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

SCHEDULE 14A INFORMATION

**Proxy Statement Pursuant to Section 14(a) of the
Securities Exchange Act of 1934
(Amendment No.)**

Filed by the Registrant

Filed by a Party other than the Registrant

Check the appropriate box:

- Preliminary Proxy Statement
- Confidential, for Use of the Commission Only (as permitted by Rule 14a-6(e)(2))**
- Definitive Proxy Statement
- Definitive Additional Materials
- Soliciting Material Pursuant to §240.14a-12

ATYR PHARMA, INC.

(Name of Registrant as Specified in its Charter)

(Name of Person(s) Filing Proxy Statement, if Other Than the Registrant)

Payment of Filing Fee (Check all boxes that apply):

- No fee required
 - Fee paid previously with preliminary materials
 - Fee computed on table in exhibit required by Item 25(b) per Exchange Act Rules 14a-6(i)(1) and 0-11
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aTyr Pharma, Inc.
3545 John Hopkins Court, Suite #250
San Diego, CA 92121

NOTICE OF ANNUAL MEETING OF STOCKHOLDERS

To Be Held On April 26, 2022

Dear Stockholder:

You are cordially invited to virtually attend the 2022 Annual Meeting of Stockholders (including any adjournments, continuations or postponements thereof, the “Annual Meeting”) of aTyr Pharma, Inc., a Delaware corporation (the “Company”). The Annual Meeting will be held virtually via live webcast on Tuesday, April 26, 2022 at 8:30 a.m. Pacific Time. The Annual Meeting is being held for the following purposes, which are more fully described in the accompanying materials:

1. To elect three Class I directors, as nominated by the Company’s Board of Directors (the “Board of Directors”), to hold office until the 2025 annual meeting of stockholders or until their successors are duly elected and qualified;
2. To ratify the appointment of Ernst & Young LLP as the independent registered public accounting firm of the Company for its fiscal year ending December 31, 2022;
3. To approve, on an advisory basis, the compensation of the Company’s named executive officers;
4. To approve an amendment to the aTyr Pharma, Inc. 2015 Stock Option and Incentive Plan, as amended;
5. To approve an amendment to the aTyr Pharma, Inc. 2015 Employee Stock Purchase Plan;
6. To approve an amendment to the Company’s Restated Certificate of Incorporation to increase the authorized number of shares of common stock from 42,500,000 to 85,000,000 shares;
7. To approve the authorization to adjourn the Annual Meeting, if necessary, to solicit additional proxies if there are not sufficient votes in favor of Proposals 4, 5 or 6; and
8. To transact such other business as may properly come before the Annual Meeting or any adjournment or postponement thereof.

These items of business are more fully described in the Proxy Statement accompanying this Notice.

Proposal 1 relates solely to the election of three Class I directors nominated by the Board of Directors and does not include any other matters relating to the election of directors, including without limitation, the election of directors nominated by any stockholder of the Company.

The Board of Directors has fixed the close of business on Monday, March 7, 2022 as the record date for the determination of stockholders entitled to notice of, and to vote at, the Annual Meeting.

In order to ensure your representation at the 2022 Annual Meeting of Stockholders, please vote over the Internet, by telephone or by completing and returning the enclosed proxy card promptly in the enclosed envelope. The 2022 Annual Meeting of Stockholders will be a virtual meeting. There will be no physical meeting location. The meeting will be conducted via live webcast. In order to attend, you must register in advance at www.proxydocs.com/LIFE prior to the deadline of Friday, April 22, 2022 at 2:00 p.m. Pacific Time. Upon completing your registration, you will receive further instructions via email, including your unique link that will allow you access to the meeting and you will have the ability to submit questions. Please be sure to follow the instructions on the enclosed proxy card and/or voting instruction form and subsequent instructions that will be delivered to you via email. If you attend the 2022 Annual Meeting of Stockholders virtually, you may submit an electronic ballot during the meeting.

All stockholders are cordially invited to attend the 2022 Annual Meeting of Stockholders.

Important Notice Regarding the Availability of Proxy Materials for the 2022 Annual Meeting of Stockholders to be Held Virtually on April 26, 2022.

The Notice of Annual Meeting, Proxy Statement and Annual Report are available electronically at <https://investors.atyrpharma.com>. Additionally, you may access our proxy materials at www.proxydocs.com/LIFE, a site that does not have “cookies” that identify visitors to the site, using the control number located on your proxy card or in the instructions that accompanied your proxy materials.

By Order of the Board of Directors

aTyr Pharma, Inc.



Sanjay S. Shukla, M.D., M.S.
President and Chief Executive Officer

San Diego, California
March 23, 2022

Your vote is important, whether or not you expect to attend the Annual Meeting via live webcast. You are urged to vote either via the Internet or telephone, or by marking, dating and signing the proxy card included in your proxy materials and returning it promptly to ensure your vote is counted. Voting promptly will help avoid the additional expense of further solicitation to assure a quorum at the meeting.

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ATYR PHARMA, INC.

**PROXY STATEMENT
FOR THE 2022 ANNUAL MEETING OF STOCKHOLDERS
To Be Held On April 26, 2022**

INFORMATION CONCERNING SOLICITATION AND VOTING

General

This proxy statement (“Proxy Statement”) is furnished in connection with the solicitation of proxies for the 2022 Annual Meeting of Stockholders (including any adjournments, continuations or postponements thereof, the “Annual Meeting”) of aTyr Pharma, Inc., a Delaware corporation (the “Company”), to be held virtually at 8:30 a.m. Pacific Time on Tuesday, April 26, 2022 for the following purposes, which are more fully described in this Proxy Statement:

1. To elect three Class I directors, as nominated by the Company’s Board of Directors (“Board of Directors”), to hold office until the 2025 annual meeting of stockholders or until their successors are duly elected and qualified;
2. To ratify the appointment of Ernst & Young LLP as the independent registered public accounting firm of the Company for its fiscal year ending December 31, 2022;
3. To approve, on an advisory basis, the compensation of the Company’s named executive officers;
4. To approve an amendment to the aTyr Pharma, Inc. 2015 Stock Option and Incentive Plan, as amended (the “2015 Stock Plan”);
5. To approve an amendment to the aTyr Pharma, Inc. 2015 Employee Stock Purchase Plan (the “2015 ESPP”);
6. To approve an amendment to the Company’s Restated Certificate of Incorporation to increase the authorized number of shares of common stock from 42,500,000 to 85,000,000 shares;
7. To approve the authorization to adjourn the Annual Meeting, if necessary, to solicit additional proxies if there are not sufficient votes in favor of Proposals 4, 5 or 6; and
8. To transact such other business as may properly come before the Annual Meeting.

Virtual Annual Meeting

The Annual Meeting will be a virtual meeting. There will be no physical meeting location. The meeting will be conducted via live webcast. In order to attend, you must register in advance at www.proxydocs.com/LIFE prior to the deadline of Friday, April 22, 2022 at 2:00 p.m. Pacific Time. Please be sure to follow the instructions on the enclosed proxy card and/or voting instruction form and subsequent instructions that will be delivered to you via email.

Upon completing your registration, you will receive further instructions via email, including your unique link that will allow you access to the Annual Meeting and you will have the ability to submit questions. This year’s stockholders question and answer session will include questions submitted in advance of and during the Annual Meeting. You may submit a question in advance of the meeting at www.proxydocs.com/LIFE after logging in with your control number. We do not place restrictions on the type or form of questions that may be asked; however, we reserve the right to edit or reject redundant questions or questions that we deem profane or otherwise inappropriate. During the live question and answer session of the Annual Meeting, we will answer questions as they come in and address those asked in advance, as time permits.

The virtual meeting platform is fully supported across browsers and devices running the most updated version of applicable software and plugins. Participants should ensure that they have a strong internet connection wherever they intend to participate in the Annual Meeting. We will have technicians ready to assist you with any technical difficulties you may have accessing the Annual Meeting. If you have registered for the Annual Meeting, you will receive an email with information about technical support.

On or about March 23, 2022, we expect to mail to all stockholders entitled to vote at the Annual Meeting a Notice of Annual Meeting of Stockholders, this Proxy Statement and our 2021 Annual Report, including our annual report on Form 10-K (“Annual Report”).

Solicitation

This solicitation is made by the Board of Directors on behalf of the Company. We will bear the costs of preparing and mailing materials, online processing and other proxy solicitation costs. In addition, we have engaged Alliance Advisors, LLC (“Alliance Advisors”) to assist us with the solicitation of proxies. We will pay Alliance Advisors a service fee, plus out-of-pocket expenses and additional fees based upon work performed at our request, which is not expected to exceed \$15,000. In addition to solicitations by mail, Alliance Advisors may solicit proxies by telephone and e-mail. **IF YOU NEED ASSISTANCE WITH THE VOTING OF YOUR SHARES, YOU MAY CONTACT ALLIANCE ADVISORS TOLL-FREE AT (844) 866-9428.** Copies of solicitation materials may be furnished to brokers, custodians, nominees and other fiduciaries for forwarding to beneficial owners of shares of our common stock, and normal handling charges may be paid for such forwarding service. Officers and other Company employees, who will receive no additional compensation for their services, may solicit proxies by mail, e-mail via the Internet or by telephone.

Voting Rights and Outstanding Shares

Only holders of record of our common stock as of the close of business on March 7, 2022 (the “Record Date”) are entitled to receive notice of, and to vote at, the Annual Meeting. Each holder of common stock as of the Record Date will be entitled to one vote per share on all matters to be voted upon at the Annual Meeting. At the close of business on the Record Date, there were 27,795,794 shares of our common stock issued and outstanding.

A quorum of stockholders is necessary to take action at the Annual Meeting. Stockholders representing a majority of the outstanding shares of our common stock entitled to vote at the Annual Meeting (present online at the Annual Meeting or represented by proxy) will constitute a quorum. We will appoint an inspector of elections for the meeting to determine whether or not a quorum is present and to tabulate votes cast by proxy or online at the Annual Meeting. Abstentions, withheld votes and broker non-votes (which occur when a broker, bank or other nominee holding shares for a beneficial owner does not vote on a particular matter because such broker, bank or other nominee does not have discretionary authority to vote on that matter and has not received voting instructions from the beneficial owner) are counted as present for purposes of determining the presence of a quorum for the transaction of business at the Annual Meeting. If there is no quorum, the chairperson of the Annual Meeting or holders of a majority of the voting power of the shares present at the Annual Meeting may adjourn the Annual Meeting to another date.

