twenty (20) consecutive calendar days, in any twelve (12) month period.

(i) The Company may require each selling Holder to furnish to the Company a certified statement as to (i) the number of shares of Common Stock beneficially owned by such Holder and any Affiliate thereof, (ii) any Financial Industry Regulatory Authority ("*FINRA*") affiliations, (iii) any natural persons who have the power to vote or dispose of the common stock and (iv) any other information as may be requested by the Commission, *FINRA* or any state securities commission.

(j) The Company shall cooperate with any registered broker through which a Holder proposes to resell its Registrable Securities in effecting a filing with *FINRA* pursuant to *FINRA* Rule 5110 as requested by any such Holder and the Company shall pay the filing fee required for the first such filing within two (2) Business Days of the request therefor.

(k) The Company shall cooperate with each selling Holder and each underwriter of a secondary underwritten offering pursuant to a Registration Statement whereby the aggregate offering price of the Registrable Securities to be sold in such secondary underwritten offering is at least ten million dollars (an "Underwritten Offering"), if applicable, to facilitate the timely preparation and delivery of certificates representing Registrable Securities to be delivered to a transferee pursuant to a Registration Statement, which certificates shall be free of all restrictive legends indicating that the Registrable Securities are unregistered or unqualified for resale under the Securities Act, Exchange Act or other applicable securities laws, and to enable such Registrable Securities to be in such denominations and registered in such names as each Holder or underwriter of an Underwritten Offering, if any, may request in writing. In connection therewith, if required by the Company's transfer agent, the Company will promptly, after the effective date of the Registration Statement, cause an opinion of counsel as to the effectiveness of the Registration Statement to be delivered to and maintained with such transfer agent, together with any other authorizations, certificates and directions required by the transfer agent which authorize and direct the transfer agent to issue such Registrable Securities without any such legend upon sale by the Holder or the underwriter or managing underwriter of an Underwritten Offering, if any, of such Registrable Securities under the Registration Statement.

(l) The Company shall in connection with an Underwritten Offering, use commercially reasonable efforts to obtain (A) opinions of counsel for the Company addressed to the underwriter(s), covering the matters customarily covered in opinions requested in underwritten offerings and such other matters as may reasonably be requested by such underwriters and (B) "comfort" letters addressed to the underwriter(s) and updates thereof (or, in the case of any such Person which does not satisfy the conditions for receipt of a "comfort" letter specified in Auditing Standard No. 6101, an "agreed

upon procedures” letter) signed by the independent public accountants who have certified the Company’s financial statements and, to the extent required, any other financial statements included in such registration statement, covering the matters customarily covered in “comfort” letters in connection with underwritten offerings.

(m) Upon the execution of an agreement with respect to confidentiality, the Company shall make available for inspection by (A) any underwriter participating in any Underwritten Offering or (B) any Holder participating in an offering who is or may be deemed to be an “underwriter” as defined in Section 2(a)(11) of the Securities, in each case pursuant to such Registration Statement and any attorney, accountant or other agent retained by any such underwriter or by such Holder, all corporate documents, financial and other records relating to the Company and its business as reasonably requested by such underwriter or by such Holder, cause the Company’s officers, directors, employees and independent accountants to supply all information reasonably requested by any such underwriter or such Holder, attorney, accountant or agent in connection with such Underwritten Offering and make senior management of the Company available for customary due diligence and drafting calls and customary marketing activities, including reasonable requests for road shows, and request that the Company’s independent accountants be available for customary due diligence calls; provided, that any Person gaining access to information or personnel of the Company pursuant to this Section 3(m) shall (i) reasonably cooperate with the Company to limit any resulting disruption to the Company’s business and (ii) protect the confidentiality of any information regarding the Company which the Company determines in good faith to be confidential and of which determination such Person is notified, unless such information (A) is or becomes known to the public without a breach of any confidentiality agreement applicable to such Person, (B) is or becomes available to such Person on a non-confidential basis from a source other than the Company, (C) is independently developed by such Person, or (D) is required to be disclosed by a Governmental Entity or is otherwise required to be disclosed by law, provided that in the case of clause (D), such Person shall, to the extent allowed under applicable law, provide the Company with reasonable notice thereof, to the extent permissible under law and reasonably practicable, to enable the Company, at its sole expense, to seek a protective order to prevent such disclosure.

(n) The Company shall enter into such agreements (including an underwriting agreement in form, scope and substance as is customary in Underwritten Offerings) and use its commercially reasonable efforts to take all such other actions reasonably requested by the Holders selling securities in an Underwritten Offering (including those reasonably requested by the lead managing underwriter(s), if any) to expedite or facilitate the disposition of such Registrable Securities, and in such connection, in an Underwritten Offering (A) make such representations and warranties to the holders of such Registrable Securities and the underwriters, if any, with respect to the business of the Company and its subsidiaries, and the Registration Statement, Prospectus and documents, if any, incorporated or deemed to be incorporated by reference therein, in each case, in form, substance and scope as are customarily made by issuers in Underwritten Offerings, (B) include in the underwriting agreement indemnification provisions and procedures in form, substance and scope as are customarily made by issuers in Underwritten Offerings and (C) deliver such documents and certificates as reasonably requested and as customary in Underwritten Offerings by the Holders of the Registrable Securities being sold, their counsel and the lead managing underwriters(s), if any, to evidence the continued validity of the representations and warranties made pursuant to sub-clause (A) above and to evidence compliance with any customary conditions contained in the underwriting agreement entered into by the Company. The above shall be done at each closing under such underwriting agreement, or as and to the extent required thereunder.

(o) The Holders of a majority of the Registrable Securities being offered in the Underwritten Offering shall have the right to select the investment banking firm(s) to act as the managing underwriter(s) in connection with such Underwritten Offering and one firm of counsel (along with any

reasonably necessary local counsel) to represent all participating Holders in such offering, and will determine the plan of distribution in cooperation with the managing underwriter(s) (including the underwriting commissions, discounts and fees).

4. Registration Expenses. All fees and expenses incident to the Company's performance of or compliance with its obligations under this Agreement (excluding any underwriting discounts and selling commissions and all legal fees and expenses of legal counsel for any Holder including those specified under Section 3(o)) shall be borne by the Company whether or not any Registrable Securities are sold pursuant to a Registration Statement. The fees and expenses referred to in the foregoing sentence shall include, without limitation, (i) all registration and filing fees (including, without limitation, fees and expenses (A) with respect to filings required to be made with any Trading Market on which the Common Stock is then listed for trading, (B) with respect to compliance with applicable state securities or Blue Sky laws (including, without limitation, fees and disbursements of counsel for the Company in connection with Blue Sky qualifications or exemptions of the Registrable Securities and determination of the eligibility of the Registrable Securities for investment under the laws of such jurisdictions as requested by the Holders) and (C) if not previously paid by the Company in connection with Section 3(j) above, with respect to any filing that may be required to be made by any broker through which a Holder intends to make sales of Registrable Securities with FINRA pursuant to the FINRA Rule 5110, so long as the broker is receiving no more than a customary brokerage commission in connection with such sale, (ii) printing expenses (including, without limitation, expenses of printing certificates for Registrable Securities and of printing prospectuses if the printing of prospectuses is reasonably requested by the Holders of a majority of the Registrable Securities included in the Registration Statement), (iii) messenger, telephone and delivery expenses, (iv) fees and disbursements of counsel and independent accountants for the Company, (v) Securities Act liability insurance, if the Company so desires such insurance, and (vi) fees and expenses of all other Persons retained by the Company in connection with the consummation of the transactions contemplated by this Agreement. In addition, the Company shall be responsible for all of its internal expenses incurred in connection with the consummation of the transactions contemplated by this Agreement (including, without limitation, all salaries and expenses of its officers and employees performing legal or accounting duties), the expense of any annual audit and the fees and expenses incurred in connection with the listing of the Registrable Securities on any securities exchange as required hereunder. In no event shall the Company be responsible for any underwriting, broker or similar fees or commissions of any Holder or, except to the extent provided for in the Transaction Documents, any legal fees or other costs of the Holders.

5. Indemnification.

(a) Indemnification by the Company. The Company shall, notwithstanding any termination of this Agreement, indemnify, defend and hold harmless each Holder, the officers, directors, agents, partners, members, managers, stockholders, Affiliates and employees of each of them, each Person who controls any such Holder (within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act) and the officers, directors, partners, members, managers, stockholders, agents and employees of each such controlling Person, to the fullest extent permitted by applicable law, from and against any and all losses, claims, damages, liabilities, costs (including, without limitation, reasonable costs of preparation and investigation and reasonable attorneys' fees) and expenses (collectively, "*Losses*"), as incurred, that arise out of or are based upon (i) any untrue or alleged untrue statement of a material fact contained in any Registration Statement, any Prospectus or any form of prospectus or in any amendment or supplement thereto or in any preliminary prospectus, or arising out of or relating to any omission or alleged omission to state a material fact required to be stated therein or necessary to make the statements therein (in the case of any Prospectus or form of prospectus or supplement thereto, in light of the circumstances under which they were made) not misleading, or (ii) any violation or alleged violation by the Company of the Securities Act, Exchange Act or any state securities law or any rule or regulation

thereunder, in connection with the performance of its obligations under this Agreement, except to the extent, but only to the extent, that (A) such untrue statements, alleged untrue statements, omissions or alleged omissions are based solely upon information regarding such Holder furnished in writing to the Company by such Holder expressly for use therein, or to the extent that such information relates to such Holder or such Holder's proposed method of distribution of Registrable Securities and was reviewed and approved in writing by such Holder expressly for use in the Registration Statement, such Prospectus or such form of Prospectus or in any amendment or supplement thereto (it being understood that each Holder has approved Annex A hereto for this purpose) or (B) in the case of a suspension of the availability of a Registration Statement or Prospectus pursuant to Section 3(h), related to the use by a Holder of an outdated or defective Prospectus after the Company has notified such Holder in writing that the Prospectus is outdated or defective and prior to the receipt by such Holder of the Advice contemplated and defined in Section 6(d) below, to the extent that following the receipt of the Advice the misstatement or omission giving rise to such Loss would have been corrected or (C) to the extent that any such Losses arise out of the Purchaser's (or any other indemnified Person's) failure to send or give a copy of the Prospectus or supplement (as then amended or supplemented), if required, pursuant to Rule 172 under the Securities Act (or any successor rule) to the Persons asserting an untrue statement or alleged untrue statement or alleged untrue statement or omission or alleged omission at or prior to the written confirmation of the sale of Registrable Securities to such Person if such statement or omission was corrected in such Prospectus or supplement. The Company shall notify the Holders promptly of the institution, threat or assertion of any Proceeding arising from or in connection with the transactions contemplated by this Agreement of which the Company is aware. Such indemnity shall remain in full force and effect regardless of any investigation made by or on behalf of an Indemnified Party (as defined in Section 5(c)) and shall survive the transfer of the Registrable Securities by the Holders.

(b) Indemnification by Holders. Each Holder shall, severally and not jointly, indemnify and hold harmless the Company, its directors, officers, agents and employees, each Person who controls the Company (within the meaning of Section 15 of the Securities Act and Section 20 of the Exchange Act), and the directors, officers, agents or employees of such controlling Persons, to the fullest extent permitted by applicable law, from and against all Losses, as incurred, arising out of or are based solely upon any untrue or alleged untrue statement of a material fact contained in any Registration Statement, any Prospectus, or any form of prospectus, or in any amendment or supplement thereto or in any preliminary prospectus, or arising out of or relating to any omission or alleged omission of a material fact required to be stated therein or necessary to make the statements therein (in the case of any Prospectus, or any form of prospectus or supplement thereto, in light of the circumstances under which they were made) not misleading (i) to the extent that such untrue statements or omissions are based solely upon information regarding such Holder furnished in writing to the Company by such Holder expressly for use therein or (ii) to the extent that such information relates to such Holder or such Holder's proposed method of distribution of Registrable Securities and was reviewed and approved in writing by such Holder expressly for use in a Registration Statement (it being understood that the Holder has approved Annex A hereto for this purpose), such Prospectus or such form of Prospectus or in any amendment or supplement thereto or (iii) in the case of a suspension of the availability of a Registration Statement or Prospectus pursuant to Section 3(h), to the extent related to the use by such Holder of an outdated or defective Prospectus after the Company has notified such Holder in writing that the Prospectus is outdated or defective and prior to the receipt by such Holder of the Advice contemplated in Section 6(d). In no event shall the liability of any selling Holder hereunder be greater in amount than the dollar amount of the net proceeds received by such Holder upon the sale of the Registrable Securities giving rise to such indemnification obligation.

(c) Conduct of Indemnification Proceedings. If any Proceeding shall be brought or asserted against any Person entitled to indemnity hereunder (an "Indemnified Party"), such Indemnified Party shall promptly notify the Person from whom indemnity is sought (the "Indemnifying Party") in

writing, and the Indemnifying Party shall have the right to assume the defense thereof, including the employment of counsel reasonably satisfactory to the Indemnified Party and the payment of all reasonable fees and expenses incurred in connection with defense thereof; *provided*, that the failure of any Indemnified Party to give such notice shall not relieve the Indemnifying Party of its obligations or liabilities pursuant to this Agreement, except (and only) to the extent that it shall be finally determined by a court of competent jurisdiction (which determination is not subject to appeal or further review) that such failure shall have materially and adversely prejudiced the Indemnifying Party.

An Indemnified Party shall have the right to employ separate counsel in any such Proceeding and to participate in the defense thereof, but the fees and expenses of such counsel shall be at the expense of such Indemnified Party or Parties unless: (1) the Indemnifying Party has agreed in writing to pay such fees and expenses; (2) the Indemnifying Party shall have failed promptly to assume the defense of such Proceeding and to employ counsel reasonably satisfactory to such Indemnified Party in any such Proceeding; or (3) the named parties to any such Proceeding (including any impleaded parties) include both such Indemnified Party and the Indemnifying Party, and such Indemnified Party shall have been advised by counsel that a conflict of interest exists if the same counsel were to represent such Indemnified Party and the Indemnifying Party (in which case, if such Indemnified Party notifies the Indemnifying Party in writing that it elects to employ separate counsel at the expense of the Indemnifying Party, the Indemnifying Party shall not have the right to assume the defense thereof and such counsel shall be at the expense of the Indemnifying Party); *provided*, that the Indemnifying Party shall not be liable for the fees and expenses of more than one separate firm of attorneys (along with any reasonably necessary local counsel) at any time for all Indemnified Parties. The Indemnifying Party shall not be liable for any settlement of any such Proceeding effected without its written consent, which consent shall not be unreasonably withheld, delayed or conditioned. No Indemnifying Party shall, without the prior written consent of the Indemnified Party, effect any settlement of any pending Proceeding in respect of which any Indemnified Party is a party, unless such settlement includes an unconditional release of such Indemnified Party from all liability on claims that are the subject matter of such Proceeding.

Subject to the terms of this Agreement, all fees and expenses of the Indemnified Party (including reasonable fees and expenses to the extent incurred in connection with investigating or preparing to defend such Proceeding in a manner not inconsistent with this [Section 5](#)) shall be paid to the Indemnified Party, as incurred, within twenty (20) Trading Days of written notice thereof to the Indemnifying Party; *provided*, that the Indemnified Party shall promptly reimburse the Indemnifying Party for that portion of such fees and expenses applicable to such actions for which such Indemnified Party is finally judicially determined to not be entitled to indemnification hereunder). The failure to deliver written notice to the Indemnifying Party within a reasonable time of the commencement of any such action shall not relieve such Indemnifying Party of any liability to the Indemnified Party under this [Section 5](#), except to the extent that the Indemnifying Party is materially and adversely prejudiced in its ability to defend such action.

(d) **Contribution.** If a claim for indemnification under [Section 5\(a\)](#) or [5\(b\)](#) is unavailable to an Indemnified Party or insufficient to hold an Indemnified Party harmless for any Losses, then each Indemnifying Party, in lieu of indemnifying such Indemnified Party, shall contribute to the amount paid or payable by such Indemnified Party as a result of such Losses, in such proportion as is appropriate to reflect the relative fault of the Indemnifying Party and Indemnified Party in connection with the actions, statements or omissions that resulted in such Losses as well as any other relevant equitable considerations. The relative fault of such Indemnifying Party and Indemnified Party shall be determined by reference to, among other things, whether any action in question, including any untrue or alleged untrue statement of a material fact or omission or alleged omission of a material fact, has been taken or made by, or relates to information supplied by, such Indemnifying Party or Indemnified Party, and the parties' relative intent, knowledge, access to information and opportunity to correct or prevent

such action, statement or omission. The amount paid or payable by a party as a result of any Losses shall be deemed to include, subject to the limitations set forth in this Agreement, any reasonable attorneys' or other reasonable fees or expenses incurred by such party in connection with any Proceeding to the extent such party would have been indemnified for such fees or expenses if the indemnification provided for in this Section 5 was available to such party in accordance with its terms.