Votes Required for Each Proposal

To elect our directors and approve the other proposals being considered at the Annual Meeting, the voting requirements are as follows:

Proposal	Vote Required	Discretionary Voting Permitted?
1. Election of Directors	Plurality	No
2. Ratification of Ernst & Young LLP	Majority Cast	Yes(1)
3. Approval of the Compensation of the Company’s Named Executive Officers	Majority Cast	No
4. Approval of Amendment to 2015 Stock Plan	Majority Cast	No
5. Approval of Amendment to 2015 ESPP	Majority Cast	No
6. Approval of Increase in Authorized Common Stock	Majority Outstanding	Yes(1)
7. Approval of the Authorization to Adjourn the Annual Meeting, if Necessary	Majority Cast	Yes(1)

- (1) The New York Stock Exchange (“NYSE”) has advised us that this proposal is considered to be a “routine” matter under NYSE rules. Accordingly, if you hold your shares in street name and do not provide voting instructions to your broker, bank or other agent that holds your shares, your broker, bank or other agent has discretionary authority under NYSE rules to vote your shares on this proposal.

“*Discretionary Voting Permitted*” means that brokers will have discretionary voting authority with respect to shares held in street name for their clients, even if the broker does not receive voting instructions from their client.

“*Majority Cast*” means a majority of the votes properly cast for or against such matter.

“*Majority Outstanding*” means a majority of the shares of common stock outstanding and entitled to vote on the Record Date.

“*Plurality*” means a plurality of the votes properly cast on such matter. For the election of directors, the three nominees receiving the most votes will be elected as directors.

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

Proposal 1—Election of Directors. If a quorum is present, the director nominees named in this Proxy Statement receiving the highest number of votes “FOR” will be elected as directors. You may vote “FOR” or “WITHHOLD” on each of the nominees. Withheld votes and broker non-votes will have no effect on the outcome of the election of the directors. The NYSE has advised us that Proposal 1 is not considered to be a discretionary item, so if you do not instruct your broker how to vote with respect to this proposal, your broker may not vote on this proposal, and those votes will be counted as “broker non-votes.”

Proposal 2—Ratification of Ernst & Young LLP as Independent Registered Public Accountants. Approval of this proposal requires the affirmative vote of a majority of the votes properly cast “FOR” or “AGAINST” such matter. Broker non-votes and abstentions will not be counted as votes properly cast with respect to such matter, and will have no effect on the proposal. The NYSE has advised us that Proposal 2 is considered to be a discretionary item, and your broker, bank or other nominee will be able to vote on this proposal even if it does not receive instructions from you.

Proposal 3—Approval of the Compensation of the Company’s Named Executive Officers. Approval of this proposal requires the affirmative vote of a majority of the votes properly cast “FOR” or “AGAINST” such matter. Broker non-votes and abstentions will not be counted as votes properly cast with respect to such matter, and will have no effect on the proposal. The NYSE has advised us that Proposal 3 is not considered to be a discretionary item, so if you do not instruct your broker how to vote with respect to this proposal, your broker may not vote on this proposal, and those votes will be counted as “broker non-votes.”

Proposal 4—Approval of Amendment to the 2015 Stock Plan. Approval of this proposal requires the affirmative vote of a majority of the votes properly cast “FOR” or “AGAINST” such matter. Broker non-votes and abstentions will not be counted as votes properly cast with respect to such matter, and will have no effect on the proposal. The NYSE has advised us that Proposal 4 is not considered to be a discretionary item, so if you do not instruct your broker how to vote with respect to this proposal, your broker may not vote on this proposal, and those votes will be counted as “broker non-votes.”

Proposal 5—Approval of Amendment to the 2015 ESPP. Approval of this proposal requires the affirmative vote of a majority of the votes properly cast “FOR” or “AGAINST” such matter. Broker non-votes and abstentions will not be counted as votes properly cast with respect to such matter, and will have no effect on the proposal. The NYSE has advised us that Proposal 5 is not considered to be a discretionary item, so if you do not instruct your broker how to vote with respect to this proposal, your broker may not vote on this proposal, and those votes will be counted as “broker non-votes.”

Proposal 6—Approval of Increase in Authorized Common Stock. Approval of this proposal requires the affirmative vote of a majority of the shares of common stock outstanding and entitled to vote on the Record Date. You may vote “FOR” or “AGAINST” this proposal. Broker non-votes and abstentions will have the same effect as a vote “AGAINST” the proposal. The NYSE has advised us that Proposal 6 is considered to be a discretionary item, and your broker will be able to vote on this proposal even if it does not receive instructions from you, so we do not anticipate any broker non-votes in connection with Proposal 6.

Proposal 7—Approval of the Authorization to Adjourn the Annual Meeting, if Necessary. Approval of this proposal requires the affirmative vote of a majority of the votes properly cast “FOR” or “AGAINST” such matter. Broker non-votes and abstentions will not be counted as votes properly cast with respect to such matter, and will have no effect on the proposal. The NYSE has advised us that Proposal 7 is considered to be a discretionary item, and your broker will be able to vote on this proposal even if it does not receive instructions from you, so we do not anticipate any broker non-votes in connection with Proposal 7.

We request that you vote your shares by proxy by mail, over the Internet, or by telephone. If you choose to vote by mail, your shares will be voted in accordance with your voting instructions if the proxy card is received prior to the Annual Meeting. If you sign and return your proxy card but do not give voting instructions, your shares will be voted FOR: (i) the election of each of the Company’s three nominees as directors; (ii) the ratification of the appointment of Ernst & Young LLP as the independent registered public accounting firm for the Company for the fiscal year ending December 31, 2022; (iii) the compensation of the Company’s named executive officers; (iv) the amendment to the 2015 Stock Plan; (v) the amendment to the 2015 ESPP; (vi) the increase in the authorized shares of common stock from 42,500,000 to 85,000,000 shares; (vii) the adjournment of the Annual Meeting, if necessary; and (viii) as the proxy holders deem advisable, in their discretion, on other matters that may properly come before the Annual Meeting.

How to Place your Vote

Stockholders who vote by proxy over the Internet or by telephone need not return a proxy card or voting instruction form by mail, but may incur costs, such as usage charges, from telephone companies or Internet service providers.

Voting by Internet. Registered stockholders can vote via the Internet at www.proxypush.com/LIFE. You will need to use the control number appearing on your proxy card to vote via the Internet. You can use the Internet to transmit your voting instructions up until 8:30 a.m. Pacific Time on April 26, 2022. Internet voting is available 24 hours a day. If you vote via the Internet, you do not need to return a proxy card.

Voting by Telephone. Registered stockholders can vote by telephone by calling the toll-free telephone number 1-866-284-6674. You will need to use the control number appearing on your proxy card to vote via by telephone. You may transmit your voting instructions by any touch-tone telephone up until 8:30 a.m. Pacific Time on April 26, 2022. Telephone voting is available 24 hours a day. If you vote by telephone, you do not need to return a proxy card.

Voting by Mail. If you are a registered stockholder and received a printed proxy card, you can vote by marking, dating and signing it, and returning it in the postage-paid envelope provided. Please promptly mail your proxy card to ensure that it is received prior to the start of the Annual Meeting.

Vote at the Meeting. The Annual Meeting will be a virtual meeting. There will be no physical meeting location. The meeting will be conducted via live webcast. In order to attend, you must register in advance at www.proxydocs.com/LIFE prior to the deadline of Friday, April 22, 2022 at 2:00 p.m. Pacific Time. Upon completing your registration, you will receive further instructions via email, including your unique link that will allow you access to the meeting and you will have the ability to submit questions in advance of and during the Annual Meeting. Please be sure to follow the instructions on the enclosed proxy card and/or voting instruction form and subsequent instructions that will be delivered to you via email. If your shares are registered directly in your name, you are considered a stockholder of record and you have the right to vote online at the Annual Meeting. If your shares are held in the name of your broker, bank or other nominee, you are considered the beneficial owner of shares held in street name. As a beneficial owner, if you wish to vote online at the Annual Meeting, you will need a legal proxy from your broker, bank or other nominee authorizing you to vote those shares.

If your shares are held in street name, the voting instruction form sent to you by your broker, bank or other nominee should indicate whether the institution has a process for beneficial holders to provide voting instructions over the Internet or by telephone. A number of banks and brokerage firms participate in a program that also permits stockholders whose shares are held in street name to direct their vote over the Internet or by telephone. If your bank or brokerage firm gives you this opportunity, the voting instructions from the bank or brokerage firm that accompany this Proxy Statement will tell you how to use the Internet or telephone to direct the vote of shares held in your account. If your voting instruction form does not include Internet or telephone information, please complete and return the voting instruction form in the self-addressed, postage-paid envelope provided by your broker.

Revocability of Proxies

Any proxy may be revoked at any time before the final vote at the Annual Meeting by filing an instrument revoking it with the Company's Secretary or by submitting a duly executed proxy bearing a later date prior to the time of the Annual Meeting. Stockholders who have voted by proxy over the Internet or by telephone or have executed and returned a proxy and who then attend the Annual Meeting and desire to vote at the Annual Meeting are requested to notify the Secretary in writing prior to the time of the Annual Meeting. We request that all such written notices of revocation to the Company be addressed to Nancy Denyes, Secretary, c/o aTyr Pharma, Inc., at the address of our principal executive offices at 3545 John Hopkins Court, Suite #250, San Diego, CA 92121. Stockholders may also revoke their proxy by entering a new vote over the Internet or by telephone prior to the deadlines described above. If your shares are held by your broker, bank or other nominee, you should follow the instructions provided by your broker, bank or other nominee. In each case, your most current proxy card or telephone or internet proxy is the one that is counted.

Stockholder Proposals to be Presented at the Next Annual Meeting

To be considered for inclusion in next year's proxy materials, stockholder proposals submitted pursuant to Rule 14a-8 under the Securities Exchange Act of 1934, as amended ("Exchange Act"), must be submitted in writing by notice delivered or mailed by first-class United States mail, postage prepaid, to our Secretary at our principal executive offices at the address set forth above no later than November 23, 2022 in order to be considered for inclusion in next year's proxy materials. If the 2023 annual meeting of stockholders is scheduled to be held on a date that is more than 30 days before or after April 26, 2023, the one year anniversary of the Annual Meeting, then notice must be received within a reasonable time before we begin to print and send proxy materials. If that happens, we will publicly announce the deadline for submitting a proposal in a press release or in a document filed with the Securities and Exchange Commission ("SEC").

Our Amended and Restated Bylaws (“Bylaws”) also provide for separate notice procedures for stockholder nominations or proposals that are not to be included in next year’s proxy materials to be considered by stockholders at a meeting. To be considered timely under these provisions, the stockholder’s notice must be received by our Secretary at our principal executive offices at the address set forth above no earlier than December 21, 2022 and no later than January 20, 2023. Our Bylaws also specify requirements as to the form and content of a stockholder’s notice. However, if our 2023 annual meeting of stockholders is not held between March 21, 2023 and June 19, 2023, the notice must be received not later than the close of business on the later of the ninetieth (90th) day prior to the scheduled date of the 2023 annual meeting of stockholders or the tenth (10th) day following the day on which public announcement of the date of such meeting is first made.

The Board of Directors, a designated committee thereof or the chairman of the meeting may refuse to acknowledge the introduction of any stockholder proposal if it is not made in compliance with the applicable notice provisions.

PROPOSAL 1

ELECTION OF DIRECTORS

General

Our Restated Certificate of Incorporation provides for a board of directors that is divided into three classes, each with a staggered, three-year term. The term of the Class I directors will expire at the Annual Meeting, and all three of our Class I directors will stand for re-election at the Annual Meeting. Our Board of Directors is currently comprised of seven members. If the Class I director nominees are re-elected at the Annual Meeting, the composition of our Board of Directors will be as follows: Class I — Mr. John K. Clarke, Dr. Paul Schimmel and Dr. Sara L. Zaknoen; Class II — Mr. Timothy P. Coughlin and Dr. Jane A. Gross; and Class III — Dr. Svetlana Lucas and Dr. Sanjay S. Shukla.

In the absence of instructions to the contrary, the persons named as proxy holders in the accompanying proxy intend to vote in favor of the election of the Class I director nominees designated below to serve until the 2025 annual meeting of stockholders and until their successors shall have been duly elected and qualified. Each nominee is currently a director. The Board of Directors expects that each nominee will be available to serve as a director, but if any such nominee should become unavailable or unwilling to stand for election, it is intended that the shares represented by the proxy will be voted for such substitute nominee as may be designated by the Board of Directors. The biographies of our directors and their ages as of March 7, 2022 are set forth below.

Name	Age	Position
Sanjay S. Shukla, M.D., M.S.	50	President, Chief Executive Officer and Director
John K. Clarke (1)(2)(3)	68	Chairman of the Board
Timothy P. Coughlin (1)(2)	55	Director
Jane A. Gross, Ph.D. (2)	65	Director
Svetlana Lucas, Ph.D. (1)(3)	50	Director
Paul Schimmel, Ph.D.	81	Director
Sara L. Zaknoen, M.D. (3)	63	Director

(1) Member of the Audit Committee.

(2) Member of the Compensation Committee.

(3) Member of the Nominating and Corporate Governance Committee.

Nominees for Director

Class I:

The three individuals listed below are nominated for election as Class I directors to serve a three-year term expiring at the 2025 annual meeting of stockholders and until their respective successors are elected and qualified. Mr. Clarke and Dr. Schimmel were previously elected by the stockholders. Dr. Zaknoen was appointed to the Board of Directors in May 2021 and was recommended for nomination to the Board of Directors by the Nominating and Corporate Governance Committee.

John K. Clarke has served as Chairman of our Board of Directors since September 2005. Mr. Clarke is Managing Partner of Cardinal Partners, a venture capital firm focused on healthcare investing. He co-founded Cardinal Partners in 1997 and has served as President of CHP Management, Inc. since that time. He currently serves as a director of Ivenix Corporation, a privately held biotechnology company. He has also served as a director for several biotechnology and biopharmaceutical companies including Alnylam Pharmaceuticals, Inc., Momenta Pharmaceuticals, Inc., Verastem, Inc., Vividion Therapeutics, Inc. (acquired by Bayer AG) and Sirtris Pharmaceuticals, Inc. (acquired by GlaxoSmithKline); healthcare information technology companies, including TechRx Technology Services Corporation (acquired by NDCHealth) and Visicu, Inc. (acquired by Phillips Electronics); and a privately held biopharmaceutical company, Rib-X Pharmaceuticals Inc. Mr. Clarke holds an A.B. in economics and biology from Harvard University and an M.B.A. from the Wharton School at the University of Pennsylvania. Our Board of Directors believes Mr. Clarke is qualified to serve on our Board of Directors due to his extensive experience within the field of drug discovery and development and his broad leadership experience on various public and private company boards.

Paul Schimmel, Ph.D. has served as a director since September 2005. Dr. Schimmel is currently a director of several private companies. He was a cofounder of Repligen Corporation, Alkermes, Inc., Cubist Pharmaceuticals, Sirtris Pharmaceuticals, and Alnylam Pharmaceuticals, Inc., and a founding Director of Momenta, Inc. Dr. Schimmel is an Ernest and

Jean Hahn Professor of Molecular Medicine and of Chemistry at Scripps Research. He was formerly the John D. and Catherine T. MacArthur Professor of Biochemistry and Biophysics in the Department of Biology at the Massachusetts Institute of Technology. Dr. Schimmel holds a B.A. from Ohio Wesleyan University and a Ph.D. in biochemistry and biophysics from the Massachusetts Institute of Technology. He is an elected member of the National Academy of Sciences, the National Academy of Medicine, the National Academy of Inventors, the American Philosophical Society and the American Academy of Arts and Sciences. Our Board of Directors believes Dr. Schimmel is qualified to serve on our Board of Directors due to his role as one of our scientific founders and his discoveries and scientific leadership in the field of tRNA synthetase biology and other areas important to the development of therapeutics.

Sara L. Zaknoen, M.D. has served as a director since May 2021. Since June 2014, through her company, Zed Strategic Consulting, Dr. Zaknoen has worked as a clinical drug development consultant with large pharmaceutical and biotechnology companies across multiple disease indications. Previously, Dr. Zaknoen held Chief Medical Officer positions at several biotechnology companies, including Ignyta, Inc., Polynoma LLC, Tragara Pharmaceuticals, Inc. and Cabrellis Pharmaceuticals Corporation. Prior to that, Dr. Zaknoen served as Executive Director of Phase 2/3 Clinical Oncology Research at Novartis Pharmaceutical Corporation, where she provided oversight for a number of important marketed therapies, such as Gleevec®, Tasigna® and Exiade®. This included supervising the execution of clinical studies, including registrational trials, and involvement with new drug applications and label expansion activities. As Director of Clinical Oncology Research at Schering-Plough (now Merck) she was the lead physician on the Temodar® program, supporting its approval and launch. Additional professional experience includes: Assistant Professor of Medicine at the University of Cincinnati Medical Center; Director of Experimental Therapeutics at the Western Pennsylvania Hospital, Western Pennsylvania Cancer Institute; and Medical Staff Fellow at the National Cancer Institute. Dr. Zaknoen completed her residency, internship and fellowship in hematology/oncology at the University of Minnesota. She received her M.D. from Indiana University School of Medicine and her B.S. in chemistry and biology from Valparaiso University. Our Board of Directors believes that Dr. Zaknoen is qualified to serve on our Board of Directors due to her extensive experience in clinical research, her medical background and her experience in the biotherapeutics industry.

Continuing Directors:

Class II: Currently Serving Until the 2023 Annual Meeting

Timothy P. Coughlin has served as a director since April 2017. Mr. Coughlin is the former Chief Financial Officer of Neurocrine Biosciences, Inc. (“Neurocrine”), a biopharmaceutical company that has received U.S. Food and Drug Administration approval for INGREZZA (valbenazine) and ORLISSA (elagolix), both of which were discovered and developed during his tenure at Neurocrine from 2002 to 2018. Prior to joining Neurocrine, he was with Catholic Health Initiatives, a nationwide integrated healthcare delivery system, where he served as Vice President, Financial Services. Mr. Coughlin also served as a Senior Manager in the Health Sciences practice of Ernst & Young LLP and its predecessors from 1989 to 1999. Mr. Coughlin serves on the board of directors of Traveo Therapeutics, Inc. and Fate Therapeutics, Inc., both biotechnology companies. He also served on the board of directors of Peloton Therapeutics prior to its sale to Merck & Co in 2019. Mr. Coughlin holds a master’s degree in international business from San Diego State University and a bachelor’s degree in accounting from Temple University. Mr. Coughlin is a certified public accountant in both California and Pennsylvania. Our Board of Directors believes that Mr. Coughlin is qualified to serve on our Board of Directors due to his extensive background in financial and accounting matters for public companies, his experience in the life science industry and his years of business and leadership experience.

Jane A. Gross, Ph.D. has served as a director since June 2019. Dr. Gross served as the Chief Scientific Officer and Senior Vice President of Research and Development at Aptevo Therapeutics Inc. (“Aptevo”) from September 2016 to September 2021. She currently serves as a consultant to Aptevo (as of September 2021) holding the title of Chief Scientific Officer. At Aptevo, Dr. Gross led the discovery of novel protein therapeutics based on the ADAPTIR™ and ADAPTIR-FLEX™ platform technologies focusing on development of therapeutics based on immuno-oncology, leading research efforts in molecular biology and protein engineering, immunology, protein and cell sciences, pharmacology, and translational research. Prior to joining Aptevo, Dr. Gross served as Vice President, Applied Research and Non-Clinical Development at Emergent BioSolutions Inc. and Vice President, Immunology Research at ZymoGenetics, Inc., where she led efforts in discovery and development of therapeutics from novel genes. Dr. Gross serves on the board of directors of BriaCell Therapeutics Corp., a biotechnology company. Dr. Gross holds a Ph.D. in Immunology from the University of California, Berkeley under Jim Allison (2018 recipient of the Nobel Prize in Physiology and Medicine) and a Post-Doctoral Fellowship from the University of Washington in Immunology. Our Board of Directors believes that Dr. Gross is qualified to serve on our Board of Directors due to her extensive experience in the biotherapeutics industry and her expertise in immunology and oncology.