The parties hereto agree that it would not be just and equitable if contribution pursuant to this Section 5(d) were determined by pro rata allocation or by any other method of allocation that does not take into account the equitable considerations referred to in the immediately preceding paragraph. Notwithstanding the provisions of this Section 5(d), (A) no Holder shall be required to contribute, in the aggregate, any amount in excess of the amount by which the net proceeds actually received by such Holder from the sale of the Registrable Securities subject to the Proceeding exceeds the amount of any damages that such Holder has otherwise been required to pay by reason of such untrue or alleged untrue statement or omission or alleged omission and (B) no contribution will be made under circumstances where the maker of such contribution would not have been required to indemnify the Indemnified Party under the fault standards set forth in this Section 5. No person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) shall be entitled to contribution from any Person who was not guilty of such fraudulent misrepresentation.

The indemnity and contribution agreements contained in this Section 5 are in addition to any liability that the Indemnifying Parties may have to the Indemnified Parties and are not in diminution or limitation of the indemnification provisions under the Purchase Agreement.

6. Miscellaneous.

(a) Remedies. In the event of a breach by the Company or by a Holder of any of their obligations under this Agreement, each Holder or the Company, as the case may be, in addition to being entitled to exercise all rights granted by law and under this Agreement, including recovery of damages, will be entitled to specific performance of its rights under this Agreement. The Company and each Holder agree that monetary damages would not provide adequate compensation for any losses incurred by reason of a breach by it of any of the provisions of this Agreement and hereby further agrees that, in the event of any action for specific performance in respect of such breach, it shall waive the defense that a remedy at law would be adequate.

(b) No Piggyback on Registrations. Neither the Company nor any of its security holders (other than the Holders in such capacity pursuant hereto) may include securities of the Company in a Registration Statement other than the Registrable Securities and the Company shall not enter into any agreement providing any such right to any of its security holders.

(c) Compliance. Each Holder covenants and agrees that it will comply with the prospectus delivery requirements of the Securities Act as applicable to it (unless an exemption therefrom is available) in connection with sales of Registrable Securities pursuant to the Registration Statement and shall sell the Registrable Securities only in accordance with a method of distribution described in the Registration Statement

(d) Discontinued Disposition. By its acquisition of Registrable Securities, each Holder agrees that, upon a suspension of the availability of a Registration Statement or Prospectus pursuant to Section 3(h), such Holder will forthwith discontinue disposition of such Registrable Securities under a Registration Statement until it is advised in writing (the "Advice") by the Company that the use of the applicable Prospectus (as it may have been supplemented or amended) may be resumed. The

Company will use its commercially reasonable efforts to ensure that the use of the Prospectus may be resumed as promptly as is practicable.

(e) No Inconsistent Agreements. Neither the Company nor any of its Subsidiaries has entered, as of the date hereof, nor shall the Company or any of its Subsidiaries, on or after the date hereof, enter into any agreement with respect to its securities, that would have the effect of impairing the rights granted to the Holders in this Agreement or otherwise conflicts with the provisions hereof.

(f) Amendments and Waivers. The provisions of this Agreement, including the provisions of this sentence, may not be amended, modified or supplemented, or waived unless the same shall be in writing and signed by the Company and each Holder of then outstanding Registrable Securities affected by such amendment, modification, supplement or waiver, provided that any party may give a waiver as to itself. Notwithstanding the foregoing, a waiver or consent to depart from the provisions hereof with respect to a matter that relates exclusively to the rights of Holders and that does not directly or indirectly affect the rights of other Holders may be given by Holders of all of the Registrable Securities to which such waiver or consent relates; *provided, however,* that the provisions of this sentence may not be amended, modified, or supplemented except in accordance with the provisions of the immediately preceding sentence.

(g) Notices. Any and all notices or other communications or deliveries required or permitted to be provided hereunder shall be delivered as set forth in the Purchase Agreement.

(h) Successors and Assigns. This Agreement shall inure to the benefit of and be binding upon the successors and permitted assigns of each of the parties and shall inure to the benefit of each Holder. Nothing in this Agreement, express or implied, is intended to confer upon any party other than the parties hereto or their respective successors and assigns any rights, remedies, obligations, or liabilities under or by reason of this Agreement, except as expressly provided in this Agreement. The Company may not assign its rights (except by merger or in connection with another entity acquiring all or substantially all of the Company's assets) or obligations hereunder without the prior written consent of all the Holders of the then outstanding Registrable Securities. Each Holder may assign its respective rights hereunder to the Persons as permitted under the Purchase Agreement; provided in each case that (i) the Holder agrees in writing with the transferee or assignee to assign such rights and related obligations under this Agreement, and for the transferee or assignee to assume such obligations, and a copy of such agreement is furnished to the Company within a reasonable time after such assignment, (ii) the Company is, within a reasonable time after such transfer or assignment, furnished with written notice of the name and address of such transferee or assignee and the securities with respect to which such registration rights are being transferred or assigned, (iii) at or before the time the Company received the written notice contemplated by clause (ii) of this sentence, the transferee or assignee agrees in writing with the Company to be bound by all of the provisions contained herein and (iv) the transferee is an "accredited investor," as that term is defined in Rule 501 of Regulation D.

(i) Execution and Counterparts. This Agreement may be executed in two or more counterparts, each of which when so executed shall be deemed to be an original and, all of which taken together shall constitute one and the same Agreement and shall become effective when counterparts have been signed by each party and delivered to the other party, it being understood that both parties need not sign the same counterpart. In the event that any signature is delivered by facsimile transmission or by e-mail delivery of a ".pdf" format data file, such signature shall create a valid and binding obligation of the party executing (or on whose behalf such signature is executed) with the same force and effect as if such facsimile or ".pdf" signature were the original thereof.

(j) Governing Law. All questions concerning the construction, validity, enforcement and interpretation of this Agreement shall be determined in accordance with the provisions of the Purchase Agreement.

(k) Cumulative Remedies. The remedies provided herein are cumulative and not exclusive of any other remedies provided by law.

(l) Severability. If any term, provision, covenant or restriction of this Agreement is held by a court of competent jurisdiction to be invalid, illegal, void or unenforceable, the remainder of the terms, provisions, covenants and restrictions set forth herein shall remain in full force and effect and shall in no way be affected, impaired or invalidated, and the parties hereto shall use their good faith reasonable efforts to find and employ an alternative means to achieve the same or substantially the same result as that contemplated by such term, provision, covenant or restriction. It is hereby stipulated and declared to be the intention of the parties that they would have executed the remaining terms, provisions, covenants and restrictions without including any of such that may be hereafter declared invalid, illegal, void or unenforceable.

(m) Headings. The headings in this Agreement are for convenience only and shall not limit or otherwise affect the meaning hereof.

(n) Independent Nature of Purchasers' Obligations and Rights. The obligations of each Purchaser under this Agreement are several and not joint with the obligations of any other Purchaser hereunder, and no Purchaser shall be responsible in any way for the performance of the obligations of any other Purchaser hereunder. The decision of each Purchaser to purchase the Securities pursuant to the Transaction Documents has been made independently of any other Purchaser. Nothing contained herein or in any other agreement or document delivered at any closing, and no action taken by any Purchaser pursuant hereto or thereto, shall be deemed to constitute the Purchasers as a partnership, an association, a joint venture or any other kind of entity, or create a presumption that the Purchasers are in any way acting in concert or as a group with respect to such obligations or the transactions contemplated by this Agreement. Each Purchaser acknowledges that no other Purchaser has acted as agent for such Purchaser in connection with making its investment hereunder and that no Purchaser will be acting as agent of such Purchaser in connection with monitoring its investment in the Securities or enforcing its rights under the Transaction Documents. Each Purchaser has been represented by its own separate legal counsel in its review and negotiation of the Transaction Documents. Each Purchaser shall be entitled to protect and enforce its rights, including, without limitation, the rights arising out of this Agreement, and it shall not be necessary for any other Purchaser to be joined as an additional party in any Proceeding for such purpose. The Company acknowledges that each of the Purchasers has been provided with the same Registration Rights Agreement for the purpose of closing a transaction with multiple Purchasers and not because it was required or requested to do so by any Purchaser.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, the parties have executed this Registration Rights Agreement as of the date first written above.

ATYR PHARMA, INC.

By: /s/ John Blake
Name: John Blake
Title: Senior Vice President, Finance

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, the parties have executed this Registration Rights Agreement as of the date first written above.

Viking Global Opportunities Illiquid Investments Sub- Master LP

By: Viking Global Opportunities Portfolio GP LLC, its general partner

By: /s/ Matthew Bloom

Name: Matthew Bloom

Title: Authorized Signatory

ADDRESS FOR NOTICE

c/o: Viking Global Investors LP

Street: 55 Railroad Avenue

City/State/Zip: Greenwich, CT 06830

Attention: General Counsel

Tel: [redacted]

Email: [redacted]

IN WITNESS WHEREOF, the parties have executed this Registration Rights Agreement as of the date first written above.

EcoR1 Capital Fund, LP

By: /s/ Oleg Nodelman

Name: Oleg Nodelman

Title: Founder, EcoR1 Capital LLC, as GP

ADDRESS FOR NOTICE

c/o: Ecor1 Capital LLC

Street: 409 Illinois Street

City/State/Zip: San Francisco, CA 94158

Attention: Sarah Marriott

Tel: [redacted]

Email: [redacted]

IN WITNESS WHEREOF, the parties have executed this Registration Rights Agreement as of the date first written above.

P REDMILE, LTD.

By: /s/ Jeremy Green
Name: Jeremy Green
Title: As Managing Member of Redmile Group, LLC – Investment Adviser to P Redmile, Ltd.

REDMILE CAPITAL OFFSHORE FUND (ERISA), LTD.

By: /s/ Jeremy Green
Name: Jeremy Green
Title: Managing Member of the Investment Manager

REDMILE CAPITAL OFFSHORE FUND, LTD.

By: /s/ Jeremy Green
Name: Jeremy Green
Title: Managing Member of the Investment Manager

REDMILE CAPITAL FUND, LP

By: /s/ Jeremy Green
Name: Jeremy Green
Title: Managing Member of the General Partner and the Investment Manager

REDMILE CAPITAL OFFSHORE FUND II, LTD.

By: /s/ Jeremy Green
Name: Jeremy Green
Title: Managing Member of the Investment Manager

ADDRESS FOR NOTICE

One Letterman Drive
Building D Suite D3-300
San Francisco, CA 94129

Telephone No.: [redacted]

E-mail Address: [redacted]

Attention: Josh Garcia

IN WITNESS WHEREOF, the parties have executed this Registration Rights Agreement as of the date first written above.

Hudson Bay Master Fund Ltd.

By: /s/ Yoav Roth

Name: Yoav Roth

Title: Authorized Signatory

ADDRESS FOR NOTICE

c/o: Hudson Bay Master Fund Ltd.

Street: 777 3rd Ave., 30th Floor

City/State/Zip: New York, 10017

Attention: Yoav Roth

Tel: [redacted]

Fax: [redacted]

Email: [redacted]

NEITHER THESE SECURITIES NOR THE SECURITIES ISSUABLE UPON EXERCISE OF THESE SECURITIES HAVE BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933, AS AMENDED (THE "SECURITIES ACT"), OR APPLICABLE STATE SECURITIES LAWS. THE SECURITIES MAY NOT BE OFFERED FOR SALE, SOLD, TRANSFERRED OR ASSIGNED (I) IN THE ABSENCE OF (A) AN EFFECTIVE REGISTRATION STATEMENT FOR THE SECURITIES UNDER THE SECURITIES ACT OR (B) AN AVAILABLE EXEMPTION FROM, OR IN A TRANSACTION NOT SUBJECT TO, THE REGISTRATION REQUIREMENTS OF THE SECURITIES ACT AND IN ACCORDANCE WITH APPLICABLE STATE SECURITIES LAWS OR BLUE SKY LAWS AS EVIDENCED BY A LEGAL OPINION OF COUNSEL REASONABLY SATISFACTORY TO THE COMPANY AND ITS TRANSFER AGENT OR (II) UNLESS PURSUANT TO RULE 144 UNDER THE SECURITIES ACT.

ATYR PHARMA, INC.

WARRANT TO PURCHASE COMMON STOCK

Warrant No. _____

Original Issue Date: _____

aTyr Pharma, Inc., a Delaware corporation (the "*Company*"), hereby certifies that, for value received, _____ or its permitted registered assigns (the "*Holder*"), is entitled to purchase from the Company up to a total of _____ shares of common stock, \$0.001 par value per share (the "*Common Stock*"), of the Company (each such share, a "*Warrant Share*" and all such shares, the "*Warrant Shares*") at an exercise price per share equal to \$4.64 per share (as adjusted from time to time as provided in Section 9 herein, the "*Exercise Price*"), at any time and from time to time on or after the date hereof (the "*Original Issue Date*") and through and including 5:30 P.M., New York City time, on December 31, 2019 (the "*Expiration Date*"), and subject to the following terms and conditions:

This Warrant (this "*Warrant*") is one of a series of similar warrants issued pursuant to that certain Securities Purchase Agreement, dated August 27, 2017, by and among the Company and the Purchasers identified therein (the "*Purchase Agreement*"). All such Warrants are referred to herein, collectively, as the "*Warrants*."

1. Definitions. In addition to the terms defined elsewhere in this Warrant, capitalized terms that are not otherwise defined herein have the meanings given to such terms in the Purchase Agreement.
2. Registration of Warrants. The Company shall register this Warrant, upon records to be maintained by the Company for that purpose (the "*Warrant Register*"), in the name of the record Holder (which shall include the initial Holder or, as the case may be, any registered assignee to which this Warrant is permissibly assigned hereunder) from time to time. The Company may deem and treat the registered Holder of this Warrant as the absolute owner hereof for the purpose of any exercise hereof or any distribution to the Holder, and for all other purposes, absent actual notice to the contrary.
3. Registration of Transfers. Subject to the restrictions on transfer set forth in Section 4.1 of the Purchase Agreement and compliance with all applicable securities laws, the Company shall

register the transfer of all or any portion of this Warrant in the Warrant Register, upon surrender of this Warrant, with the Form of Assignment attached as Schedule 2 hereto duly completed and signed, to the Company's transfer agent or to the Company at its address specified in the Purchase Agreement and (x) in compliance with the legend affixed to the face of this Warrant and (y) delivery by the transferee of a written statement to the Company certifying that the transferee is an "accredited investor" as defined in Rule 501(a) under the Securities Act and making the representations and certifications set forth in Sections 3.2(b), (c) and (d) of the Purchase Agreement, to the Company at its address specified in the Purchase Agreement. Upon any such registration or transfer, a new warrant to purchase Common Stock in substantially the form of this Warrant (any such new warrant, a "New Warrant") evidencing the portion of this Warrant so transferred shall be issued to the transferee, and a New Warrant evidencing the remaining portion of this Warrant not so transferred, if any, shall be issued to the transferring Holder. The acceptance of the New Warrant by the transferee thereof shall be deemed the acceptance by such transferee of all of the rights and obligations in respect of the New Warrant that the Holder has in respect of this Warrant. The Company shall prepare, issue and deliver at its own expense any New Warrant under this Section 3.

4. Exercise and Duration of Warrants.

(a) All or any part of this Warrant shall be exercisable by the registered Holder in any manner permitted by Section 10 of this Warrant at any time and from time to time on or after the Original Issue Date and through and including 5:30 P.M. New York City time, on the Expiration Date. At 5:30 P.M., New York City time, on the Expiration Date, the portion of this Warrant not exercised prior thereto shall be and become void and of no value and this Warrant shall be terminated and no longer outstanding.

(b) The Holder may exercise this Warrant by delivering to the Company (i) an exercise notice, in the form attached as Schedule 1 hereto (the "Exercise Notice"), completed and duly signed, and (ii) payment of the Exercise Price for the number of Warrant Shares as to which this Warrant is being exercised (which may take the form of a "cashless exercise" if so indicated in the Exercise Notice and if a "cashless exercise" may occur at such time pursuant to Section 10 below), and the date on which the last of such items is delivered to the Company (as determined in accordance with the notice provisions hereof) is an "Exercise Date." The delivery by (or on behalf of) the Holder of the Exercise Notice and the applicable Exercise Price as provided above shall constitute the Holder's certification to the Company that its representations contained in Sections 3.2(b), (c) and (d) of the Purchase Agreement are true and correct as of the Exercise Date as if remade in their entirety (or, in the case of any transferee Holder that is not a party to the Purchase Agreement, such transferee Holder's certification to the Company that such representations are true and correct as to such assignee Holder as of the Exercise Date). The Holder shall not be required to deliver the original Warrant in order to effect an exercise hereunder. Execution and delivery of the Exercise Notice shall have the same effect as cancellation of the original Warrant and issuance of a New Warrant evidencing the right to purchase the remaining number of Warrant Shares.