Class III: Currently Serving Until the 2024 Annual Meeting

Svetlana Lucas, Ph.D. has served as a director since June 2019. Dr. Lucas currently serves as Chief Business Officer at Scribe Therapeutics, a private biotechnology company. Prior to her current role, she served as Senior Vice President, Business Development at Tizona Therapeutics, Inc. (“Tizona”), a clinical stage immunotherapy company, where she was responsible for the company’s business development strategy and transactions, including a global strategic collaboration with AbbVie Inc. (“AbbVie”). Before joining Tizona, Dr. Lucas was Head of Oncology and Inflammation External R&D at Amgen Inc. (“Amgen”), where she oversaw business development activities, including Amgen’s strategic cancer immunotherapy research collaboration and licensing agreement with Kite Pharma, and collaborated with Amgen Ventures on several investments in oncology and inflammation. Dr. Lucas joined Amgen following the acquisition of Onyx Pharmaceuticals, Inc. (“Onyx”), where she spearheaded the company’s oncology partnering strategy and due diligence of new opportunities. Prior to Onyx, she held positions of increasing responsibility in strategy, business development and strategic marketing at Amgen, PDL BioPharma/Facet Biotech (acquired by AbbVie), and XOMA Corporation. She began her career as a strategy consultant in the Life Sciences practice of McKinsey & Company, Inc. Dr. Lucas received her Ph.D. in Molecular Biology and Biochemistry from California Institute of Technology, and an undergraduate degree in Biology from Moscow State University. Our Board of Directors believes that Dr. Lucas is qualified to serve on our Board of Directors due to her extensive business development experience in the biotherapeutics industry.

Sanjay S. Shukla, M.D., M.S. has served as our President and Chief Executive Officer and as a director since November 2017. Dr. Shukla served as our Chief Medical Officer from March 2016 to November 2017. From April 2015 to March 2016, Dr. Shukla worked in an advisory capacity for a number of companies, including as a consultant to our company from January 2016 to March 2016. Prior to that, from October 2012 to April 2015, Dr. Shukla served as Vice President and Global Head of Integrated Medical Services for Novartis, a biopharmaceutical company, where he led global medical affairs operations, with oversight for all pharma general medicines therapies, both inline and in development. Dr. Shukla served as Chief Executive Officer of RXMD, a clinical development consultancy that assisted in advancing proof of concept for early stage drug candidates, from April 2009 to September 2012. Prior to that, Dr. Shukla served in a variety of clinical development, data analytics and drug safety roles at Vifor Pharma, a biopharmaceutical company, and Aspreva Pharmaceuticals (acquired by Vifor Pharma). Dr. Shukla received his M.D. from Howard University College of Medicine and his Bachelors of Science in microbiology and Master of Science in epidemiology and biostatistics from the University of Maryland. Our Board of Directors believes that Dr. Shukla is qualified to serve on our Board of Directors due to his experience as our Chief Executive Officer and previously as our Chief Medical Officer, as well as his medical background, experience in the life science industry and his leadership experience.

Independence of the Board of Directors

Our Board of Directors has affirmatively determined that each of our directors, except for Dr. Shukla, are independent, as determined in accordance with the rules of the Nasdaq Stock Market (“Nasdaq”) and the SEC. In making this independence determination, the Board of Directors considered the relationships that each non-employee director has with us and with the holders of greater than 5% of our common stock, and all other facts and circumstances that the Board of Directors deemed relevant in determining their independence, including the beneficial ownership of our capital stock by each non-employee director. There are no family relationships among any of our directors or executive officers.

Board Leadership Structure

The positions of our Chairman of the Board and Chief Executive Officer are presently separated. Separating these positions allows our Chief Executive Officer to focus on our day-to-day business, while allowing the Chairman of the Board to lead our Board of Directors in its fundamental role of providing advice to and independent oversight of management. Our Board of Directors recognizes the time, effort and energy that the Chief Executive Officer must devote to his position in the current business environment, as well as the commitment required to serve as our Chairman of the Board, particularly as our Board of Directors’ oversight responsibilities continue to grow. Our Board of Directors also believes that this structure ensures a greater role for the independent directors in the oversight of our company and active participation of the independent directors in setting agendas and establishing priorities and procedures for the work of our Board of Directors.

While our Bylaws and corporate governance guidelines do not require that our Chairman of the Board and Chief Executive Officer positions be separate, our Board of Directors believes that having separate positions and having an independent outside director serve as Chairman of the Board is the appropriate leadership structure for us at this time and demonstrates our commitment to good corporate governance. Our separated Chairman of the Board and Chief Executive Officer positions are augmented by the independence of six of our seven directors, and our three entirely independent Board committees that provide appropriate oversight in the areas described above. At regularly scheduled executive sessions of independent directors, these directors speak candidly on any matter of interest, without the Chief Executive Officer or other executive

officers present. The independent directors met three times in 2021 without management present. We believe this structure provides consistent and effective oversight of our management and our company.

Board Diversity

Our Board of Directors believes that a diverse board is better able to effectively oversee our management and strategy, and position us to deliver long-term value for our stockholders. Our Board of Directors considers diversity, including gender and ethnic diversity, as adding to the overall mix of perspectives of our Board of Directors as a whole. With the assistance of the Nominating and Corporate Governance Committee, our Board of Directors regularly reviews trends in board composition, including on director diversity.

Board Diversity Matrix (As of March 7, 2022)		
Board Size:		
Total Number of Directors	7	
Gender:	Female	Male
Directors	3	4
Number of Directors who identify in any of the Categories Below:		
Asian	0	1
White	3	3

Board of Directors' Role in Risk Management

Risk is inherent with every business, and how well a business manages risk can ultimately determine its success. We face a number of risks, including risks relating to our financial condition, development activities, regulatory matters, operations and intellectual property. Management is responsible for the day-to-day management of risks we face, while our Board of Directors, as a whole and through its committees, has responsibility for the oversight of risk management. In its risk oversight role, our Board of Directors has the responsibility to satisfy itself that the risk management processes designed and implemented by management are adequate and functioning as designed.

The role of our Board of Directors in overseeing the management of our risks is conducted primarily through committees of the Board of Directors, as disclosed in the descriptions of each of the committees below and in the charters of each of the committees. The full Board of Directors (or the appropriate board committee in the case of risks that are under the purview of a particular committee) discusses with management our major risk exposures, their potential impact on our company, and the steps we take to manage them. When a board committee is responsible for evaluating and overseeing the management of a particular risk or risks, the chairman of the relevant committee reports on the discussion to the full Board of Directors during the committee reports portion of the next board meeting. This enables our Board of Directors and its committees to coordinate the risk oversight role, particularly with respect to interrelated risks.

Hedging Policy

The Company maintains Special Trading Procedures for Designated Individuals (the "Trading Procedures") as an addendum to the Company's Statement of Company Policy on Insider Trading and Disclosure (the "Insider Trading Policy"). The Trading Procedures regulate securities trades by all directors, officers and employees of the Company and certain designated consultants of the Company (the "Designated Individuals"). Pursuant to the Trading Procedures, all trades must be pre-cleared by the Company's designated insider trading compliance officer (the "Compliance Officer"). Under the Trading Procedures, no directors, officers or employees of the Company, nor any Designated Individuals, may buy or sell puts, calls or other derivative securities of the Company or any other financial instruments that provide the economic equivalent of ownership of any of the Company's securities or an opportunity, directly or indirectly, to profit from any change in the value of the Company's securities or engage in any other hedging or similar transactions that hedge or offset, or are designed to hedge or offset, any decrease in the market value of the Company's securities, at any time unless such transaction has been approved by the Compliance Officer.

Meetings of the Board of Directors

During 2021, the Board of Directors held a total of ten meetings. All directors attended at least 75% of the total number of Board meetings and of the total number of meetings of committees of the Board of Directors on which the director served during the time he or she served on the Board of Directors or such committees.

Information Regarding Committees of the Board of Directors

The Board of Directors has a standing Audit Committee, Compensation Committee and Nominating and Corporate Governance Committee. Each of our Audit Committee, Compensation Committee and Nominating and Corporate Governance Committee is composed entirely of independent directors in accordance with current Nasdaq Marketplace Rules. Furthermore, our Audit Committee meets the enhanced independence standards established by the Sarbanes-Oxley Act of 2002 (“Sarbanes-Oxley Act”) and Rule 10A-3(b)(1) of the Exchange Act. Copies of our Audit Committee, Compensation Committee and Nominating and Corporate Governance Committee charters and our corporate governance guidelines are available, free of charge, on our website at <http://www.atyrpharma.com>, under the “Investors/Corporate Governance” link.

Audit Committee

Mr. Clarke, Mr. Coughlin and Dr. Lucas currently serve on the Audit Committee, which is chaired by Mr. Coughlin. Our Board of Directors has determined that Mr. Coughlin qualifies as an “audit Committee financial expert,” as defined under the applicable rules of the SEC. We believe that the composition and functioning of our Audit Committee complies with all applicable requirements of the Sarbanes-Oxley Act, and all applicable SEC and Nasdaq rules and regulations. The Audit Committee’s responsibilities include:

- appointing, approving the compensation of, and assessing the independence of our independent registered public accounting firm;
- approving auditing and permissible non-audit services, and the terms of such services, to be provided by our independent registered public accounting firm;
- reviewing the internal audit plan with the independent registered public accounting firm and members of management responsible for preparing our financial statements;
- reviewing and discussing with management and the independent registered public accounting firm our annual and quarterly financial statements and related disclosures as well as critical accounting policies and practices used by us;
- reviewing the adequacy of our internal control over financial reporting;
- establishing policies and procedures for the receipt and retention of accounting-related complaints and concerns;
- recommending, based upon the Audit Committee’s review and discussions with management and the independent registered public accounting firm, whether our audited financial statements shall be included in our Annual Report on Form 10-K;
- monitoring the integrity of our financial statements and our compliance with legal and regulatory requirements as they relate to our financial statements and accounting matters;
- preparing the Audit Committee report required by SEC rules to be included in our annual proxy statement;
- reviewing all related party transactions for potential conflict of interest situations and approving all such transactions; and
- reviewing quarterly earnings releases.

During 2021, the Audit Committee held four meetings. Dr. Lucas was appointed as a member of the Audit Committee effective as of April 28, 2021.