5. Delivery of Warrant Shares.

(a) Upon exercise of this Warrant, the Company shall promptly (but in no event later than two (2) Trading Days after the Exercise Date) issue or cause to be issued and cause to be delivered to or upon the written order of the Holder and in such name or names as the Holder may designate (provided that, if the Registration Statement is not effective and the Holder directs the Company to deliver a certificate for the Warrant Shares in a name other than that of the Holder or

an Affiliate of the Holder, it shall deliver to the Company on the Exercise Date an opinion of counsel reasonably satisfactory to the Company to the effect that the issuance of such Warrant Shares in such other name may be made pursuant to an available exemption from the registration requirements of the Securities Act and all applicable state securities or blue sky laws), (i) a certificate for the Warrant Shares issuable upon such exercise, free of restrictive legends, or (ii) an electronic delivery of the Warrant Shares to the Holder's account at the Depository Trust Company ("DTC") or a similar organization, unless in the case of clause (i) and (ii) a registration statement covering the resale of the Warrant Shares and naming the Holder as a selling stockholder thereunder is not then effective or the Warrant Shares are not freely transferable without volume and manner of sale restrictions pursuant to Rule 144 under the Securities Act, in which case such Holder shall receive a certificate for the Warrant Shares issuable upon such exercise with appropriate restrictive legends (it being understood that the Company's obligations to cause its counsel to issue a legal opinion under Section 4.1(c) of the Purchase Agreement shall also apply to the Warrant Shares and following the issuance of such legal opinion, the Holder may request book entry notation at the Company's transfer agent). The Holder, or any Person permissibly so designated by the Holder to receive Warrant Shares, shall be deemed to have become the holder of record of such Warrant Shares as of the Exercise Date. If the Warrant Shares are to be issued free of all restrictive legends, the Company shall, upon the written request of the Holder, use its reasonable best efforts to deliver, or cause to be delivered, Warrant Shares hereunder electronically through DTC or another established clearing corporation performing similar functions, if available; provided, that, the Company may, but will not be required to, change its transfer agent if its current transfer agent cannot deliver Warrant Shares electronically through such a clearing corporation.

(b) To the extent permitted by law, the Company's obligations to issue and deliver Warrant Shares in accordance with and subject to the terms hereof (including the limitations set forth in Section 11 below) are absolute and unconditional, irrespective of any action or inaction by the Holder to enforce the same, any waiver or consent with respect to any provision hereof, the recovery of any judgment against any Person or any action to enforce the same, or any setoff, counterclaim, recoupment, limitation or termination, or any breach or alleged breach by the Holder or any other Person of any obligation to the Company or any violation or alleged violation of law by the Holder or any other Person, and irrespective of any other circumstance that might otherwise limit such obligation of the Company to the Holder in connection with the issuance of Warrant Shares. Nothing herein shall limit the Holder's right to pursue any other remedies available to it hereunder, at law or in equity including, without limitation, a decree of specific performance and/or injunctive relief with respect to the Company's failure to timely deliver certificates representing shares of Common Stock upon exercise of the Warrant as required pursuant to the terms hereof.

6. Charges, Taxes and Expenses. Issuance and delivery of certificates for shares of Common Stock upon exercise of this Warrant shall be made without charge to the Holder for any issue or transfer tax, transfer agent fee or other incidental tax or expense in respect of the issuance of such certificates, all of which taxes and expenses shall be paid by the Company; *provided, however*, that the Company shall not be required to pay any tax that may be payable in respect of any transfer involved in the registration of any certificates for Warrant Shares or the Warrants in a name other than that of the Holder or an Affiliate thereof. The Holder shall be responsible for all other tax liability that may arise as a result of holding or transferring this Warrant or receiving Warrant Shares upon exercise hereof.

7. Replacement of Warrant. If this Warrant is mutilated, lost, stolen or destroyed, the Company shall issue or cause to be issued in exchange and substitution for and upon cancellation

hereof, or in lieu of and substitution for this Warrant, a New Warrant, but only upon receipt of evidence reasonably satisfactory to the Company of such loss, theft or destruction (in such case) and, in each case, a customary and reasonable indemnity and surety bond, if requested by the Company. Applicants for a New Warrant under such circumstances shall also comply with such other reasonable regulations and procedures and pay such other reasonable third-party costs as the Company may prescribe. If a New Warrant is requested as a result of a mutilation of this Warrant, then the Holder shall deliver such mutilated Warrant to the Company as a condition precedent to the Company's obligation to issue the New Warrant.

8. **Reservation of Warrant Shares.** The Company covenants that it will at all times reserve and keep available out of the aggregate of its authorized but unissued and otherwise unreserved Common Stock, solely for the purpose of enabling it to issue Warrant Shares upon exercise of this Warrant as herein provided, the number of Warrant Shares that are initially issuable and deliverable upon the exercise of this entire Warrant, free from preemptive rights or any other contingent purchase rights of persons other than the Holder (taking into account the adjustments and restrictions of [Section 9](#)). The Company covenants that all Warrant Shares so issuable and deliverable shall, upon issuance and the payment of the applicable Exercise Price in accordance with the terms hereof, be duly and validly authorized, issued and fully paid and nonassessable. The Company will take all such action as may be reasonably necessary to assure that such shares of Common Stock may be issued as provided herein without violation of any applicable law or regulation, or of any requirements of any securities exchange or automated quotation system upon which the Common Stock may be listed.

9. **Certain Adjustments.** The Exercise Price and number of Warrant Shares issuable upon exercise of this Warrant are subject to adjustment from time to time as set forth in this [Section 9](#).

(a) **Stock Dividends and Splits.** If the Company, at any time while this Warrant is outstanding, (i) pays a stock dividend on its Common Stock or otherwise makes a distribution on any class of capital stock that is payable in shares of Common Stock, (ii) subdivides its outstanding shares of Common Stock into a larger number of shares, (iii) combines its outstanding shares of Common Stock into a smaller number of shares or (iv) issues by reclassification of shares of Common Stock any shares of capital of the Company, then in each such case the Exercise Price shall be multiplied by a fraction, the numerator of which shall be the number of shares of Common Stock outstanding immediately before such event and the denominator of which shall be the number of shares of Common Stock outstanding immediately after such event. Any adjustment made pursuant to clause (i) of this paragraph shall become effective immediately after the record date for the determination of stockholders entitled to receive such dividend or distribution, and any adjustment pursuant to clause (ii) or (iii) of this paragraph shall become effective immediately after the effective date of such subdivision or combination.

(b) **Pro Rata Distributions.** If the Company, at any time while this Warrant is outstanding, distributes to all holders of Common Stock for no consideration (i) evidences of its indebtedness, (ii) any security (other than a distribution of Common Stock covered by the preceding paragraph) or (iii) rights or warrants to subscribe for or purchase any security, or (iv) any other asset (in each case, "*Distributed Property*"), then, upon any exercise of this Warrant that occurs after the record date fixed for determination of stockholders entitled to receive such distribution, the Holder shall be entitled to receive, in addition to the Warrant Shares otherwise issuable upon such exercise (if applicable), the Distributed Property that such Holder would have been entitled to receive in respect of such number of Warrant Shares had the Holder been the

record holder of such Warrant Shares immediately prior to such record date without regard to any limitation on exercise contained therein.

(c) Fundamental Transactions. If, at any time while this Warrant is outstanding (i) the Company effects any merger or consolidation of the Company with or into another Person, in which the Company is not the survivor or the stockholders of the Company immediately prior to such merger or consolidation do not own, directly or indirectly, at least 50% of the voting securities of the surviving entity, (ii) the Company effects any sale of all or substantially all of its assets or a majority of its Common Stock is acquired by a third party, in each case, in one or a series of related transactions, (iii) any tender offer or exchange offer (whether by the Company or another Person) is completed pursuant to which all or substantially all of the holders of Common Stock are permitted to tender or exchange their shares for other securities, cash or property, or (iv) the Company effects any reclassification of the Common Stock or any compulsory share exchange pursuant to which the Common Stock is effectively converted into or exchanged for other securities, cash or property (other than as a result of a subdivision or combination of shares of Common Stock covered by Section 9(a) above) (in any such case, a “*Fundamental Transaction*”), then the Holder shall have the right thereafter to receive, upon exercise of this Warrant, the same amount and kind of securities, cash or property as is equal to the Black Scholes Value of the remaining unexercised portion of this Warrant on the date of such Fundamental Transaction (the “*Alternate Consideration*”). The Company shall not effect any such Fundamental Transaction unless prior to or simultaneously with the consummation thereof, any successor to the Company, surviving entity or the corporation purchasing or otherwise acquiring such assets or other appropriate corporation or Person shall assume the obligation to deliver to the Holder, such Alternate Consideration as, in accordance with the foregoing provisions, the Holder may be entitled to receive, and the other obligations under this Warrant. The provisions of this paragraph (c) shall similarly apply to subsequent transactions analogous of a Fundamental Transaction type. For purposes hereof, “*Black Scholes Value*” means the value of the Warrant based on the Black Scholes Option Pricing Model obtained from the “OV” function on Bloomberg determined as of the day immediately following the public announcement of the applicable Fundamental Transaction and reflecting (i) a risk-free interest rate corresponding to the U.S. Treasury rate for a period equal to the remaining term of this Warrant as of such date of request and (ii) an expected volatility equal to the volatility percentage obtained from the HVT function on Bloomberg for a daily period equal to the remaining term of this Warrant as of such date of request determined as of the Trading Day immediately prior to the announcement of the Fundamental Transaction.

(d) Number of Warrant Shares. Simultaneously with any adjustment to the Exercise Price pursuant to paragraph (a) of this Section 9, the number of Warrant Shares that may be purchased upon exercise of this Warrant shall be increased or decreased proportionately, so that after such adjustment the aggregate Exercise Price payable hereunder for the increased or decreased number of Warrant Shares shall be the same as the aggregate Exercise Price in effect immediately prior to such adjustment.

(e) Calculations. All calculations under this Section 9 shall be made to the nearest cent or the nearest share, as applicable.

(f) Notice of Adjustments. Upon the occurrence of each adjustment pursuant to this Section 9, the Company at its expense will, at the written request of the Holder, promptly compute such adjustment, in good faith, in accordance with the terms of this Warrant and prepare a certificate setting forth such adjustment, including a statement of the adjusted Exercise Price

and adjusted number or type of Warrant Shares or other securities issuable upon exercise of this Warrant (as applicable), describing the transactions giving rise to such adjustments and showing in detail the facts upon which such adjustment is based. Upon written request, the Company will promptly deliver a copy of each such certificate to the Holder and to the Company's transfer agent.

(h) Notice of Corporate Events. If, while this Warrant is outstanding, the Company (i) declares a dividend or any other distribution of cash, securities or other property in respect of its Common Stock, including, without limitation, any granting of rights or warrants to subscribe for or purchase any capital stock of the Company or any subsidiary, (ii) authorizes or approves, enters into any agreement contemplating or solicits stockholder approval for any Fundamental Transaction or (iii) authorizes the voluntary dissolution, liquidation or winding up of the affairs of the Company, then the Company shall deliver to the Holder a notice of such transaction at least twenty (20) calendar days prior to the applicable record or effective date on which a Person would need to hold Common Stock in order to participate in or vote with respect to such transaction; *provided, however*, that the failure to deliver such notice or any defect therein shall not affect the validity of the corporate action required to be described in such notice. To the extent that any notice provided hereunder constitutes, or contains, material, non-public information regarding the Company or any of its subsidiaries, the Company shall simultaneously file such notice with the Commission (as defined in the Purchase Agreement) pursuant to a Current Report on Form 8-K.

10. Payment of Exercise Price. The Holder shall pay the Exercise Price in immediately available funds; *provided, however*, that if, on any Exercise Date there is not an effective Registration Statement (as defined in that certain Registration Rights Agreement, of even date herewith, by and among the Company and the several Purchasers signatory thereto) registering, or no current prospectus available for, the resale of the Warrant Shares by the Holder, then the Holder may, in its sole discretion, satisfy its obligation to pay the Exercise Price through a "cashless exercise", in which event the Company shall issue to the Holder the number of Warrant Shares determined as follows:

$$X = Y [(A-B)/A]$$

where:

"X" equals the number of Warrant Shares to be issued to the Holder;

"Y" equals the total number of Warrant Shares with respect to which this Warrant is being exercised;

"A" equals the average of the Closing Sale Prices of the shares of Common Stock (as reported by Bloomberg Financial Markets) for the five (5) consecutive Trading Days ending on the date immediately preceding the Exercise Date; and

"B" equals the Exercise Price then in effect for the applicable Warrant Shares at the time of such exercise.

For purposes of this Warrant, "*Closing Sale Price*" means, for any security as of any date, the last trade price for such security on the Principal Trading Market for such security, as reported by Bloomberg Financial Markets, or, if such Principal Trading Market begins to operate on an extended hours basis and does not designate the last trade price, then the last trade price of such

security prior to 4:00 P.M., New York City time, as reported by Bloomberg Financial Markets, or if the foregoing do not apply, the last trade price of such security in the over-the-counter market on the electronic bulletin board for such security as reported by Bloomberg Financial Markets, or, if no last trade price is reported for such security by Bloomberg Financial Markets, the average of the bid prices, or the ask prices, respectively, of any market makers for such security as reported in the "pink sheets" by Pink Sheets LLC. If the Closing Sale Price cannot be calculated for a security on a particular date on any of the foregoing bases, the Closing Sale Price of such security on such date shall be the fair market value as mutually determined by the Company and the Holder. If the Company and the Holder are unable to agree upon the fair market value of such security, then the Board of Directors of the Company shall use its good faith judgment to determine the fair market value. The Board of Directors' determination shall be binding upon all parties absent demonstrable error. All such determinations shall be appropriately adjusted for any stock dividend, stock split, stock combination or other similar transaction during the applicable calculation period.

For purposes of Rule 144 promulgated under the Securities Act, it is intended, understood and acknowledged that the Warrant Shares issued in a "cashless exercise" transaction shall be deemed to have been acquired by the Holder, and the holding period for the Warrant Shares shall be deemed to have commenced, on the date this Warrant was originally issued pursuant to the Purchase Agreement (provided that the Commission continues to take the position that such treatment is proper at the time of such exercise).

11. Beneficial Ownership Limitation. Notwithstanding anything herein to the contrary, the Company shall not effect any exercise of this Warrant, and a Holder shall not have the right to exercise, and shall be deemed not to have exercised, any portion of this Warrant, to the extent that, after giving effect to an attempted exercise set forth on an applicable Notice of Exercise, such Holder (together with any other Persons whose beneficial ownership of Common Stock would be aggregated with the Holder's for purposes of Section 13(d) or Section 16 of the Exchange Act and the applicable regulations of the Commission, including any "group" of which the Holder is a member (the foregoing, "*Attribution Parties*")) would beneficially own a number of shares of Common Stock in excess of the Beneficial Ownership Limitation (as defined below). For purposes of the foregoing sentence, the number of shares of Common Stock beneficially owned by such Holder and its Attribution Parties shall include the number of shares of Common Stock issuable upon exercise of this Warrant subject to the Notice of Exercise with respect to which such determination is being made, but shall exclude the number of shares of Common Stock which are issuable upon (A) exercise of the remaining, unconverted shares of Warrants beneficially owned by such Holder or any of its Attribution Parties, and (B) exercise or conversion of the unexercised or unconverted portion of any other securities of the Company (including any Class X Preferred Stock) beneficially owned by such Holder or any of its Attribution Parties that, in the case of both (A) and (B), are subject to a limitation on conversion or exercise similar to the limitation contained herein. For purposes of this Section 6(c), beneficial ownership shall be calculated in accordance with Section 13(d) of the Exchange Act and the applicable regulations of the Commission. In addition, for purposes hereof, "group" has the meaning set forth in Section 13(d) of the Exchange Act and the applicable regulations of the Commission. In order to ensure that a Holder and its Attribution Parties do not exceed the Beneficial Ownership Limitation in connection with any Notice of Exercise, upon delivery of any Notice of Exercise, such Holder shall inform the Company in such Notice of Exercise of the number of shares of Common Stock then beneficially owned by such Holder and its Attribution Parties as determined in accordance with Section 13(d) of the Exchange Act and the applicable regulations of the Commission, and such notice shall be deemed not to be delivered to the extent

(and only to the extent) such Beneficial Ownership Limitation would be exceeded. The Company shall be entitled to rely on representations made to it by the Holder in any Notice of Exercise regarding its beneficial ownership of shares of Common Stock. Upon the written request of a Holder (which may be by email), the Company shall, within three (3) Trading Days thereof, confirm in writing to such Holder (which may be via email) the number of shares of Common Stock then outstanding. The “*Beneficial Ownership Limitation*” shall initially be [9.50][9.99][19.99]% of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock pursuant to such Notice of Exercise (to the extent permitted pursuant to this Section 6(c)). Notwithstanding the foregoing, by written notice to the Company, which will not be effective until the sixty-first (61st) day after such notice is delivered to the Company, the Holder may reset the Beneficial Ownership Limitation percentage to a higher or lower percentage, not to exceed 19.99% of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock pursuant to such Notice of Exercise [unless the Proposal (as defined in the Purchase Agreement) has been approved by the stockholders’ of the Company, in which case the Beneficial Ownership Limitation percentage may exceed 19.99%]¹. Upon such a change by a Holder of the Beneficial Ownership Limitation, the Beneficial Ownership Limitation may not be further amended by such Holder without first providing the minimum 61-day notice required by this Section 6(c). Notwithstanding the foregoing, at any time following notice of a Fundamental Transaction, the Holder may waive and/or change the Beneficial Ownership Limitation effective immediately upon written notice to the Company and may reinstitute a Beneficial Ownership Limitation at any time thereafter effective immediately upon written notice to the Company.

12. No Fractional Shares. No fractional Warrant Shares will be issued in connection with any exercise of this Warrant. In lieu of any fractional shares that would otherwise be issuable, the number of Warrant Shares to be issued shall be rounded down to the next whole number and the Company shall pay the Holder in cash the fair market value (based on the Closing Sale Price) for any such fractional shares.

13. Notices. Any and all notices or other communications or deliveries hereunder (including, without limitation, any Exercise Notice) shall be in writing and shall be deemed given and effective on the earliest of (i) the date of transmission, if such notice or communication is delivered via facsimile at the facsimile number specified in the Purchase Agreement prior to 5:30 P.M., New York City time, on a Trading Day, (ii) the next Trading Day after the date of transmission, if such notice or communication is delivered via facsimile at the facsimile number specified in the Purchase Agreement on a day that is not a Trading Day or later than 5:30 P.M., New York City time, on any Trading Day, (iii) the Trading Day following the date of mailing, if sent by nationally recognized overnight courier service specifying next business day delivery, or (iv) upon actual receipt by the Person to whom such notice is required to be given, if by hand delivery. The address and facsimile number of a Person for such notices or communications shall be as set forth in the Purchase Agreement unless changed by such Person by two (2) Trading Days’ prior notice to the other Persons in accordance with this Section 13.

14. Warrant Agent. The Company shall serve as warrant agent under this Warrant. Upon thirty (30) days’ notice to the Holder, the Company may appoint a new warrant agent. Any corporation into which the Company or any new warrant agent may be merged or any corporation resulting from any consolidation to which the Company or any new warrant agent shall be a party or any corporation to which the Company or any new warrant agent transfers substantially all of its corporate trust or shareholders services business shall be a successor warrant agent under this

¹ Applies only to holders of the Company’s Class X Preferred Stock.

Warrant without any further act. Any such successor warrant agent shall promptly cause notice of its succession as warrant agent to be mailed (by first class mail, postage prepaid) to the Holder at the Holder's last address as shown on the Warrant Register.

15. Miscellaneous.

(a) No Rights as a Stockholder. The Holder, solely in such Person's capacity as a holder of this Warrant, shall not be entitled to vote or receive dividends or be deemed the holder of share capital of the Company for any purpose, nor shall anything contained in this Warrant be construed to confer upon the Holder, solely in such Person's capacity as the Holder of this Warrant, any of the rights of a stockholder of the Company or any right to vote, give or withhold consent to any corporate action (whether any reorganization, issue of stock, reclassification of stock, consolidation, merger, amalgamation, conveyance or otherwise), receive notice of meetings, receive dividends or subscription rights, or otherwise, prior to the issuance to the Holder of the Warrant Shares which such Person is then entitled to receive upon the due exercise of this Warrant. In addition, nothing contained in this Warrant shall be construed as imposing any liabilities on the Holder to purchase any securities (upon exercise of this Warrant or otherwise) or as a stockholder of the Company, whether such liabilities are asserted by the Company or by creditors of the Company.

(b) Authorized Shares. (i) The Company covenants that during the period the Warrant is outstanding, it will reserve from its authorized and unissued Common Stock a sufficient number of shares to provide for the issuance of the Warrant Shares upon the exercise of any purchase rights under this Warrant. The Company further covenants that its issuance of this Warrant shall constitute full authority to its officers who are charged with the duty of executing stock certificates to execute and issue the necessary certificates for the Warrant Shares upon the exercise of the purchase rights under this Warrant. The Company will take all such reasonable action as may be necessary to assure that such Warrant Shares may be issued as provided herein without violation of any applicable law or regulation, or of any requirements of the Trading Market upon which the Common Stock may be listed. The Company covenants that all Warrant Shares which may be issued upon the exercise of the purchase rights represented by this Warrant will, upon exercise of the purchase rights represented by this Warrant, be duly authorized, validly issued, fully paid and nonassessable and free from all taxes, liens and charges created by the Company in respect of the issue thereof (other than taxes in respect of any transfer occurring contemporaneously with such issue)._

(ii) Except and to the extent as waived or consented to by the Holder, the Company shall not by any action, including, without limitation, amending its certificate or articles of incorporation or through any reorganization, transfer of assets, consolidation, merger, dissolution, issue or sale of securities or any other voluntary action, avoid or seek to avoid the observance or performance of any of the terms of this Warrant, but will at all times in good faith assist in the carrying out of all such terms and in the taking of all such actions as may be necessary or appropriate to protect the rights of Holder as set forth in this Warrant against impairment. Without limiting the generality of the foregoing, the Company will (a) not increase the par value of any Warrant Shares above the amount payable therefor upon such exercise immediately prior to such increase in par value, (b) take all such action as may be necessary or appropriate in order that the Company may validly and legally issue fully paid and nonassessable Warrant Shares upon the exercise of this Warrant, and (c) use commercially reasonable efforts to obtain all such authorizations, exemptions or consents from any public regulatory body having jurisdiction thereof as may be necessary to enable the Company to perform its obligations under this Warrant.

(iii) Before taking any action which would result in an adjustment in the number of Warrant Shares for which this Warrant is exercisable or in the Exercise Price, the Company shall obtain all such authorizations or exemptions thereof, or consents thereto, as may be necessary from any public regulatory body or bodies having jurisdiction thereof.

(c) Successors and Assigns. Subject to the restrictions on transfer set forth in this Warrant and in Section 4.1 of the Purchase Agreement, and compliance with applicable securities laws, this Warrant may be assigned by the Holder. This Warrant may not be assigned by the Company without the written consent of the Holder except to a successor in the event of a Fundamental Transaction. This Warrant shall be binding on and inure to the benefit of the Company and the Holder and their respective successors and assigns. Subject to the preceding sentence, nothing in this Warrant shall be construed to give to any Person other than the Company and the Holder any legal or equitable right, remedy or cause of action under this Warrant. This Warrant may be amended only in writing signed by the Company and the Holder, or their successors and assigns.

(d) Amendment and Waiver. Except as otherwise provided herein, the provisions of the Warrants may be amended and the Company may take any action herein prohibited, or omit to perform any act herein required to be performed by it, only if the Company has obtained the written consent of the Holders of Warrants representing no less than a majority of the Warrant Shares obtainable upon exercise of the Warrants then outstanding; *provided* such consent shall include Viking Global Investors, each Affiliate of Viking Global Investors that it has transferred Warrants to and each subsequent transferee of such Warrants that is an Affiliate of Viking Global Investors, provided that no such consent shall be required from any party that does not hold Warrants at the time of such amendment or waiver.

(e) Acceptance. Receipt of this Warrant by the Holder shall constitute acceptance of and agreement to all of the terms and conditions contained herein.

(f) Governing Law; Jurisdiction. ALL QUESTIONS CONCERNING THE CONSTRUCTION, VALIDITY, ENFORCEMENT AND INTERPRETATION OF THIS WARRANT SHALL BE GOVERNED BY AND CONSTRUED AND ENFORCED IN ACCORDANCE WITH THE LAWS OF THE STATE OF NEW YORK WITHOUT REGARD TO THE PRINCIPLES OF CONFLICTS OF LAW THEREOF. EACH OF THE COMPANY AND THE HOLDER HEREBY IRREVOCABLY SUBMITS TO THE 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 HERewith OR WITH ANY TRANSACTION CONTEMPLATED HEREBY OR DISCUSSED HEREIN (INCLUDING WITH RESPECT TO THE ENFORCEMENT OF ANY OF THE TRANSACTION DOCUMENTS), 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. EACH OF THE COMPANY AND THE HOLDER 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 VIA REGISTERED OR CERTIFIED MAIL OR OVERNIGHT DELIVERY (WITH EVIDENCE OF DELIVERY) TO SUCH PERSON AT THE ADDRESS IN EFFECT FOR NOTICES TO IT UNDER THE PURCHASE 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. EACH OF THE COMPANY AND THE HOLDER HEREBY WAIVES ALL RIGHTS TO A TRIAL BY JURY.

(g) Headings. The headings herein are for convenience only, do not constitute a part of this Warrant and shall not be deemed to limit or affect any of the provisions hereof.

(h) Severability. In case any one or more of the provisions of this Warrant shall be invalid or unenforceable in any respect, the validity and enforceability of the remaining terms and provisions of this Warrant shall not in any way be affected or impaired thereby, and the Company and the Holder will attempt in good faith to agree upon a valid and enforceable provision which shall be a commercially reasonable substitute therefor, and upon so agreeing, shall incorporate such substitute provision in this Warrant.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, the Company has caused this Warrant to be duly executed by its authorized officer as of the date first indicated above.

ATYR PHARMA, INC.

By: _____
Name:
Title:

SCHEDULE 1

FORM OF EXERCISE NOTICE

[To be executed by the Holder to purchase shares of Common Stock under the Warrant]

Ladies and Gentlemen:

- (1) The undersigned is the Holder of Warrant No. _____ (the “Warrant”) issued by aTyr Pharma, Inc., a Delaware corporation (the “Company”). Capitalized terms used herein and not otherwise defined herein have the respective meanings set forth in the Warrant.
- (2) The undersigned hereby exercises its right to purchase _____ Warrant Shares pursuant to the Warrant.
- (3) The Holder intends that payment of the Exercise Price shall be made as (check one):
- Cash Exercise
- “Cashless Exercise” under Section 10 of the Warrant
- (4) If the Holder has elected a Cash Exercise, the Holder shall pay the sum of \$_____ in immediately available funds to the Company in accordance with the terms of the Warrant.
- (5) Pursuant to this Exercise Notice, the Company shall deliver to the Holder Warrant Shares determined in accordance with the terms of the Warrant.
- (6) The Holder and its Attribution Parties (as defined in the Warrant) together beneficially own an aggregate of ____ shares of Common Stock (as defined in the Warrant), as determined in accordance with Section 13(d) of the Securities Exchange Act of 1934 and the applicable regulations of the Securities and Exchange Commission.

Dated: _____

Name of Holder: _____

By: _____

Name: _____

Title: _____

(Signature must conform in all respects to name of Holder as specified on the face of the Warrant)

SCHEDULE 2

FORM OF ASSIGNMENT

[To be completed and executed by the Holder only upon transfer of the Warrant]

FOR VALUE RECEIVED, the undersigned hereby sells, assigns and transfers unto _____ (the "Transferee") the right represented by the within Warrant to purchase _____ shares of Common Stock of aTyr Pharma, Inc. (the "Company") to which the within Warrant relates and appoints _____ attorney to transfer said right on the books of the Company with full power of substitution in the premises. In connection therewith, the undersigned represents, warrants, covenants and agrees to and with the Company that:

- (a) the offer and sale of the Warrant contemplated hereby is being made in compliance with Section 4(a)(1) of the United States Securities Act of 1933, as amended (the "Securities Act") or another valid exemption from the registration requirements of Section 5 of the Securities Act and in compliance with all applicable securities laws of the states of the United States;
- (b) the undersigned has not offered to sell the Warrant by any form of general solicitation or general advertising, including, but not limited to, any advertisement, article, notice or other communication published in any newspaper, magazine or similar media or broadcast over television or radio, and any seminar or meeting whose attendees have been invited by any general solicitation or general advertising;
- (c) the undersigned has read the Transferee's investment letter included herewith, and to its actual knowledge, the statements made therein are true and correct; and
- (d) the undersigned understands that the Company may condition the transfer of the Warrant contemplated hereby upon the delivery to the Company by the undersigned or the Transferee, as the case may be, of a written opinion of counsel (which opinion shall be in form, substance and scope customary for opinions of counsel in comparable transactions) to the effect that such transfer may be made without registration under the Securities Act and under applicable securities laws of the states of the United States.

Dated: _____

(Signature must conform in all respects to name of holder as specified on the face of the Warrant)

Address of Transferee

In the presence of:

IMMEDIATE RELEASE**Contact:****Mark Johnson**

Sr. Director, Investor Relations

mjohnson@atyrpharma.com

858-223-1163

aTyr Pharma Announces \$45 Million Equity Financing

SAN DIEGO – August 28, 2017 – aTyr Pharma, Inc. (Nasdaq: LIFE), a biotherapeutics company engaged in the discovery and development of Physiocrine-based therapeutics, harnessing the Resokine pathway, to treat patients suffering from severe, rare immune-mediated diseases, as well as various cancers, today announced that it has entered into a definitive securities purchase agreement with certain institutional and other accredited investors including members of the Company's Board of Directors. The private placement is being led by Viking Global Investors with participation from EcoR1 Capital and Redmile Group, among others. Gross proceeds from the private placement are expected to be approximately \$45.8 million.

Investors have agreed to purchase 5,872,120 shares of common stock at \$2.65 per share. Viking Global Investors has also agreed to purchase 2,285,952 shares of non-voting Class X Preferred Stock at \$13.25 per share, each of which is convertible into 5 shares of common stock upon certain conditions. Each common share, and on an as-converted basis for the preferred stock, will be issued with a warrant to purchase 0.375 additional shares of aTyr's common stock at an exercise price of \$4.64, representing a 75% premium to the purchase price of common stock, with an expiration date of December 31, 2019. The transaction is expected to close on or about August 31, 2017, subject to customary closing conditions.

The Company expects to use the proceeds from the transaction primarily to advance its pipeline of innovative therapeutic candidate programs based on its knowledge of the Resokine pathway, and for general corporate purposes. Piper Jaffray & Co. served as the exclusive placement agent to the Company in connection with the financing.

The offer and sale of the foregoing securities are being made in a transaction not involving a public offering and have not been registered under the Securities Act of 1933, as amended (the Securities Act), or applicable state securities laws. Accordingly, the securities may not be reoffered or resold in the United States except pursuant to an effective registration statement or an applicable exemption from the registration requirements of the Securities Act and such applicable state securities laws. As part of the transaction, the Company has agreed to file a registration statement with the Securities and Exchange Commission for purposes of registering the resale by the investors not affiliated with the Company of the shares of common stock purchased by such investors.

This press release is issued pursuant to Rule 135(c) under the Securities Act of 1933, as amended, and does not constitute an offer to sell or the solicitation of an offer to buy the securities, nor shall there be any sale of the securities in any state in which such offer, solicitation or sale would be unlawful prior to the registration or qualification under the securities laws of such state. Any offering of the securities under the resale registration statement will only be by means of a prospectus.

About aTyr Pharma

aTyr Pharma is engaged in the discovery and clinical development of innovative medicines for patients using its knowledge of Physiocrine biology, a newly discovered set of immunological and physiological pathways. To date, aTyr has generated three innovative therapeutic programs with three different biologic modalities based on its knowledge of the Resokine pathway to treat patients suffering from severe, rare immune-mediated diseases, as well as various cancers. The Resolaris and iMod.Fc programs are agonists of the Resokine pathway designed to temper immune system engagement in diseases characterized by excessive immune cell involvement. aTyr's third program, ORCA, represents a novel, proprietary pathway in immuno-oncology that utilizes antibody approaches to block the Resokine pathway and 'release multiple brakes' on the immune system in the tumor cell environment. aTyr has built an intellectual property estate, to protect its pipeline, comprising over 220 issued patents or allowed patent applications that are owned or exclusively licensed, including over 300 potential Physiocrine-based protein compositions. For more information, please visit <http://www.atyrpharma.com>.

Forward-Looking Statements

This press release contains forward-looking statements within the meaning of the Private Litigation Reform Act. Forward-looking statements are usually identified by the use of words such as “anticipates,” “believes,” “estimates,” “expects,” “intends,” “may,” “plans,” “projects,” “seeks,” “should,” “will,” and variations of such words or similar expressions. We intend these forward-looking statements to be covered by such safe harbor provisions for forward-looking statements and are making this statement for purposes of complying with those safe harbor provisions. These forward-looking statements, including statements regarding the timing of the consummation of the private placement and the expected receipt and use of proceeds from the private placement reflect our current views about our plans, intentions, expectations, strategies and prospects, which are based on the information currently available to us and on assumptions we have made. Although we believe that our plans, intentions, expectations, strategies and prospects as reflected in or suggested by those forward-looking statements are reasonable, we can give no assurance that the plans, intentions, expectations or strategies will be attained or achieved. Furthermore, actual results may differ materially from those described in the forward-looking statements and will be affected by a variety of risks and factors that are beyond our control including, without limitation, risks associated with the discovery, development and regulation of our Physiocrine-based product candidates, the risk that the closing conditions for the private placement transaction are not met by the expected closing date or at all, the risk that the resale registration statement covering the common stock is not timely filed by us or declared effective by the Securities and Exchange Commission (SEC), the risk that we may not use the proceeds from the private placement as currently expected, the risk that we may cease or delay preclinical or clinical development activities for any of its existing or future product candidates for a variety of reasons (including difficulties or delays in patient enrollment in planned clinical trials), and the risk that we may not be able to raise the additional funding required for its business and product development plans, as well as those set forth in our most recent Annual Report on Form 10-K for the year ended December 31, 2016 and in our other SEC filings. Except as required by law, we assume no obligation to update publicly any forward-looking statements, whether as a result of new information, future events or otherwise.