Compensation Committee

Mr. Clarke, Mr. Coughlin and Dr. Gross currently serve on the Compensation Committee, which is chaired by Mr. Clarke. We believe that the composition and functioning of our Compensation Committee complies with all applicable requirements of the Sarbanes-Oxley Act, and all applicable SEC and Nasdaq rules and regulations. The Compensation Committee’s responsibilities include:

- annually reviewing and approving corporate goals and objectives relevant to the compensation of our Chief Executive Officer;

- evaluating the performance of our Chief Executive Officer in light of such corporate goals and objectives and recommending the compensation of our Chief Executive Officer to the Board of Directors for approval;
- reviewing and approving the compensation of our other officers;
- reviewing and establishing our overall management and employee compensation, philosophy and policy;
- overseeing and administering our compensation and similar plans;
- evaluating and assessing potential and current compensation advisors in accordance with the independence standards identified in the applicable Nasdaq and SEC rules;
- retaining and approving the compensation of any compensation advisors;
- reviewing and approving our policies and procedures for the grant of equity-based awards;
- reviewing and making recommendations to our Board of Directors with respect to director compensation;
- preparing the compensation committee report required by the SEC rules to be included in our annual proxy statement;
- reviewing and discussing with management the compensation discussion and analysis to be included in our annual proxy statement or Annual Report on Form 10-K; and
- reviewing and discussing with our Board of Directors corporate succession plans for the Chief Executive Officer and other key officers.

Pursuant to its charter, the Compensation Committee has the authority to retain compensation consultants to assist in its evaluation of executive and director compensation. Our Compensation Committee may retain one or more third-party compensation advisors to provide information and advice in future years for consideration in establishing overall compensation for our executives and directors.

During 2021, the Compensation Committee held two meetings.

Nominating and Corporate Governance Committee

Mr. Clarke, Dr. Lucas and Dr. Zaknoen currently serve on the Nominating and Corporate Governance Committee, which is chaired by Mr. Clarke. We believe that the composition and functioning of our Nominating and Corporate Governance Committee complies with all applicable requirements of the Sarbanes-Oxley Act, and all applicable SEC and Nasdaq rules and regulations. The Nominating and Corporate Governance Committee's responsibilities include:

- developing and recommending to the Board of Directors criteria for board and committee membership;
- establishing procedures for identifying and evaluating candidates for service on the Board of Directors, including nominees recommended by stockholders;
- identifying individuals qualified to become members of the Board of Directors;
- recommending to the Board of Directors the persons to be nominated for election as directors and to each of the committees of the Board of Directors;
- developing and recommending to the Board of Directors a set of corporate governance guidelines; and
- overseeing the evaluation of the Board of Directors.

During 2021, the Nominating and Corporate Governance Committee held three meetings. Dr. Zaknoen was appointed as a member of the Nominating and Corporate Governance Committee on March 2, 2022.

Director Nominations

The director qualifications developed to date focus on what our Board of Directors believes to be essential competencies to effectively serve on the Board of Directors. The Nominating and Corporate Governance Committee reassesses such criteria from time to time and submits any proposed changes to the Board of Directors for approval. Presently, at a minimum, the Nominating and Corporate Governance Committee must be satisfied that each nominee it recommends: (i) has experience at a strategic or policymaking level in a business, government, non-profit or academic organization of high standing, (ii) is highly accomplished in his or her respective field, with superior credentials and recognition, (iii) is well regarded in the community and has a long-term reputation for high ethical and moral standards, (iv) has sufficient time and availability to devote to the affairs of the Company, particularly in light of the number of boards of directors on which such nominee may

serve, and (v) to the extent such nominee serves or has previously served on other boards, the nominee has a demonstrated history of actively contributing at board meetings.

In addition to those minimum qualifications, the Nominating and Corporate Governance Committee recommends that our Board of Directors select persons for nomination to help ensure that:

- a majority of our Board of Directors is “independent” in accordance with Nasdaq standards;
- each of the Audit Committee, Compensation Committee and Nominating and Corporate Governance Committee be comprised entirely of independent directors; and
- at least one member of the Audit Committee shall have the experience, education and other qualifications necessary to qualify as an “audit committee financial expert” as defined by the rules of the SEC.

In addition to other standards the Nominating and Corporate Governance Committee may deem appropriate from time to time for the overall structure and compensation of the Board of Directors, the Nominating and Corporate Governance Committee may consider the following factors when recommending that our Board of Directors select persons for nomination:

- whether a nominee has direct experience in the biotechnology or pharmaceuticals industry or in the markets in which the Company operates; and
- whether the nominee, if elected, assists in achieving a mix of directors that represents a diversity of background and experience.

Although the Nominating and Corporate Governance Committee may consider whether nominees assist in achieving a mix of directors that represents a diversity of background and experience, which is not only limited to race, gender or national origin, we have no formal policy regarding director diversity.

The Nominating and Corporate Governance Committee adheres to the following process for identifying and evaluating nominees for the Board of Directors. First, it solicits recommendations for nominees from non-employee directors, our Chief Executive Officer, other executive officers, third-party search firms, stockholders or any other source it deems appropriate. The Nominating and Corporate Governance Committee then reviews and evaluates the qualifications of proposed nominees and conducts inquiries it deems appropriate; all proposed nominees, including those recommended by stockholders, are evaluated in the same manner, regardless of who initially recommended such nominee. In reviewing and evaluating proposed nominees, the Nominating and Corporate Governance Committee may consider, in addition to the minimum qualifications and other criteria for directorship approved by our Board of Directors from time to time, all facts and circumstances that it deems appropriate or advisable, including, among other things, the skills of the proposed nominee, his or her depth and breadth of business experience or other background characteristics, his or her independence and the needs of the Board of Directors.

If the Nominating and Corporate Governance Committee decides to retain a third-party search firm to identify proposed nominees, it has sole authority to retain and terminate such firm and to approve any such firm’s fees and other retention terms.

Each nominee for election as director at the Annual Meeting was recommended by the Nominating and Corporate Governance Committee and is presently a director and is standing for re-election by the stockholders. From time to time, we may pay fees to third-party search firms to assist in identifying and evaluating potential nominees, although no such fees have been paid in connection with nominations to be acted upon at the Annual Meeting.

Pursuant to our Bylaws, stockholders who wish to nominate persons for election to the Board of Directors at an annual meeting of stockholders must be a stockholder of record at the time of giving the notice, entitled to vote at the meeting and present (themselves or by proxy) at the meeting, and must comply with the notice procedures in our Bylaws. A stockholder’s notice of nomination to be made at an annual meeting of stockholders must be delivered to our principal executive offices not later than 90 days nor more than 120 days before the anniversary date of the immediately preceding annual meeting. However, if an annual meeting is more than 30 days before or more than 60 days after such anniversary date, the notice must be delivered no later than the later of the 90th day prior to such annual meeting or the 10th day following the day on which the first public announcement of the date of such annual meeting was made. A stockholder’s notice of nomination may not be made at a special meeting of stockholders unless such special meeting is held in lieu of an annual meeting of stockholders. The stockholder’s notice must include the following information for the person making the nomination:

- name and address;
- the class and number of shares of the Company owned beneficially or of record;

- disclosure regarding any derivative, swap or other transactions which give the nominating person economic risk similar to ownership of shares of the Company or provide the opportunity to profit from an increase in the price of value of shares of the Company;
- any proxy (other than a revocable proxy given in response to a public proxy solicitation made pursuant to, and in accordance with, the Exchange Act), agreement, arrangement, understanding or relationship that confers a right to vote any shares of the Company;
- any agreement, arrangement, understanding or relationship engaged in for the purpose of acquiring, holding, disposing or voting of any shares of any class or series of capital stock of the Company;
- any rights to dividends or other distributions on the shares that are separate from the underlying shares;
- any performance-related fees that the nominating person is entitled to based on any increase or decrease in the value of any shares of the Company;
- a description of all agreements, arrangements or understandings by and between the proposing stockholder and another person relating to the proposed business (including an identification of each party to such agreement, arrangement or understanding and the names, addresses and class and number of shares owned beneficially or of record of other stockholders known by the proposing stockholder support such proposed business);
- a statement whether or not the proposing stockholder will deliver a proxy statement and form of proxy to holders of, in the case of a business proposal, at least the percentage of voting power of all shares of capital stock required to approve the proposal or, in the case of director nominations, at least the percentage of voting power of all of the shares of capital stock reasonably believed by the proposing stockholder to be sufficient to elect the nominee; and
- any other information relating to the nominating person that would be required to be disclosed in a proxy statement filed with the SEC.

With respect to proposed director nominees, the stockholder's notice must include all information required to be disclosed in a proxy statement in connection with a contested election of directors or otherwise required pursuant to Regulation 14A under the Exchange Act (including such person's written consent to being named in the proxy statement as a nominee and to serving as a director if elected).

For matters other than the election of directors, the stockholder's notice must also include a brief description of the business desired to be brought before the meeting, the reasons for conducting such business at the meeting and any material interest in such business of the stockholder(s) proposing the business.

The stockholder's notice must be updated and supplemented, if necessary, so that the information required to be provided in the notice is true and correct as of the record date for the meeting and as of the date that is ten business days prior to the meeting.

The Board of Directors, a designated committee thereof or the chairman of the meeting will determine if the procedures in our Bylaws have been followed, and if not, declare that the proposal or nomination will be disregarded. The nominee must be willing to provide any other information reasonably requested by the Nominating and Corporate Governance Committee in connection with its evaluation of the nominee's independence. There have been no material changes to the process by which stockholders may recommend nominees to our Board of Directors.

Stockholder Communications with the Board of Directors

The Board of Directors has adopted a process for stockholders to send communications to the Board of Directors. Stockholders may send correspondence to the Board of Directors, c/o the Chairman of the Board, at our principal executive offices at the address set forth above. We will forward all correspondence addressed to the Board of Directors or any individual director.

Director Attendance at Annual Meetings

Directors are encouraged to attend the Annual Meeting. All of our directors attended the 2021 Annual Meeting of Stockholders virtually.

Director Compensation

Our Board of Directors adopted a non-employee director compensation policy in May 2015 that is designed to provide a total compensation package that enables us to attract and retain, on a long-term basis, high-caliber non-employee directors. In January 2016, February 2017 and February 2022, our Board of Directors adopted amendments to the policy with respect to the cash and equity component of compensation to our non-employee directors. Under this policy, as amended to date, all non-employee directors are paid cash compensation for service on the Board of Directors and committees of the Board of Directors as set forth below, prorated based on days of service during a calendar year.