Targeting Novel Immune Therapeutic Intervention Points
First-in-Class Treatments for Patients with Myopathies & Lung Diseases
Novel I/O Target for Universal Backbone Therapy for Cancer Patients



aTyr Pharma, Inc.
August 2017

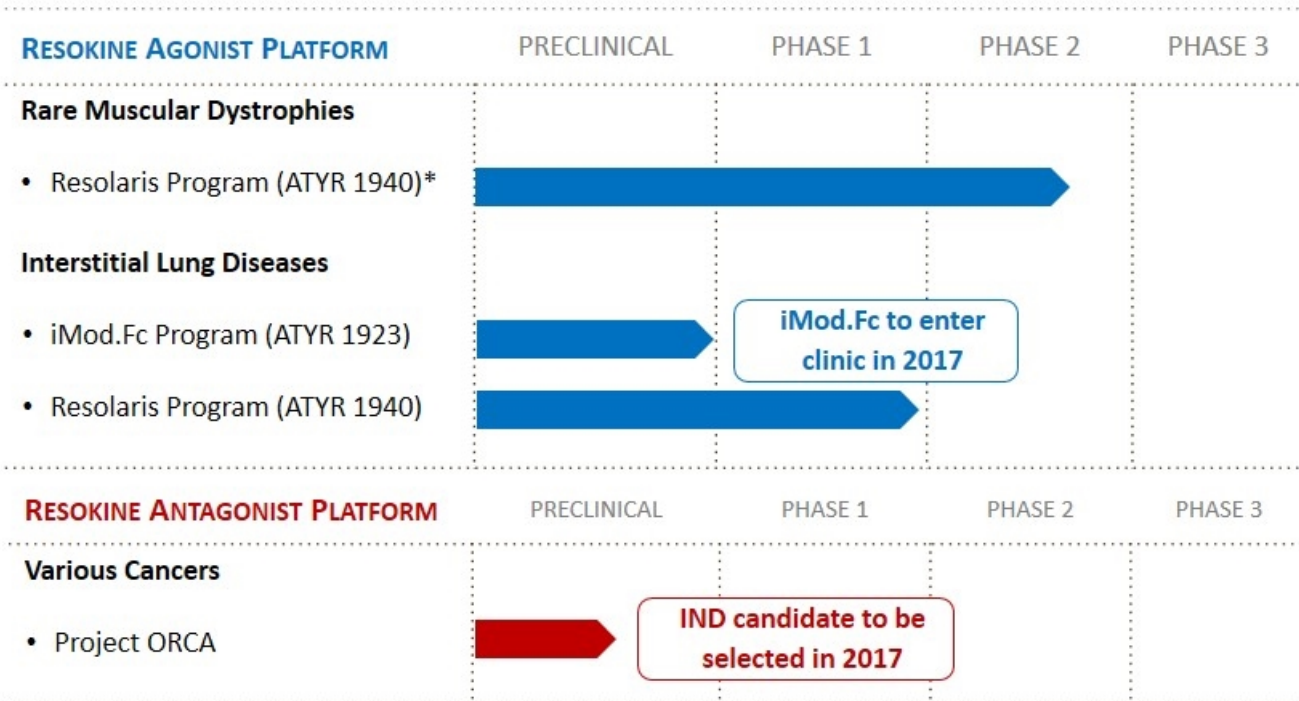
Forward-Looking Statements

The following slides and any accompanying oral presentation contain forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995 and other federal securities laws. The use of words such as “may,” “might,” “will,” “should,” “expect,” “plan,” “anticipate,” “believe,” “estimate,” “project,” “intend,” “future,” “potential,” “opportunity,” or “continue,” and other similar expressions are intended to identify forward-looking statements. For example, all statements we make regarding the potential therapeutic benefits of Physiocrines and our product candidates, including Resolaris™, our iMod.Fc program and Project ORCA, the ability to successfully advance our pipeline or product candidates, the timing within which we expect to initiate, receive and report data from, and complete our planned clinical trials, and our ability to receive regulatory approvals for, and commercialize, our product candidates, our ability to identify and discover additional product candidates, our projected cash expenditures, and the ability of our intellectual property portfolio to provide protection are forward-looking statements. All forward-looking statements are based on estimates and assumptions by our management that, although we believe to be reasonable, are inherently uncertain. All forward-looking statements are subject to risks and uncertainties that may cause actual results to differ materially from those that we expected. These risks, uncertainties and other factors are more fully described in our filings with the U.S. Securities and Exchange Commission, including our Quarterly Report on Form 10-Q, our Annual Report on Form 10-K and in our other filings. The forward-looking statements in this presentation speak only as of the date of this presentation and neither we nor any other person assume responsibility for the accuracy and completeness of any forward-looking statement. We undertake no obligation to publicly update or revise any forward-looking statement, whether as a result of new information, future events or otherwise, except as required by law.

We own various U.S. federal trademark applications and unregistered trademarks, including our company name, Resolaris™. All other trademarks or trade names referred to in this presentation are the property of their respective owners. Solely for convenience, the trademarks and trade names in this presentation are referred to without the symbols ° and ™, but such references should not be construed as any indicator that their respective owners will not assert, to the fullest extent under applicable law, their rights thereto.

LIFE Candidate Pipeline

All programs currently wholly-owned



Resokine Pathway Hypothesis:

A homeostatic pathway that controls the set point of key cells in the immune system.
(Reso for resolution; Kine for activity)

TAPPING THE POWER OF THE RESOKINE PATHWAY

EVOLVED FROM CELLULAR HOMEOSTASIS GENES OVER 400 MILLION YEARS



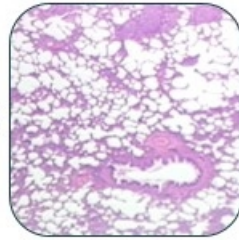
Evidence For A New Immunological Pathway in Humans: Resokine

Disrupting the pathway promotes T-cell invasion

Homeostasis

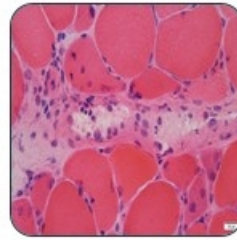


Healthy muscle

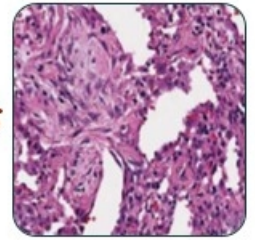


Healthy lung

Imbalance (↑ Immune cell invasion/activity)



Diseased Muscle



Diseased Lung

Resokine Pathway:



Modulates Immune System



Antibodies Antagonize Modulation

100% (18 of 18)
anti-synthetase syndrome
patients tested positive for
antibodies for Resokine
iMod domain

Free Resokine Levels
in Healthy Volunteers
(n=117)

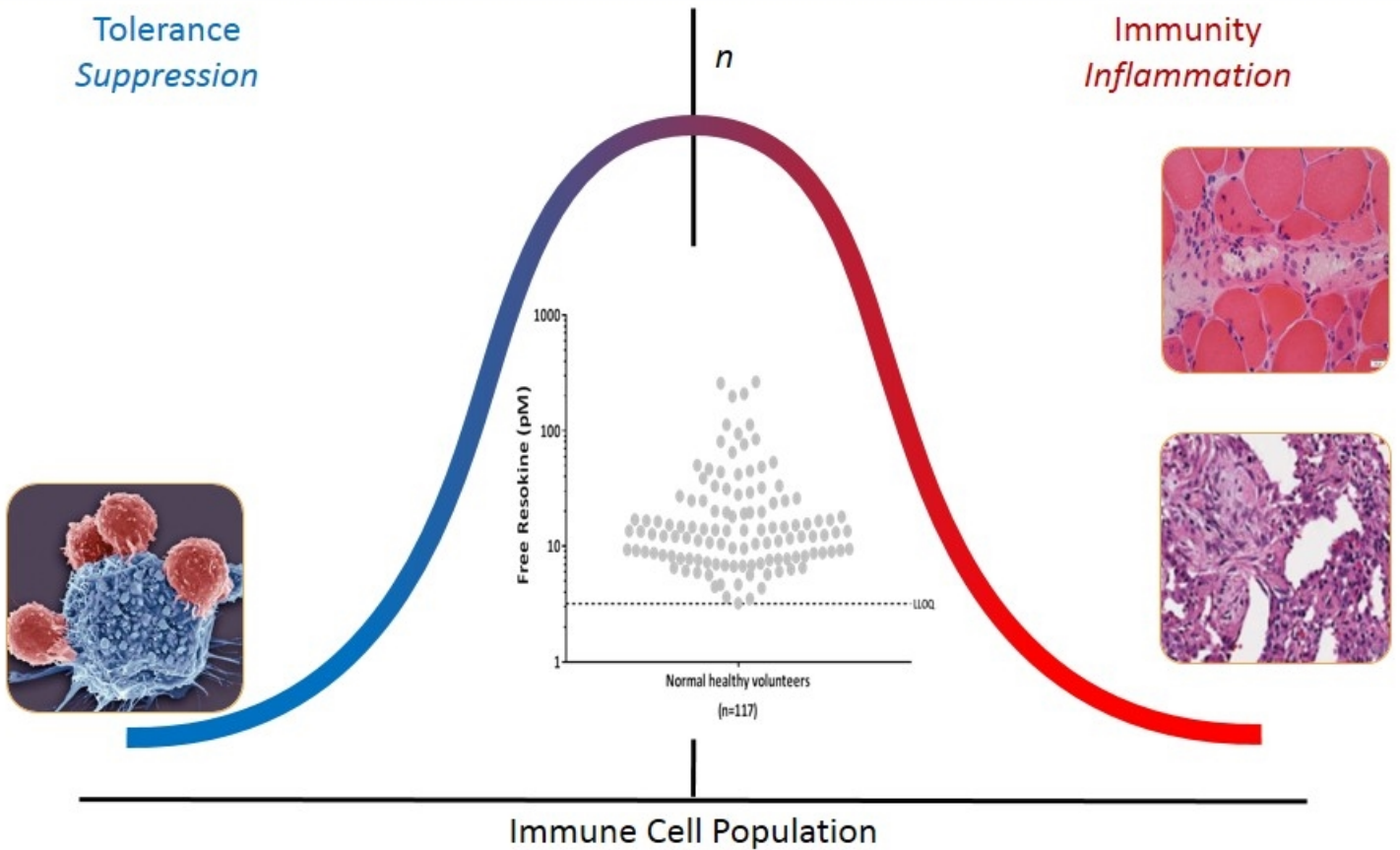
0/117 Healthy Volunteers with
Undetectable Levels of Free Resokine

Free Resokine Levels
in Anti-Synthetase Syndrome
Patients
(n=52)

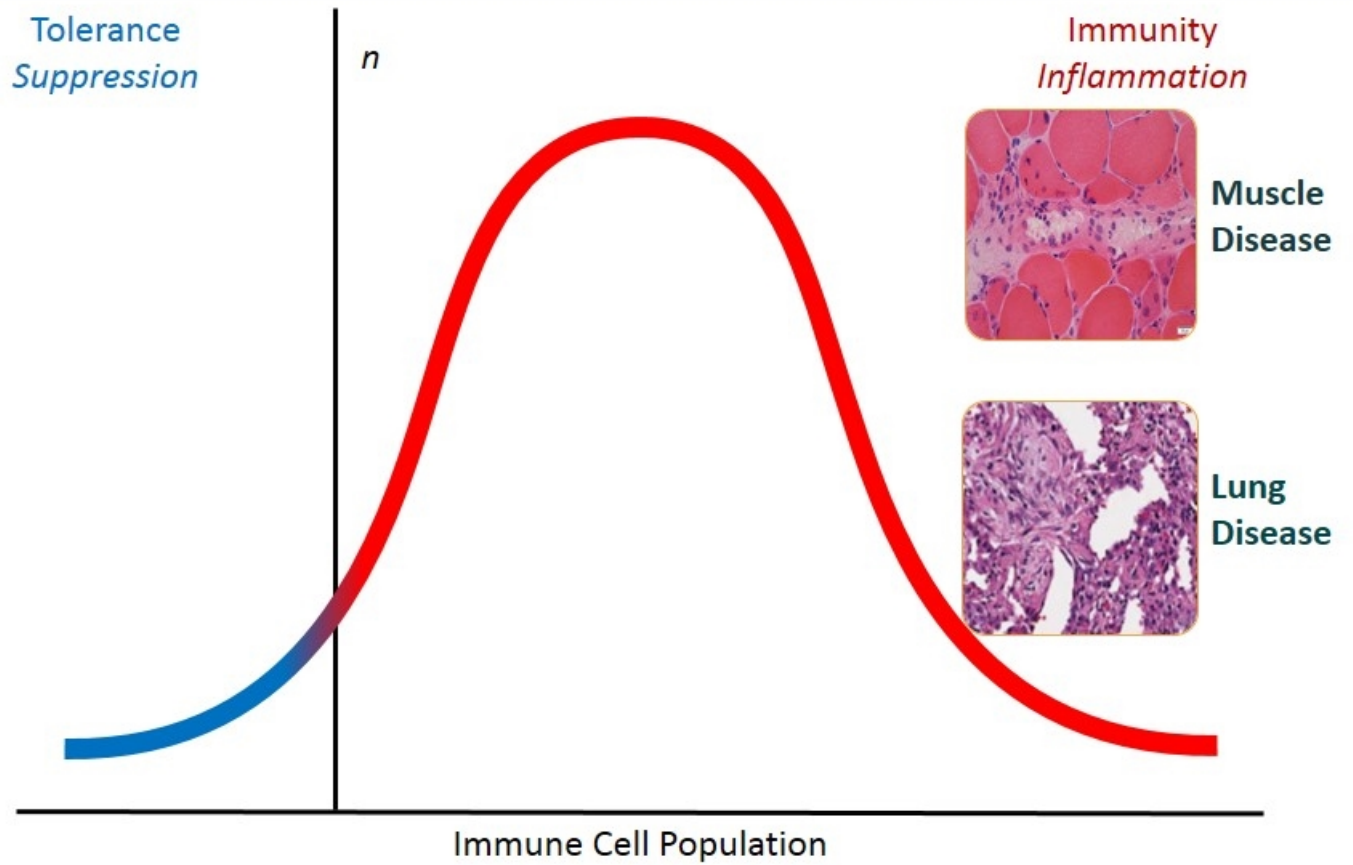
36/52 Patients with
Undetectable Levels of Free Resokine
p-value <0.0001

Resokine Levels Influence Tolerance and Immunity

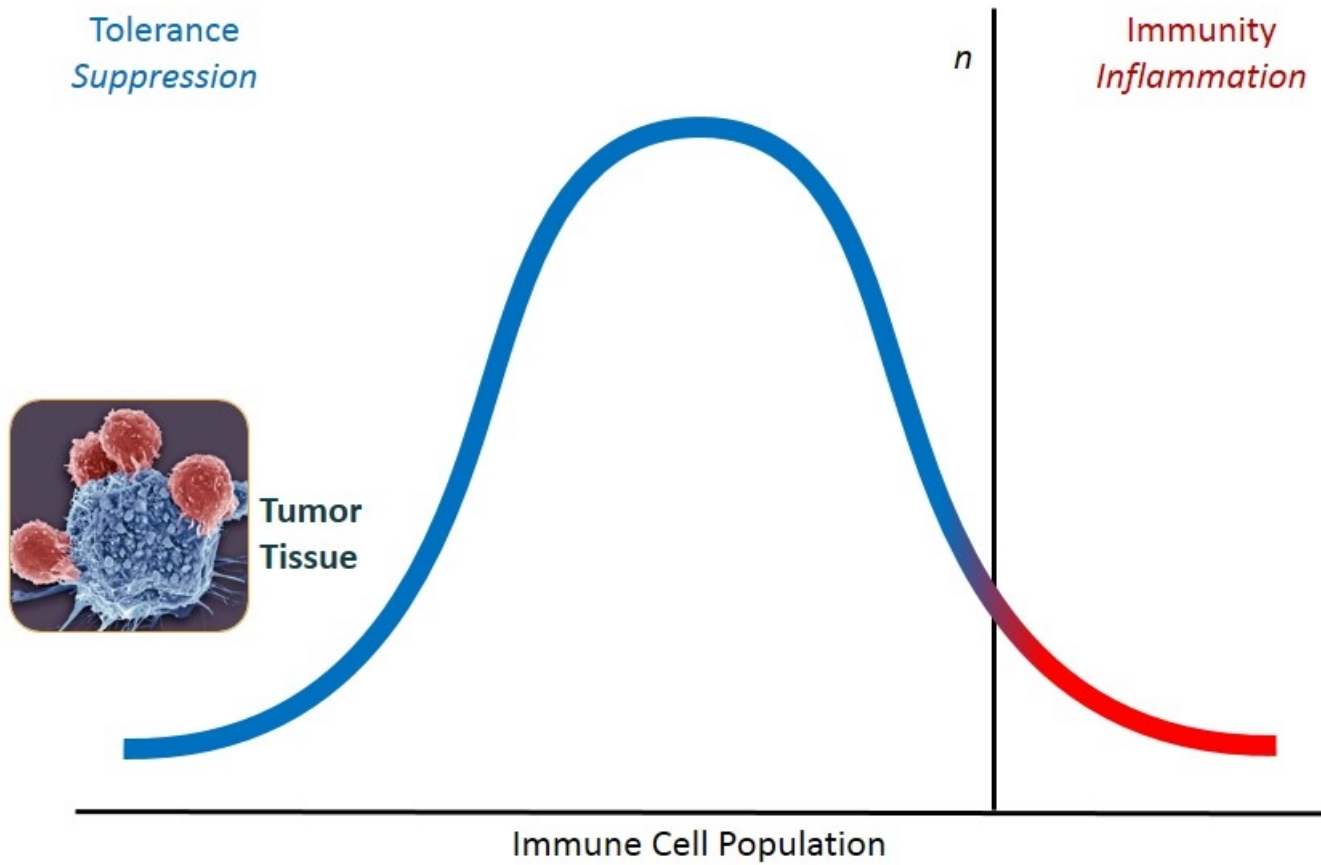
Resokine pathway as a set point modulator of immune engagement