	Annual Retainer
Board of Directors	
All non-employee members	\$ 40,000
Additional retainer for Chairperson	\$ 35,000
Audit Committee:	
Chairperson	\$ 25,000
Non-Chairperson members	\$ 8,000
Compensation Committee:	
Chairperson	\$ 12,000
Non-Chairperson members	\$ 6,000
Nominating and Corporate Governance Committee:	
Chairperson	\$ 8,000
Non-Chairperson members	\$ 4,000

In addition, under the policy, each newly appointed or elected non-employee director will receive an option grant to purchase up to 24,000 shares of common stock, which will vest in equal monthly installments during the 36 months following the grant date, subject to the director's continued service on our Board of Directors. Thereafter, on the date of each annual meeting of stockholders, each continuing non-employee director will be eligible to receive an annual option grant to purchase up to 12,000 shares of common stock, which will vest in full upon the earlier of the first anniversary of the date of grant or the date of the following annual meeting of stockholders, subject to the director's continued service on our Board of Directors (the "Annual Grant"). All of the foregoing options will be granted with an exercise price equal to the fair market value of our common stock on the date of grant. In light of the limited shares available under the 2015 Stock Plan, in February 2022, the Board of Directors approved the one-time issuance of restricted stock units covering an aggregate of 6,000 shares of common stock in lieu of option grants for the 2022 Annual Grant.

We have agreed to reimburse all reasonable out-of-pocket expenses incurred by non-employee directors in attending Board and committee meetings.

Director Compensation Table—2021

The following table sets forth information with respect to the compensation earned by our non-employee directors during the fiscal year ended December 31, 2021. During 2021, Dr. Shukla did not receive compensation for his service on the Board of Directors. The compensation paid to Dr. Shukla as an employee of our company is set forth under the heading "Executive Compensation—Summary Compensation Table" below.

Name	Fees Earned or Paid in Cash	Option Awards ⁽¹⁾	Total
John K. Clarke (Chairman) ⁽²⁾	\$ 96,865	\$ 4,240	\$ 101,105
Timothy P. Coughlin ⁽³⁾	\$ 67,500	\$ 4,240	\$ 71,740
Jane A. Gross, Ph.D. ⁽⁴⁾	\$ 42,500	\$ 4,240	\$ 46,740
Jeffrey S. Hatfield ⁽⁵⁾	\$ 17,181	\$ —	\$ 17,181
Svetlana Lucas, Ph.D. ⁽⁶⁾	\$ 46,907	\$ 4,240	\$ 51,147
Paul Schimmel, Ph.D. ⁽⁷⁾	\$ 37,500	\$ 4,240	\$ 41,740
Sara L. Zaknoen, M.D. ⁽⁸⁾	\$ 22,974	\$ 7,276	\$ 30,250

- (1) In accordance with SEC rules, this column reflects the aggregate grant date fair value of the option awards granted during 2021 computed in accordance with Financing Accounting Standards Board Accounting Standards Codification Topic 718 ("FASB ASC Topic 718"). For additional information on the valuation assumptions underlying the value of these options, see Part II, Item 8 "Financial Statements and Supplementary Data" of our Annual Report in the Notes to Consolidated Financial Statements, Note 6, "Stockholders Equity". These amounts do not reflect the actual economic value that may be realized by the directors upon the vesting of the stock options, the exercise of the stock options or the sale of the common stock underlying such stock options. Our non-employee directors will only realize compensation to the extent the trading price of our common stock is greater than the exercise price of such stock options.
- (2) Mr. Clarke held stock options to purchase an aggregate of 10,261 shares of common stock as of December 31, 2021.

- (3) Mr. Coughlin held stock options to purchase an aggregate of 9,425 shares of common stock as of December 31, 2021.
- (4) Dr. Gross held stock options to purchase an aggregate of 5,141 shares of common stock as of December 31, 2021.
- (5) Mr. Hatfield completed his service on our Board of Directors as of our 2021 annual meeting of stockholders on April 28, 2021. Mr. Hatfield held stock options to purchase an aggregate of 7,997 shares of common stock as of December 31, 2021.
- (6) Dr. Lucas held stock options to purchase an aggregate of 5,141 shares of common stock as of December 31, 2021.
- (7) Dr. Schimmel held stock options to purchase an aggregate of 10,763 shares of common as of December 31, 2021.
- (8) Dr. Zaknoen has served as a director since May 2021. Dr. Zaknoen held stock options to purchase an aggregate of 2,285 shares of common as of December 31, 2021.

Required Vote

Directors are elected by a plurality of the votes of the holders of shares present by virtual attendance or represented by proxy and entitled to vote on the election of directors. Accordingly, the three nominees named in this Proxy Statement receiving the highest number of “FOR” votes properly cast shall be elected as Class I directors to serve until the 2025 annual meeting of stockholders or until their successors have been duly elected and qualified. Broker non-votes will have no effect on the vote for this proposal.

Recommendation of the Board of Directors

The Board of Directors unanimously recommends that the stockholders vote “FOR” the election of the Class I nominees listed above.

PROPOSAL 2

RATIFICATION OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

The Audit Committee has appointed Ernst & Young LLP as the Company's independent registered public accounting firm for its fiscal year ending December 31, 2022. Ernst & Young LLP has audited the Company's financial statements since 2008. Representatives of Ernst & Young LLP will attend the Annual Meeting and will have the opportunity to make a statement if they desire to do so. They will also be available to respond to appropriate questions.

The Company's organizational documents do not require that the stockholders ratify the selection of Ernst & Young LLP as the Company's independent registered public accounting firm, and stockholder ratification is not binding on the Company, the Board of Directors or the Audit Committee. The Company requests such ratification, however, as a matter of good corporate practice. Our Board of Directors, including our Audit Committee, values the opinions of our stockholders and, to the extent there is any significant vote against the ratification of the selection of Ernst & Young LLP as disclosed in this Proxy Statement, we will consider our stockholders' concerns and evaluate what actions may be appropriate to address those concerns, although the Audit Committee, in its discretion, may still retain Ernst & Young LLP.

Principal Accountant Fees and Services

The following table shows information about fees billed to the Company by Ernst & Young LLP for the fiscal years ended December 31, 2021 and 2020:

Fees billed by Ernst & Young LLP	Fiscal Year Ended December 31,	
	2021	2020
Audit Fees ⁽¹⁾	\$ 547,095	\$ 512,442
Audit-Related Fees	—	—
Tax Fees	—	—
All Other Fees	—	—
Total	\$ 547,095	\$ 512,442

(1) Includes fees associated with the annual audit of our financial statements, the reviews of our interim financial statements and the issuance of consent and comfort letters in connection with certain financing transactions and registration statements.

Audit Committee Pre-Approval Policies

The Audit Committee is directly responsible for the appointment, retention and termination, and for determining the compensation, of our independent registered public accounting firm. The Audit Committee is required to pre-approve all auditing services and the terms thereof and non-audit services (other than non-audit services prohibited under Section 10A(g) of the Exchange Act or the applicable rules of the SEC or the Public Company Accounting Oversight Board), except that pre-approval is not required for the provision of non-audit services if the "de minimus" provisions of Section 10A(i)(1)(B) of the Exchange Act are satisfied. The Audit Committee has also delegated to the chairperson of the Audit Committee the authority to grant pre-approvals for audit and non-audit services, provided such approvals are presented to the Audit Committee at its next scheduled meeting. All services provided by Ernst & Young LLP during the fiscal years ended December 31, 2021 and 2020 were pre-approved by the Audit Committee in accordance with the pre-approval procedures described above.

Required Vote

The ratification of the selection of Ernst & Young LLP requires the affirmative vote of a majority of the votes properly cast on the proposal at the Annual Meeting. Abstentions and broker non-votes are not considered votes properly cast and will have no effect on the vote for this proposal.

Recommendation of the Board of Directors

The Board of Directors unanimously recommends that the stockholders vote "FOR" the ratification of the appointment of Ernst & Young LLP as the independent registered public accounting firm of the Company for its fiscal year ending December 31, 2022.

PROPOSAL 3

ADVISORY VOTE ON NAMED EXECUTIVE OFFICER COMPENSATION

We are soliciting a non-binding advisory vote on the compensation of our named executive officers identified in the “Executive Compensation” section of this Proxy Statement, commonly referred to as a “say-on-pay vote.”

This vote is not intended to address any specific item of compensation, but rather the overall compensation of the Company’s named executive officers and the compensation philosophy, policies and practices described in this Proxy Statement. The compensation of our named executive officers is disclosed in the “Executive Compensation” section of this Proxy Statement. As discussed in that section, the Company believes that its compensation policies and decisions are designed to align executive compensation with the Company’s business objectives and corporate performance, to be consistent with current market practices, and to enable the Company to attract and retain talented and experienced executives to lead the Company successfully in a competitive environment.

Accordingly, our Board of Directors is asking the stockholders to indicate their support for the compensation of the Company’s named executive officers as described in this Proxy Statement by casting a non-binding advisory vote “For” the following resolution:

“RESOLVED, that the compensation paid to the Company’s named executive officers, as disclosed in the Proxy Statement, is hereby APPROVED.”

Because the vote is advisory, it is not binding on our Board of Directors or the Company. Nevertheless, the views expressed by stockholders, whether through this vote or otherwise, are important to management and the Board of Directors and, accordingly, the Board of Directors and the Compensation Committee intend to consider the results of this vote in making determinations in the future regarding executive compensation arrangements.

Required Vote

Approval of this proposal requires the affirmative vote of a majority of the votes properly cast on the proposal at the Annual Meeting. Abstentions and broker non-votes will have no effect on the vote for this proposal.

Recommendation of the Board of Directors

The Board of Directors unanimously recommends a vote “FOR” the resolution to approve, on an advisory basis, the compensation of our named executive officers as disclosed in this Proxy Statement.

PROPOSAL 4

APPROVAL OF AN AMENDMENT TO THE 2015 STOCK PLAN

The Board of Directors believes that stock-based incentive awards can play an important role in our success by encouraging and enabling our employees, officers, non-employee directors and consultants and those of our subsidiaries upon whose judgment, initiative and efforts we largely depend for the successful conduct of our business to acquire a proprietary interest in our company. The Board of Directors believes that providing such persons with a direct stake in our company assures a closer identification of the interests of such individuals with those of our company and our stockholders, thereby stimulating their efforts on our behalf and strengthening their desire to remain with our company.

On March 2, 2022, the Board of Directors adopted an amendment to the 2015 Stock Plan, subject to and effective upon stockholder approval, to increase the maximum number of shares of common stock reserved and available for issuance under the 2015 Stock Plan by 2,000,000 to 3,709,693. This amendment was designed to ensure that we can continue to grant stock options and other awards to our officers, employees, non-employee directors and other key persons at levels determined to be appropriate by the Compensation Committee. A copy of the 2015 Stock Plan (as amended by the proposed amendment) is attached as Annex A to this Proxy Statement and is incorporated herein by reference.

Based solely on the closing price of our common stock as reported on Nasdaq on March 7, 2022, the maximum aggregate market value of the additional shares of common stock that would become available for issuance under the 2015 Stock Plan is \$9.7 million.

Summary of Material Features of the 2015 Stock Plan

The material features of the 2015 Stock Plan (as amended by the proposed amendment) are:

- The maximum number of shares of common stock reserved and available for issuance under the 2015 Stock Plan (prior to the proposed amendment) is 1,709,693 and after the proposed amendment will be 3,709,693;
- The award of stock options (both incentive and non-qualified options), stock appreciation rights, restricted stock, restricted stock units, unrestricted stock, cash-based awards, performance share awards and dividend equivalent rights is permitted;
- Shares reacquired on the open market will not be added to the share reserve;
- Stock options and stock appreciation rights will not be repriced in any manner without stockholder approval;
- Without stockholder approval, the exercise price of stock options and stock appreciation rights will not be reduced and stock options and stock appreciation rights will not be otherwise repriced through cancellation in exchange for cash, other awards or stock options or stock appreciation rights with a lower exercise price;
- Any material amendment to the 2015 Stock Plan is subject to approval by our stockholders; and
- The term of the 2015 Stock Plan will expire on May 6, 2025.

Based solely on the closing price of our common stock as reported by Nasdaq on March 7, 2022 and the maximum number of shares that would have been available for awards as of such date under the 2015 Stock Plan, as amended, the maximum aggregate market value of the common stock that could potentially be issued under the 2015 Stock Plan is \$0.3 million. The shares of common stock underlying any awards that are forfeited, canceled or otherwise terminated, other than by exercise, under the 2015 Stock Plan and our 2014 Stock Plan, as amended (the "2014 Stock Plan"), will be added back to the shares of common stock available for issuance under the 2015 Stock Plan.

Rationale for Share Increase

The 2015 Stock Plan is critical to our ongoing effort to build stockholder value. Equity incentive awards are an important component of our executive and non-executive employees' compensation. Our Compensation Committee and the Board of Directors believe that we must continue to offer a competitive equity compensation program in order to attract, retain and motivate the talented and qualified employees necessary for our continued growth and success.

We manage our long-term stockholder dilution by limiting the number of equity incentive awards granted annually. The Compensation Committee carefully monitors our annual net burn rate, total dilution and equity expense in order to maximize stockholder value by granting only the number of equity incentive awards that it believes are necessary and appropriate to attract, reward and retain our employees. Our compensation philosophy reflects broad-based eligibility for equity

incentive awards for high performing employees. By doing so, we link the interests of those employees with those of our stockholders and motivate our employees to act as owners of the business.

Our Board of Directors determined the size of the share reserve pool under the 2015 Stock Plan based on projected equity awards to anticipated new hires, projected annual equity awards to existing employees and an assessment of the magnitude of dilution to our existing stockholders.

Our Board of Directors also considered the amount of underwater options and overhang in the determination of the proposed share reserve increase under the 2015 Stock Plan. As of March 7, 2022, approximately 48% of our outstanding employee stock options were “underwater,” meaning the exercise price of each of those options was greater than our stock price as of March 7, 2022. Overhang is another measure of the dilutive impact of equity programs. Our overhang is equal to the number of shares subject to outstanding equity compensation awards (i.e., unexercised options, excluding outstanding inducement awards, and unvested stock awards) plus the number of shares available for the grant of future awards under the 2015 Stock Plan, divided by the total number of outstanding shares of common stock. As of March 7, 2022, our overhang was 5.5%. The 2,000,000 share reserve increase under the 2015 Stock Plan being proposed in this Proposal 4 would result in our overhang as of March 7, 2022 increasing to approximately 12.6%.

Summary of the 2015 Stock Plan

The following description of certain features of the 2015 Stock Plan is intended to be a summary only. The summary is qualified in its entirety by the full text of the 2015 Stock Plan (as amended by the plan amendment), which is attached hereto as Annex A.

Administration. The 2015 Stock Plan is administered by the Administrator, as defined in the 2015 Stock Plan. The Administrator has full power to select, from among the individuals eligible for awards, the individuals to whom awards will be granted, to make any combination of awards to participants, and to determine the specific terms and conditions of each award, subject to the provisions of the 2015 Stock Plan. The Administrator may delegate to our Chief Executive Officer the authority to grant awards to employees who are not subject to the reporting and other provisions of Section 16 of the Exchange Act, subject to certain limitations and guidelines.

Eligibility; Plan Limits. All full-time and part-time officers, employees, non-employee directors and consultants are eligible to participate in the 2015 Stock Plan, subject to the discretion of the Administrator. As of March 7, 2022, each of our non-employee directors and approximately 56 employees were eligible to participate in the 2015 Stock Plan, which includes officers. Furthermore, the shares of common stock underlying any awards that are forfeited, canceled or otherwise terminated, other than by exercise, under the 2015 Stock Plan and the Company’s 2014 Stock Plan, will be added back to the shares of common stock available for issuance under the 2015 Stock Plan. Shares of common stock repurchased on the open market will not be added back to the shares of common stock available for issuance under the 2015 Stock Plan.

Stock Options. The 2015 Stock Plan permits the granting of (1) options to purchase common stock intended to qualify as incentive stock options under Section 422 of the Internal Revenue Code of 1986, as amended (the “Code”) and (2) options that do not so qualify. Options granted under the 2015 Stock Plan will be non-qualified options if they fail to qualify as incentive options or exceed the annual limit on incentive stock options. Incentive stock options may only be granted to employees of the Company and its subsidiaries. Non-qualified options may be granted to any persons eligible to receive incentive options and to non-employee directors and consultants. The option exercise price of each option will be determined by the Administrator but may not be less than 100% of the fair market value of the common stock on the date of grant. Fair market value for this purpose will be the last reported sale price of the shares of common stock on Nasdaq on the date immediately preceding the grant date. The exercise price of an option may not be reduced after the date of the option grant, other than to appropriately reflect changes in our capital structure.

The term of each option will be fixed by the Administrator and may not exceed ten years from the date of grant. The Administrator will determine at what time or times each option may be exercised. Options may be made exercisable in installments and the exercisability of options may be accelerated by the Administrator in circumstances involving the optionee’s death, disability, retirement or termination of employment, or a change in control. In general, unless otherwise permitted by the Administrator, no option granted under the 2015 Stock Plan is transferable by the optionee other than by will or by the laws of descent and distribution or pursuant to a domestic relations order, and options may be exercised during the optionee’s lifetime only by the optionee, or by the optionee’s legal representative or guardian in the case of the optionee’s incapacity.

Upon exercise of options, the option exercise price must be paid in full either in cash, by certified or bank check or other instrument acceptable to the Administrator or by delivery (or attestation to the ownership) of shares of common stock

that are beneficially owned by the optionee and that are not subject to risk of forfeiture. Subject to applicable law, the exercise price may also be delivered to the Company by a broker pursuant to irrevocable instructions to the broker from the optionee. In addition, the Administrator may permit non-qualified options to be exercised using a net exercise feature which reduces the number of shares issued to the optionee by the number of shares with a fair market value equal to the exercise price.

To qualify as incentive options, options must meet additional federal tax requirements, including a \$100,000 limit on the value of shares subject to incentive options that first become exercisable by a participant in any one calendar year.

Stock Appreciation Rights. The Administrator may award stock appreciation rights subject to such conditions and restrictions as the Administrator may determine. Stock appreciation rights entitle the recipient to shares of common stock equal to the value of the appreciation in the stock price over the exercise price. The exercise price is the fair market value of the common stock on the date of grant. The term of a stock appreciation right may not exceed ten years.

Restricted Stock. The Administrator may award shares of common stock to participants subject to such conditions and restrictions as the Administrator may determine. These conditions and restrictions may include the achievement of certain performance goals and/or continued employment with us through a specified restricted period. During the vesting period, restricted stock awards may be credited with dividend equivalent rights (but dividend equivalents payable with respect to restricted stock awards with vesting tied to the attainment of performance criteria shall not be paid unless and until such performance conditions are attained with respect to the restricted stock award).

Restricted Stock Units. The Administrator may award restricted stock units to participants. Restricted stock units are ultimately payable in the form of shares of common stock subject to such conditions and restrictions as the Administrator may determine. These conditions and restrictions may include the achievement of certain performance goals and/or continued employment with the Company through a specified vesting period. In the Administrator's sole discretion, it may permit a participant to make an advance election to receive a portion of his or her future cash compensation otherwise due in the form of a restricted stock unit award, subject to the participant's compliance with the procedures established by the Administrator and requirements of Section 409A of the Code. During the deferral period, the deferred stock awards may be credited with dividend equivalent rights.

Unrestricted Stock Awards. The Administrator may also grant shares of common stock which are free from any restrictions under the 2015 Stock Plan. Unrestricted stock may be granted to any participant in recognition of past services or other valid consideration and may be issued in lieu of cash compensation due to such participant.

Dividend Equivalent Rights. The Administrator may grant dividend equivalent rights to participants, which entitle the recipient to receive credits for dividends that would be paid if the recipient had held specified shares of common stock. Dividend equivalent rights granted as a component of another award (other than a stock option or stock appreciation right) may be paid only if the related award becomes vested. Dividend equivalent rights may be settled in cash, shares of common stock or a combination thereof, in a single installment or installments, as specified in the award.

Cash-Based Awards. The Administrator may grant cash bonuses under the 2015 Stock Plan to participants. The cash bonuses may be subject to the achievement of certain performance goals.

Performance Share Awards. The Administrator may grant performance share awards to any participant which entitle the recipient to receive shares of common stock upon the achievement of certain performance goals and such other conditions as the Administrator shall determine. Subject to the Administrator's discretion to accelerate in the case of retirement, death, disability or a change in control, these awards granted to employees will have a vesting period of at least one year except in the case of a "sale event," as defined in the 2015 Stock Plan, and such other limitations and conditions as the Administrator shall determine.