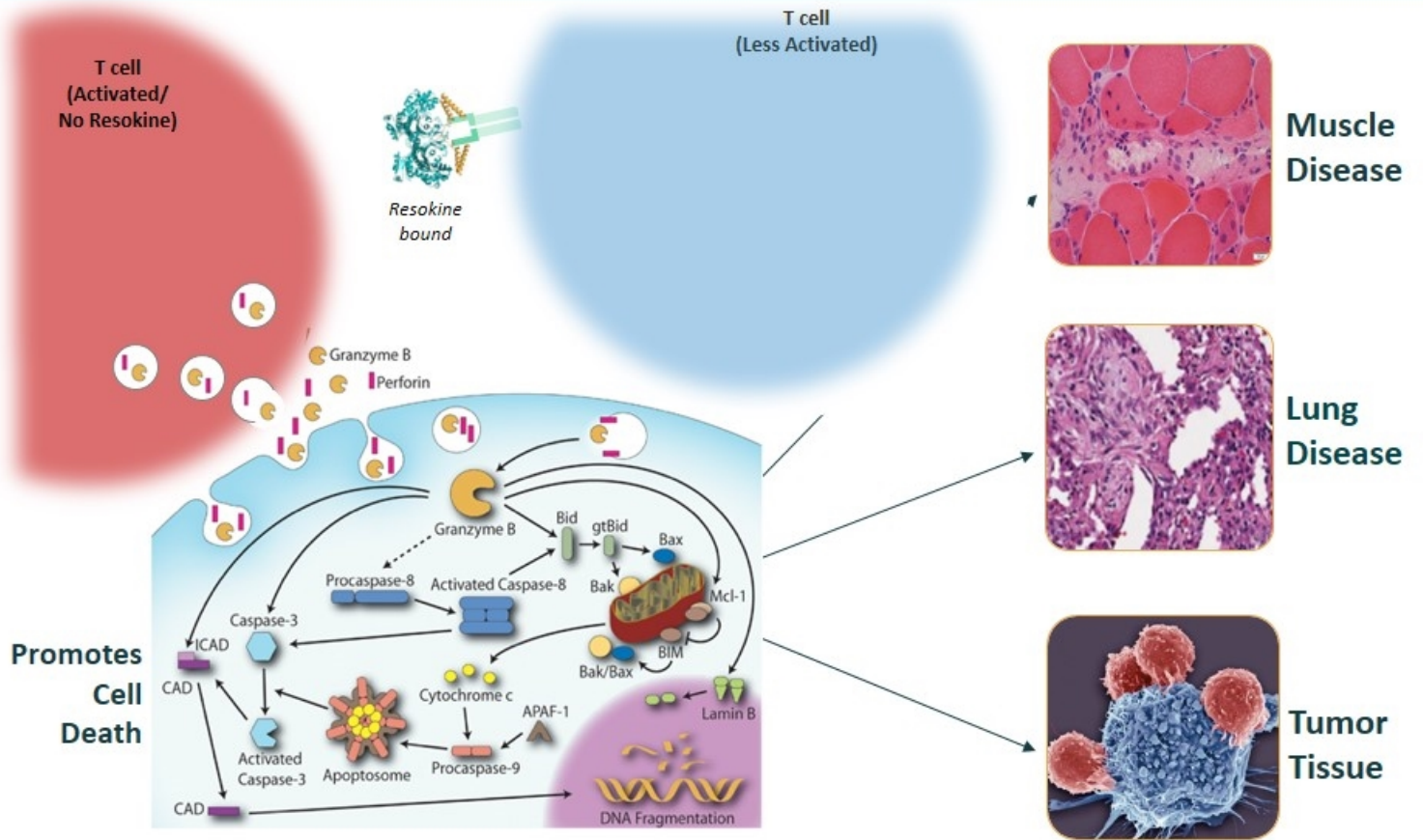
Resokine Hypothesis in Immune Invaded Tissues: Damage Signals Exceed Resokine Ability to Resolve Immune Engagement



Resokine Hypothesis in Cancer: Higher than Normal Resokine

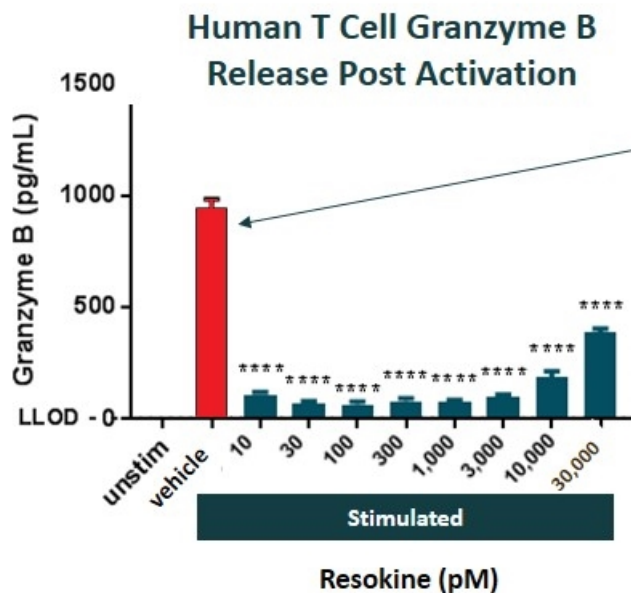


MOA Hypothesis: T Cells Release Granzyme B That Promotes Cell Death & Local Tissue Damage



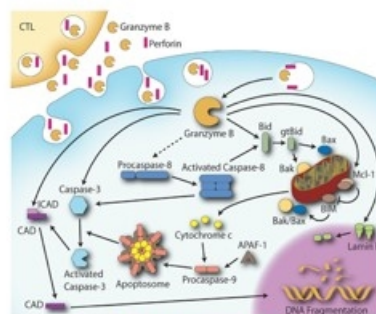
Resokine Inhibits Granzyme B Release From Activated Human T Cells

Key mediator of T cell cytotoxicity



Potential For More Tissue Damage

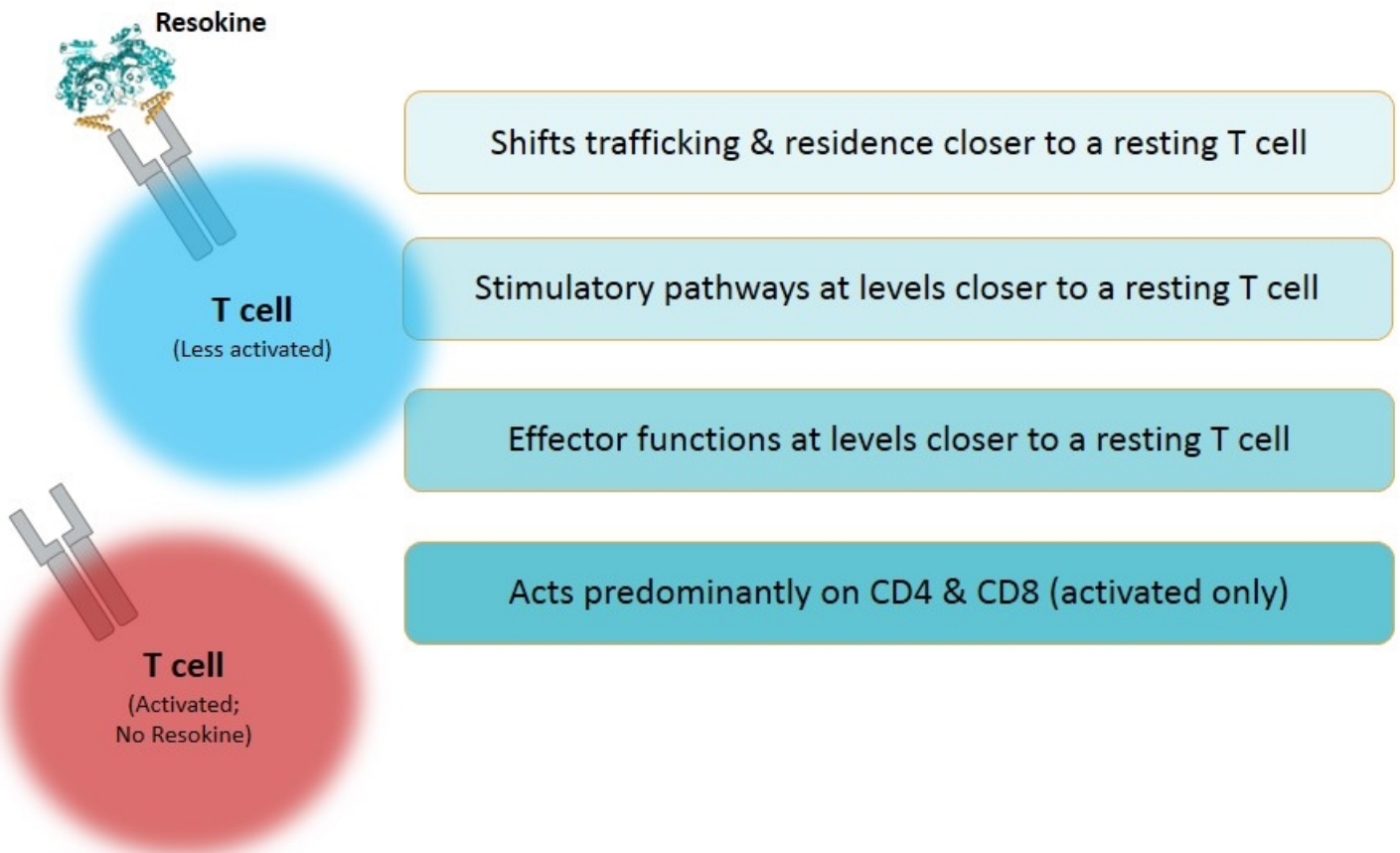
Note: Common with human donors and T cell assays to have variability



Granzyme B Promotes Cell Death

Resokine Agonists Change T Cell Phenotype

Unique MOA to orchestrate immune homeostasis in activated T cells



Harnessing New Immunological Insights Across 3 Therapeutic Areas, 3 Therapeutic Modalities

Cooling Down the Immune System

Resolaris



“Native Agonist”
to Resokine pathway

May promote
tissue homeostasis
in muscle & lung

No observed signs of
immunosuppression;
Signals of potential improved
muscle function

iMod.Fc



“Engineered Agonist”
Splice variant of Resokine
fused to Fc of antibody

May promote tissue
homeostasis in lung

Fc reduces clearance;
allowing for potential
TPP of monthly dosing

Heating Up the Immune System

ORCA



“Antagonist”
Antibody to Resokine pathway

Potential to *Disrupt* tumor
homeostasis

Preclinical tumor activity;
Pathway appears
upregulated in cancer

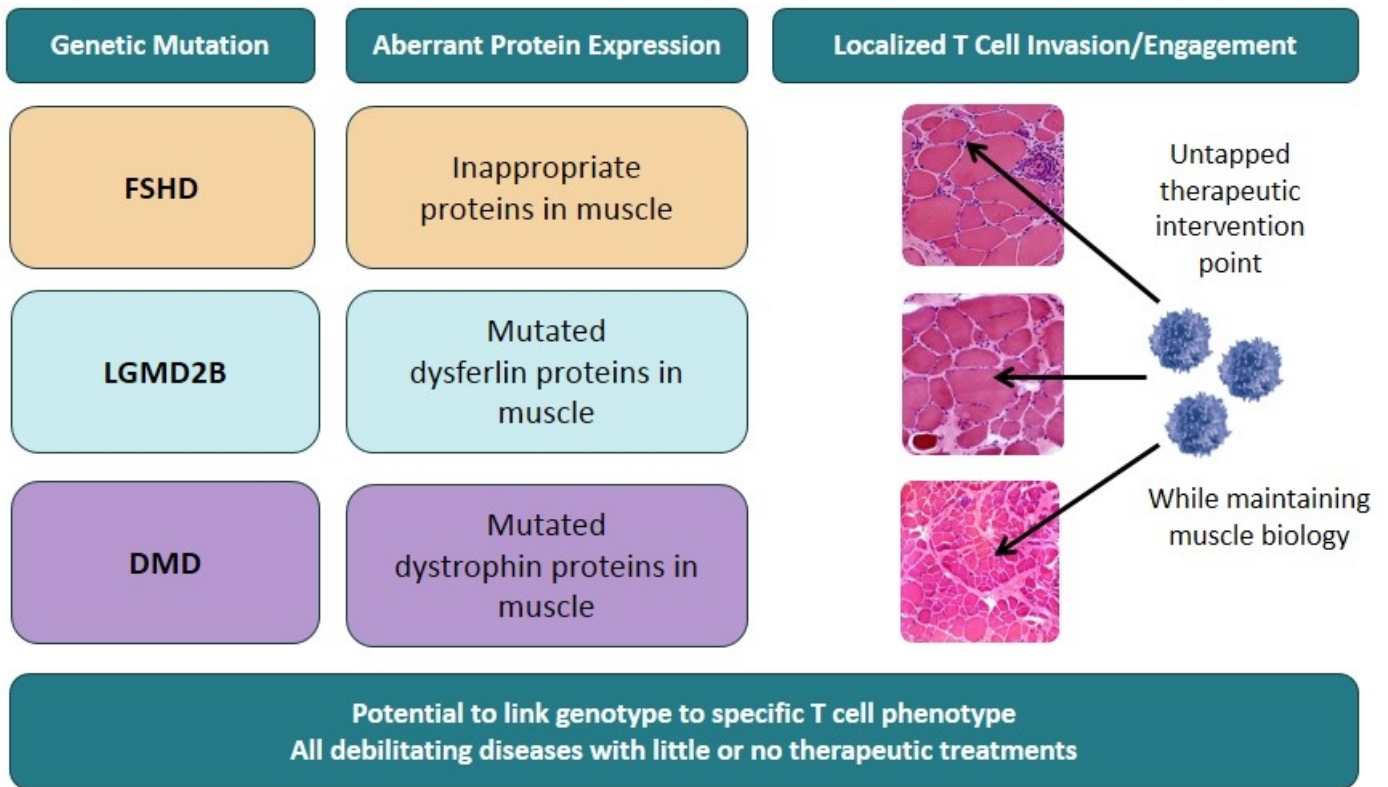


RESOLARIS PROGRAM

**HARNESSING THE RESOKINE PATHWAY
TO TREAT MULTIPLE RARE MUSCLE DISEASES**

Rare Myopathies Have an Immune Component

Chronic damage, homeostasis disrupted





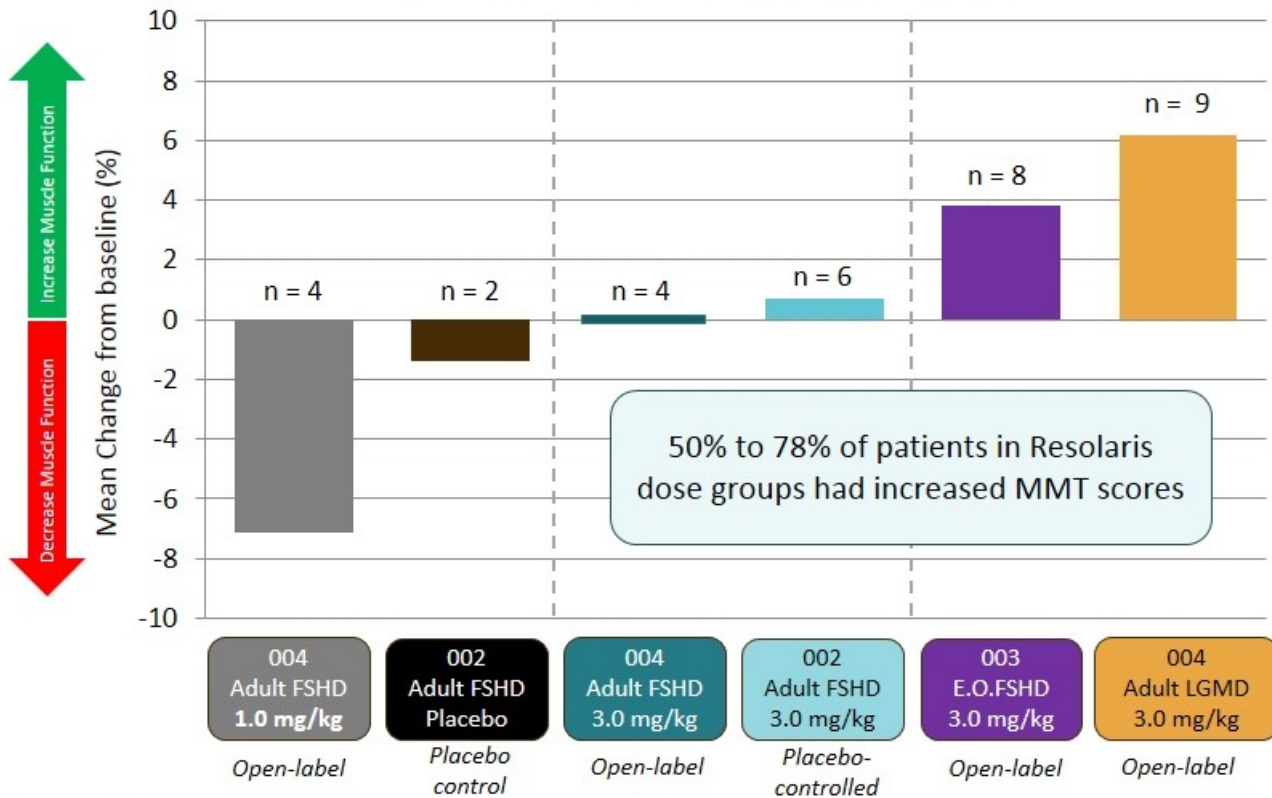
Patients	Rare Myopathies with an Immune Component
Therapeutic concept	Upregulate naturally occurring homeostatic pathway involving immune cells
Target	Resokine pathway: activated T-cell
Rationale	Functional knockout in humans & rodents results in increased muscle damage
Molecular entity	57.4kD monomer (recombinant human Resokine slightly truncated)
Affinity	In vitro cell assay (human T cells) $EC_{50} \leq 100$ pM
Human active dose	3.0 mg/kg (weekly or bi-weekly)
Human safety profile	<ul style="list-style-type: none"> • 44 patients have received Resolaris for a total drug exposure of 204 patient months • Generally well-tolerated; low-level anti-drug antibody signals did not result in clinical symptoms; some transient infusion related reactions observed • No observed signs of general immunosuppression • 12 patients have received at least 6 months of Resolaris with no significant trends of worsening in either muscle function or quality of life assessments
Clinical activity	<ul style="list-style-type: none"> • Muscle function signals: Adult LGMD2B, Early onset FSHD > Adult FSHD • Overall patients not feeling worse as measured by quality of life questionnaire
Clinical development plans	Conduct large randomized controlled trial (RCT) in rare muscular dystrophy (commence post partnership)

Resolaris Clinical Data from Three Phase 1/2a Clinical Trials

Signals of clinical activity (improved muscle function) in patients

Overall Mean MMT Change Week 14 by Dose Group

FSHD & LGMD2B Patients From 002, 003, 004 Trials



MMT = Manual Muscle Testing a validated assessment of muscle function/strength in 14 muscle groups

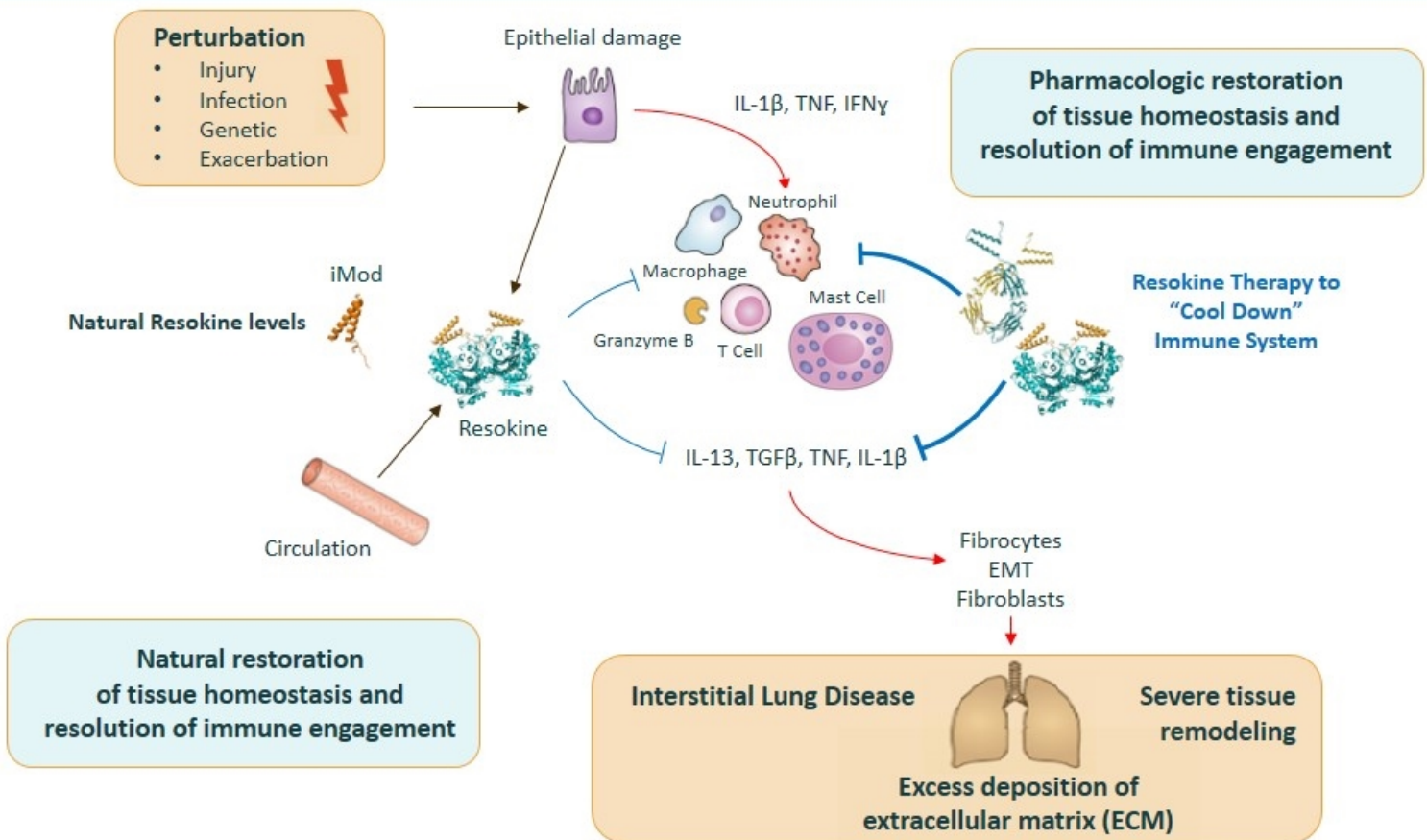
E.O. = Early Onset



IMOD.FC PROGRAM

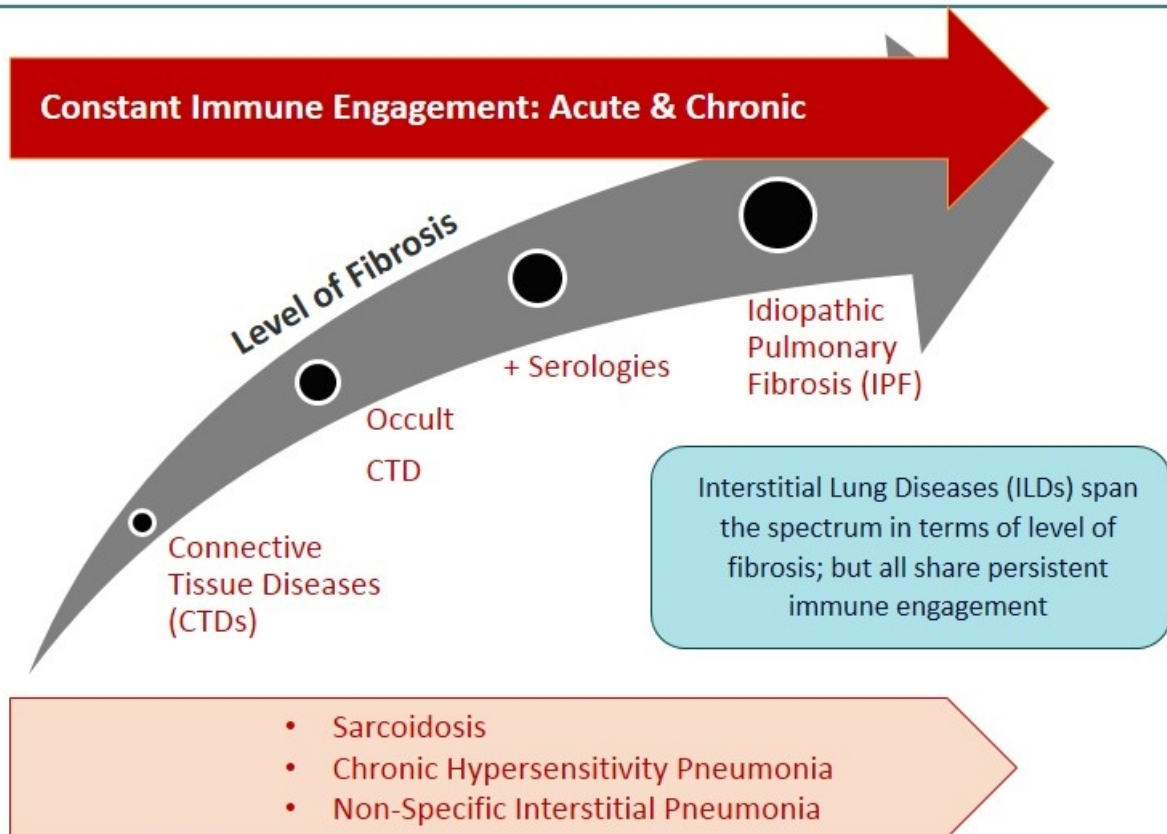
LUNG PHYSIOCRINE ENGINEERED
TO TREAT MULTIPLE PULMONARY DISEASES

Resokine Promotes Lung Homeostasis



Interstitial Lung Diseases Shared Immune Engagement

Significant and persistent immune engagement provoking fibrosis



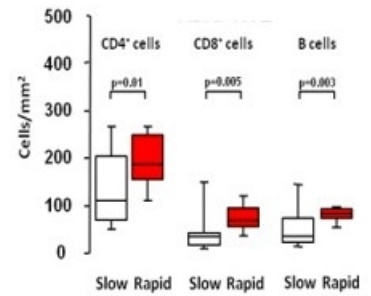
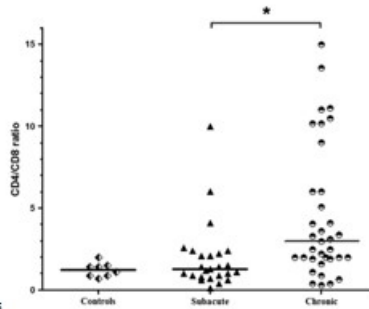
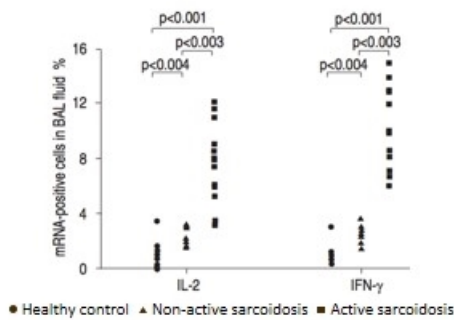
Pathophysiological Role of T Cells in ILD

Sarcoidosis

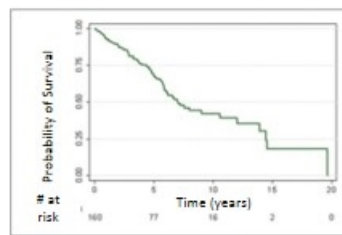
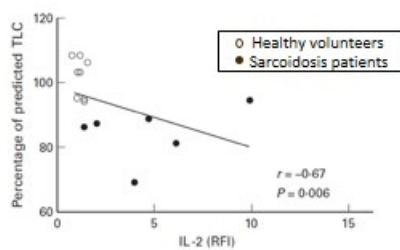
Hypersensitivity Pneumonitis

Idiopathic Pulmonary Fibrosis

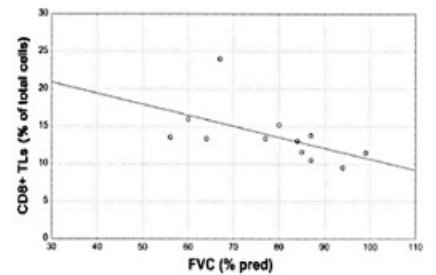
Elevated T Cell Activity in ILDs



T Cells Correlated with Negative Outcomes

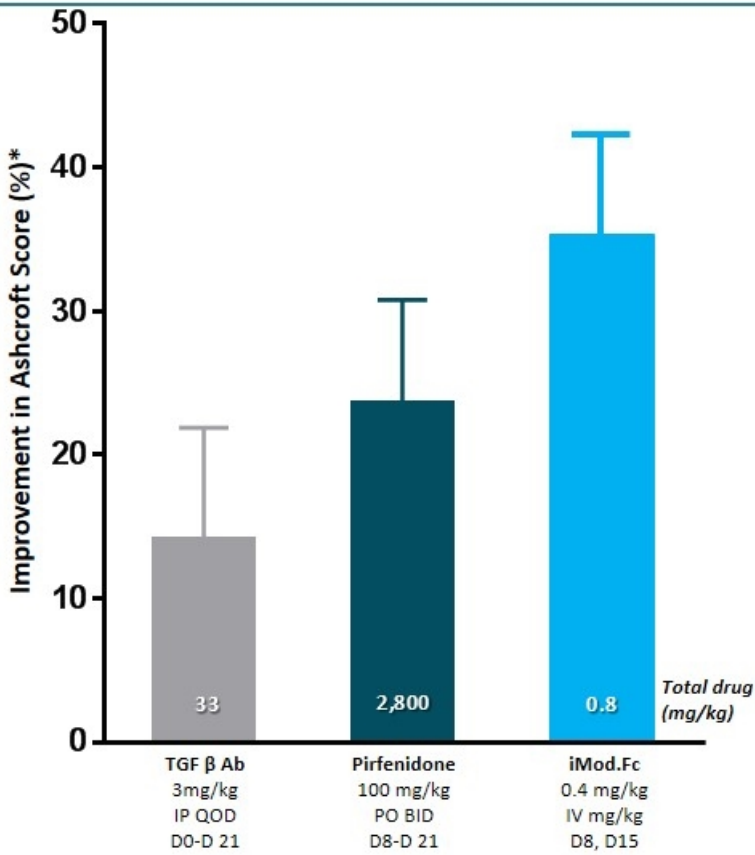


Percentage of lymphocytes in pulmonary lavage independently associated with survival



iMod.Fc Outperforms Current Treatment

Established rodent model for idiopathic pulmonary fibrosis (IPF)

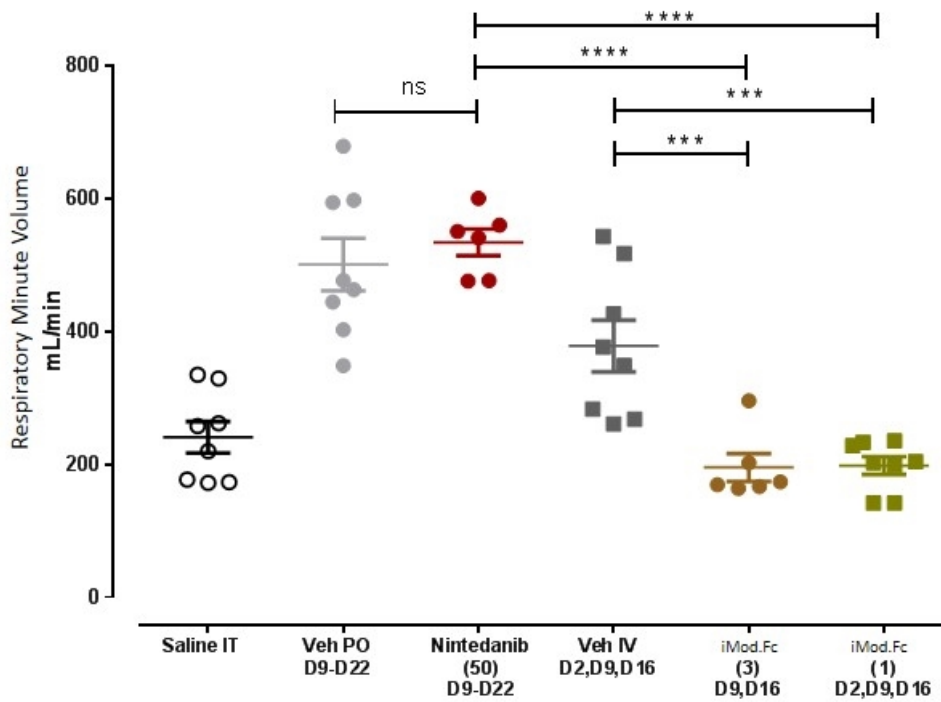


Outperformed Pirfenidone (SOC for IPF) and TGF β Ab (Fibrosis pathway blocker) in the bleomycin IPF model at lower and less frequent dosing**



*The Ashcroft scale for the evaluation of bleomycin-induced lung fibrosis is the analysis of stained histological samples by visual assessment
**Bleomycin mouse model abstract presented as a poster at the American Thoracic Society in May 2017

iMod.Fc Returns Breathing to Normal



iMod.Fc outperformed Nintedanib (SOC for IPF) in the respiratory mouse model at lower and less frequent dosing



*** $P \leq 0.001$; **** $P < 0.0001$; ns = not significant
 Respiratory Minute Volume = amount of air inhaled/exhaled/min
 Nintedanib dosed daily



Patients	Interstitial Lung Diseases, including IPF
Therapeutic concept	Upregulate naturally occurring homeostatic pathway involving immune cells
Target	Resokine pathway: activated T-cell
Rationale	Functional knockout in humans & rodents results in lung damage
Molecular entity	64.5kD: covalent dimer (native human Resokine iMod + Fc AA sequence)
Affinity	In vitro cell assay (human T cells) $EC_{50} \leq 100\text{pM}$
Proposed human dosing	0.03 mg/kg up to 5.0 mg/kg
Target administration	Monthly dosing (IV infusion)
Clinical development plans	Conduct Phase 1/2a single and multiple ascending dose trial in healthy volunteers (commence 2017) and patients with interstitial lung disease (commence 1H 2018)

iMod.Fc Phase 1/2a Program Current Plan

Program Overview

(Final trial designs subject to approval of regulatory authorities)

Randomized, Double-Blind, Placebo-Controlled Studies to Investigate the Safety, Tolerability, Immunogenicity, Pharmacokinetics and Pharmacodynamics of Intravenous ATYR1923 (iMod.Fc) in Healthy Volunteers and Patients with Interstitial Lung Disease.

Phase 1 - Healthy Volunteers:

- Approximately 36 subjects
- Single study drug infusion
- Starting at 0.03 mg/kg, increasing at half-log, up to potentially 5.0 mg/kg
- Initiation – first subject expected to be dosed in the second half of 2017
- Data expected in first half of 2018

Phase 2a: – Interstitial Lung Disease Patients:

- First patient expected to be dosed mid-2018; with potential data read-outs within 6 months of trial initiation

Phase 2a Potential Patient Analysis:

- BALF
- Imaging: HRCT, PET
- Disease Biomarkers: ACE, IL-2R, Neopterin, Resokine PD Assay



BALF = Bronchoalveolar Lavage Fluid analysis
PET = Positron Emission Tomography scan

HRCT = High-Resolution Computed Tomography
ACE = Angiotensin Converting Enzyme

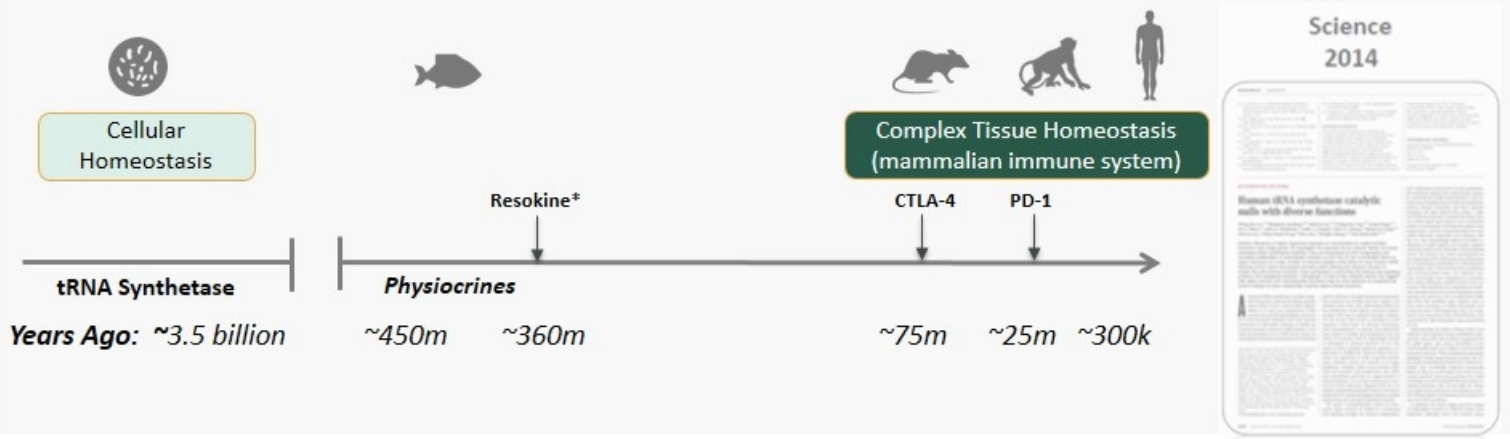
CANCER PROMOTING TUMOR HOMEOSTASIS

BY HIJACKING A 400 MILLION YEAR OLD PATHWAY, RESOKINE

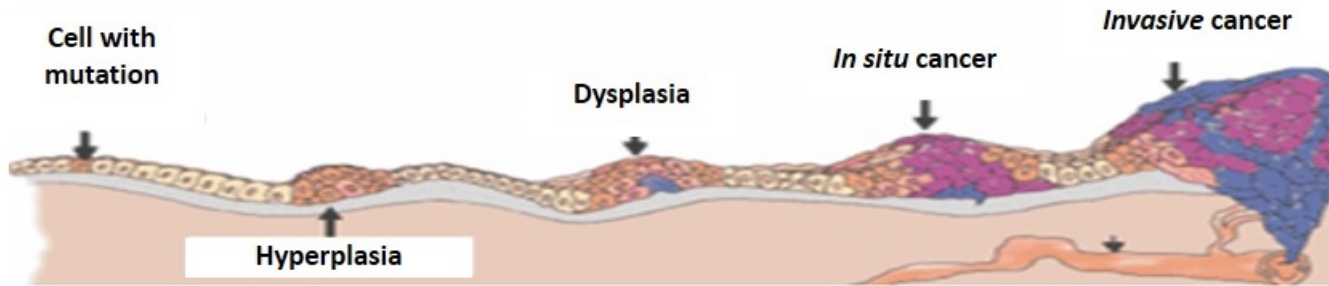


Resokine: Potential Key Regulator of Tissue & Tumor Homeostasis

Cancer homeostasis follows homeostasis evolution



Tumor Growth Mirrors LIFE Evolution:



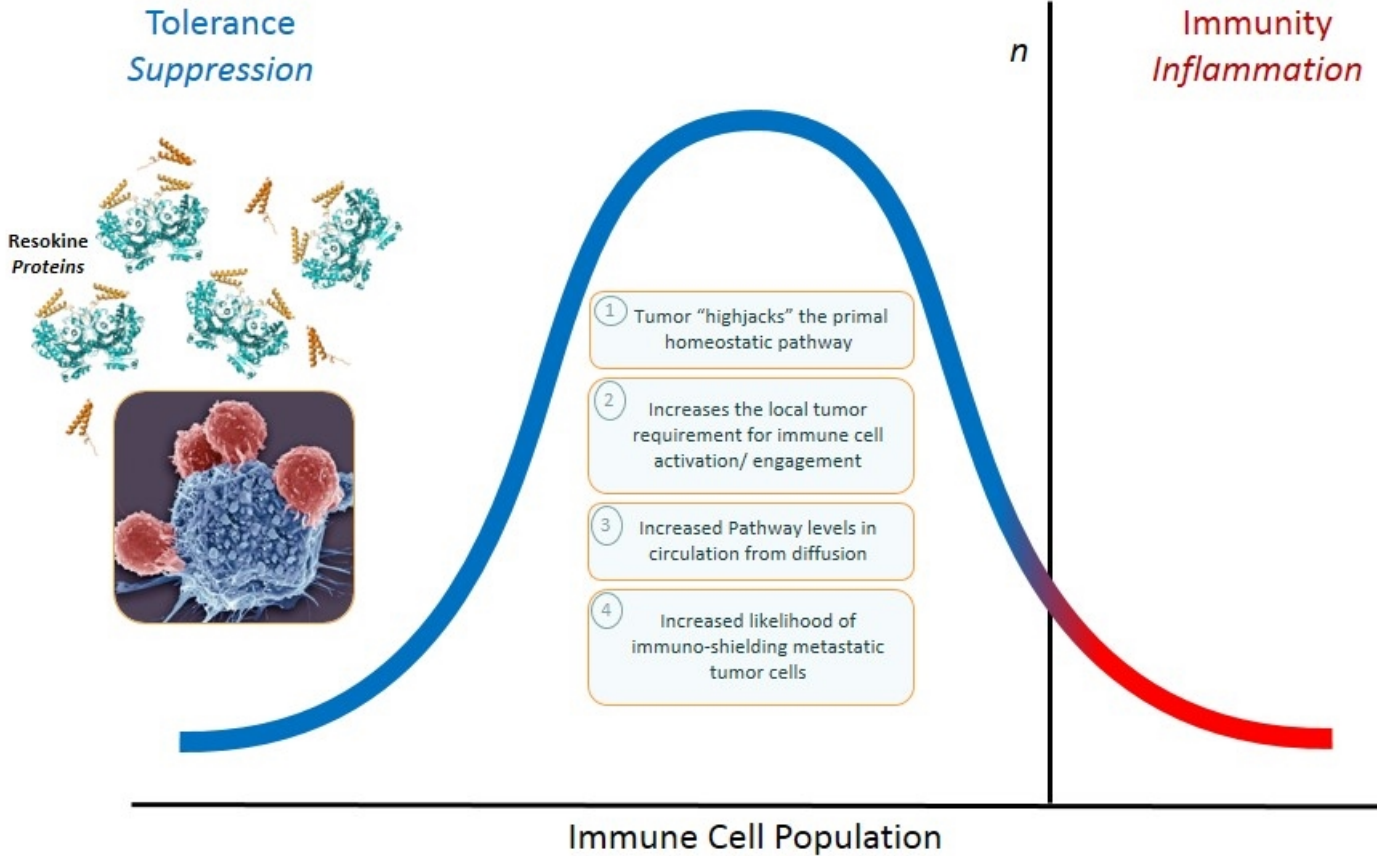
*Resokine, CTLA-4, PD-1 timeline for when >70% sequence identity
Guo et al. Nature 2010; Science 2017; Science 2007; Nature 2002; Nature 2010; Genome Research 2000

PROJECT ORCA: RESOKINE ANTAGONISTS

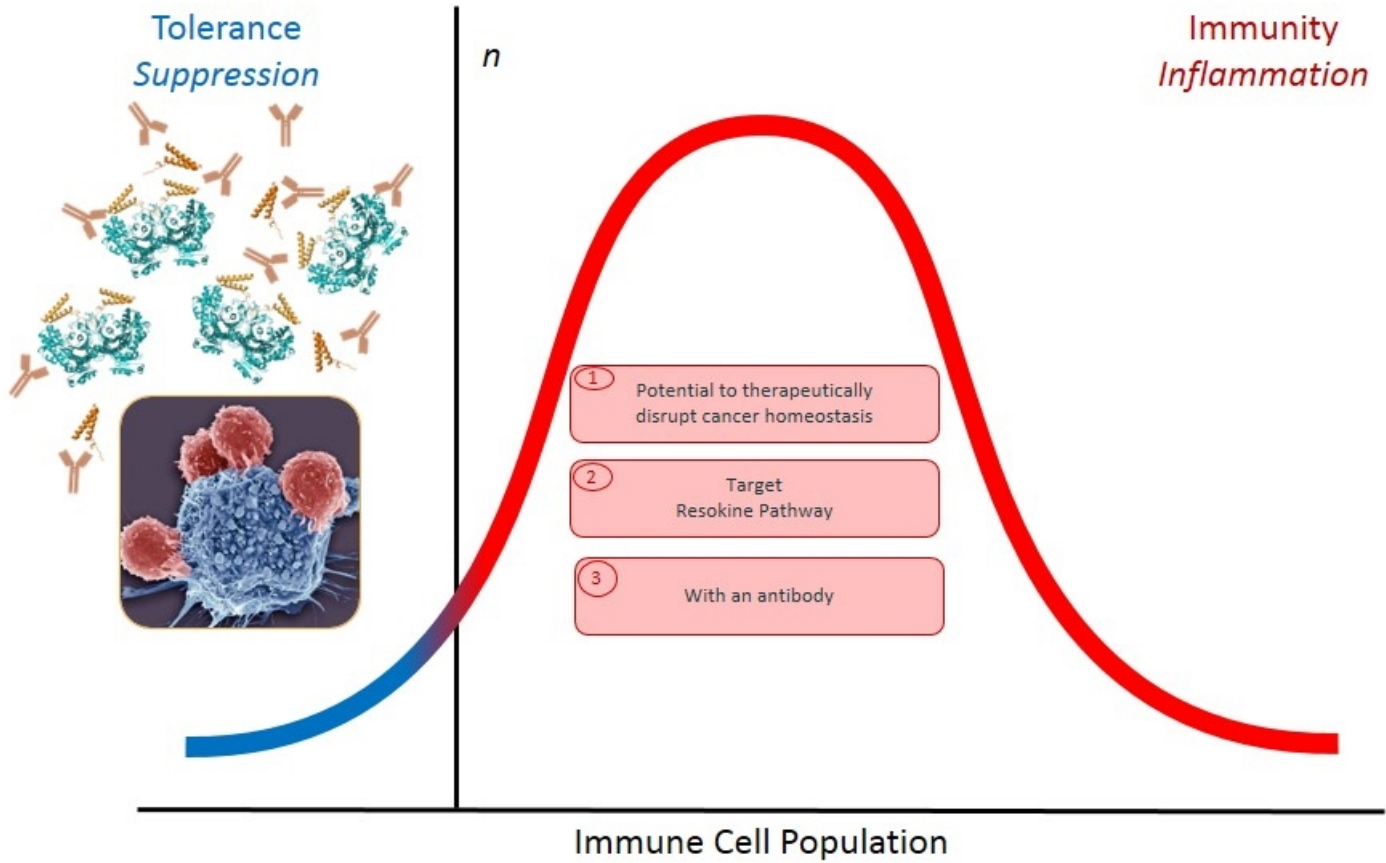
ACTIVATING T CELLS "TURNING UP THE HEAT" TO DISRUPT TUMOR HOMEOSTASIS



Higher Resokine Levels in Tumors: Colder Immune System at the Tumor



Setting Lower Resokine Levels in Cancer Patients in Tumors: Hotter Immune System at the Tumor



ORCA: Development Highlights & Status

Development Highlights	Status
✓ Resokine over expressed in all cancers tested to date	Over 10 tumor types tested; >300 patient samples tested; ≥95% of patients tested positive for Resokine
✓ Human evidence of Ab blockade; changes T cell behavior	Anti-synthetase syndrome patients
✓ Key blocking epitope	Out of multitude of Resokine epitopes
✓ Tested Resokine Abs in multiple mouse syngeneic tumor models	Outperformed checkpoint inhibitors (e.g. Abs to PD-1, PD-L1, and CTLA-4) in various animal models
✓ Tested Resokine Abs in combination	Efficacy potential as monotherapy and Resokine Abs with checkpoint inhibitors (based on tumor model data)
✓ Resokine Ab assay development & "Druggability"	Resokine Abs shown to knock-out Resokine pathway
✓ Biomarker identified and tested	Liquid biopsy: correlates with tumor volume and efficacy
☐ Resokine antibody selection	On track to declare an IND candidate by end of 2017
☐ Publications/preclinical presentations	Throughout 2018
☐ Phase 1	2019



BUILDING A NEW CLASS OF THERAPEUTICS FOR PATIENTS
FOUNDATION FOR THE FUTURE

LIFE Leaders



John Mendlein, Ph.D.
Chief Executive Officer



Sanuj Ravindran, M.D.
Chief Business Officer



Sanjay Shukla, M.D.
Chief Medical Officer



David King, Ph.D.
SVP, Research



Grove Matsuoka
SVP, Product Programs and Planning



John Blake, CPA
SVP, Finance



Andrea Cubitt, Ph.D.
VP, Product Protection



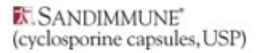
Ashraf Amanullah, Ph.D.
VP, Manufacturing



Holly D. Chrzanowski
VP, Enterprise Talent and Organization



Nancy Krueger
VP, Legal Affairs



LIFE Corporate Goals and Financial Update

Corporate Goals

1. Advance Pipeline with Two Molecules in the Clinic

- iMod.Fc scheduled to commence Phase 1 in 2017

2. Declare 3rd IND Candidate

- ORCA on track to declare an IND candidate in 2017

3. Partner One or More Wholly-Owned Programs

- Active discussions ongoing (Resolaris/iMod.Fc/ORCA)

Financial Update

- \$57.2M cash and investments as of 6/30/2017
- Announced Private Placement on 8/28/17 with \$45.8M in gross proceeds