Change of Control Provisions. The 2015 Stock Plan provides that upon the effectiveness of a "sale event," as defined in the 2015 Stock Plan, except as otherwise provided by the Compensation Committee in the award agreement, all stock options, stock appreciation rights and other awards will be assumed or continued by the successor entity and adjusted accordingly to take into account the impact of the transaction. To the extent, however, that the parties to such sale event do not agree that all stock options, stock appreciation rights or any other awards shall be assumed or continued, then such stock options and stock appreciation rights shall terminate at the effective time of such sale event. In addition, the Company may make or provide for payment, in cash or in kind, to participants holding options and stock appreciation rights equal to the difference between the per share cash consideration and the exercise price of the options or stock appreciation rights. The Administrator shall also have the option to make or provide for a payment, in cash or in kind, to grantees holding other awards in an amount equal to

the per share cash consideration multiplied by the number of vested shares under such awards. All awards will terminate in connection with a sale event unless they are assumed by the successor entity.

Adjustments for Stock Dividends, Stock Splits, Etc. The 2015 Stock Plan requires the Administrator to make appropriate adjustments to the number of shares of common stock that are subject to the 2015 Stock Plan, to certain limits in the 2015 Stock Plan, and to any outstanding awards to reflect stock dividends, stock splits, extraordinary cash dividends and similar events.

Tax Withholding. Participants in the 2015 Stock Plan are responsible for the payment of any federal, state or local taxes that the Company is required by law to withhold upon the exercise of options or stock appreciation rights or vesting of other awards. Subject to approval by the Administrator, participants may elect to have their tax withholding obligations satisfied by authorizing the Company to withhold shares of common stock to be issued pursuant to exercise or vesting. The Administrator may also require awards to be subject to mandatory share withholding up to the required withholding amount.

Amendments and Termination. The Board of Directors may at any time amend or discontinue the 2015 Stock Plan and the Administrator may at any time amend or cancel any outstanding award for the purpose of satisfying changes in the law or for any other lawful purpose. However, no such action may adversely affect any rights under any outstanding award without the holder's consent. To the extent required under the rules of Nasdaq, any amendments that materially change the terms of the 2015 Stock Plan will be subject to approval by our stockholders. Amendments shall also be subject to approval by our stockholders if and to the extent determined by the Administrator to be required by the Code to preserve the qualified status of incentive options.

Effective Date of Plan. The 2015 Stock Plan was approved by our Board of Directors and stockholders on April 25, 2015 and became effective on May 6, 2015. No awards may be granted under the 2015 Stock Plan after May 6, 2025, the date that is ten years from the date the 2015 Stock Plan was effective.

New Plan Benefits

Because the grant of awards under the 2015 Stock Plan is within the discretion of the Administrator, we cannot determine the dollar value or number of shares of common stock that will in the future be received by or allocated to any participant in the 2015 Stock Plan, except with respect to non-employee directors. Under our non-employee director compensation policy, each continuing non-employee director is eligible to receive an annual option grant to purchase up to 12,000 shares of common stock on the date of each annual meeting of stockholders. We anticipate that any such stock options will continue to be granted under the 2015 Stock Plan if this Proposal 4 is approved by our stockholders. Regardless of whether this Proposal 4 is approved by our stockholders, in light of the limited shares available under the 2015 Stock Plan, in February 2022, our Board of Directors approved the one-time issuance of restricted stock units covering an aggregate of 6,000 shares of common stock in lieu of option grants for the 2022 Annual Grant. For additional information regarding our current compensation program for non-employee directors, please see "Director Compensation" above.

Name and Position	Number of Shares Subject to Awards (#)
All current directors who are not executive officers as a group (6 persons)	72,000 per calendar year

Awards Granted under the 2015 Stock Plan

The following table shows, for each of the individuals and the various groups indicated and as of March 7, 2022, the number of shares subject to awards that have been granted (even if not currently outstanding) under the 2015 Stock Plan.

Name and Position	Number of Shares Subject to Awards (#)
Sanjay S. Shukla, M.D., M.S., <i>President and Chief Executive Officer</i>	609,541
Jill M. Broadfoot, <i>Chief Financial Officer</i>	207,000
Nancy E. Denyes, <i>General Counsel</i>	194,250
All current executive officers, as a group	1,010,791
All current directors who are not executive officers, as a group	62,908
Each nominee for election as a director:	
John K. Clarke	11,159
Paul Schimmel, Ph.D.	13,457
Sara A. Zaknoen, M.D.	2,285
Each associate of any executive officers, current directors or director nominees	See above
Each other persons who received or is to receive 5% of awards	—
All employees, including all current officers who are not executive officers, as a group	737,177

Tax Aspects Under the Code

The following is a summary of the principal federal income tax consequences of certain transactions under the 2015 Stock Plan. It does not describe all federal tax consequences under the 2015 Stock Plan, nor does it describe state or local tax consequences.

Incentive Options. No taxable income is generally realized by the optionee upon the grant or exercise of an incentive option. If shares of common stock issued to an optionee pursuant to the exercise of an incentive option are sold or transferred after two years from the date of grant and after one year from the date of exercise, then (i) upon sale of such shares, any amount realized in excess of the option price (the amount paid for the shares) will be taxed to the optionee as a long-term capital gain, and any loss sustained will be a long-term capital loss, and (ii) the Company will not be entitled to any deduction for federal income tax purposes. The exercise of an incentive option will give rise to an item of tax preference that may result in alternative minimum tax liability for the optionee.

If shares of common stock acquired upon the exercise of an incentive option are disposed of prior to the expiration of the two-year and one-year holding periods described above (a “disqualifying disposition”), generally (i) the optionee will realize ordinary income in the year of disposition in an amount equal to the excess (if any) of the fair market value of the shares of common stock at exercise (or, if less, the amount realized on a sale of such shares of common stock) over the option price thereof, and (ii) we will be entitled to deduct such amount. Special rules will apply where all or a portion of the exercise price of the incentive option is paid by tendering shares of common stock.

If an incentive option is exercised at a time when it no longer qualifies for the tax treatment described above, the option is treated as a non-qualified option. Generally, an incentive option will not be eligible for the tax treatment described above if it is exercised more than three months following termination of employment (or one year in the case of termination of employment by reason of disability). In the case of termination of employment by reason of death, the three-month rule does not apply.

Non-Qualified Options. No income is realized by the optionee at the time a non-qualified option is granted. Generally (i) at exercise, ordinary income is realized by the optionee in an amount equal to the excess of the fair market value of the shares of common stock on the date of exercise over the option price, and we receive a tax deduction for the same amount, and (ii) at disposition, appreciation or depreciation after the date of exercise is treated as either short-term or long-term capital gain or loss depending on how long the shares of common stock have been held. Special rules will apply where all or a portion of the exercise price of the non-qualified option is paid by tendering shares of common stock. Upon exercise, the optionee will also be subject to Social Security taxes on the excess of the fair market value over the exercise price of the option.

Other Awards. The Company generally will be entitled to a tax deduction in connection with other awards under the 2015 Stock Plan in an amount equal to the ordinary income realized by the participant at the time the participant recognizes such income. Participants typically are subject to income tax and recognize such tax at the time that an award is exercised, vests or becomes non-forfeitable, unless the award provides for a further deferral.

Parachute Payments. The vesting of any portion of an award that is accelerated due to the occurrence of a change in control (such as a sale event) may cause a portion of the payments with respect to such accelerated awards to be treated as “parachute payments” as defined in the Code. Any such parachute payments may be non-deductible to the Company, in whole or in part, and may subject the recipient to a non-deductible 20% federal excise tax on all or a portion of such payment (in addition to other taxes ordinarily payable).

Limitation on Deductions. Under Section 162(m) of the Code, compensation paid to any publicly held corporation’s “covered employees” (as defined under Section 162(m) of the Code) that exceeds \$1 million per taxable year for any covered employee is generally non-deductible. Prior to the enactment of the Tax Cuts and Jobs Act, compensation that qualified as “performance-based compensation” under Section 162(m) of the Code was not subject to this deduction limitation. Pursuant to the Tax Cuts and Jobs Act, this exception for “performance-based compensation” under Section 162(m) of the Code was repealed with respect to taxable years beginning after December 31, 2017, except that certain transition relief is provided for remuneration provided pursuant to a written binding contract which was in effect on November 2, 2017 and which was not modified in any material respect on or after such date. As a result, compensation paid to any of our “covered employees” in excess of \$1 million per taxable year generally will not be deductible unless, among other requirements, it is intended to qualify, and is eligible to qualify, as “performance-based compensation” under Section 162(m) of the Code pursuant to the transition relief described above. Because of certain ambiguities and uncertainties as to the application and interpretation of Section 162(m) of the Code, as well as other factors beyond the control of the Compensation Committee, no assurance can be given that any award granted under the 2015 Stock Plan will be eligible for such transition relief and, therefore, eligible for the “performance-based compensation” exception under Section 162(m) of the Code.

Equity Compensation Plan Information

The following table provides information as of December 31, 2021 regarding shares of common stock that may be issued under our equity compensation plans approved by our stockholders, consisting of our 2015 Stock Plan, our 2015 ESPP, and our 2014 Stock Plan, and through inducement grants issued outside of our 2015 Stock Plan.

Plan Category	Equity Compensation Plan Information		
	Number of Securities to be Issued upon Exercise of Outstanding Options, Warrants and Rights (a) (1)	Weighted Average Exercise Price of Outstanding Options, Warrants and Rights (b) (2)	Number of Securities Remaining Available for Future Issuance under Equity Compensation Plan (Excluding Securities Reflected in Column (a)) (c)
Equity compensation plans approved by security holders: 2014 Stock Plan, 2015 Stock Plan and 2015 ESPP (3)	1,265,765	\$ 12.44 (4)	574,354
Equity compensation plans not approved by security holders: Inducement option grants (5)	154,285	\$ 8.54	—
Total	1,420,050		574,354

(1) Includes 1,258,265 shares subject to outstanding stock options and 7,500 shares subject to outstanding restricted stock unit (“RSU”) awards.

(2) The weighted-average exercise price is calculated based solely on outstanding stock options and does not reflect the shares that will be issued upon the vesting and settlement of outstanding awards of RSUs, which have no exercise price.

(3) The number of shares of common stock available for issuance under the 2015 Stock Plan was automatically increased each January 1, from January 1, 2016 until January 1, 2019, by the lesser of (i) 131,428, (ii) 4% of the number of outstanding shares of the Company’s common stock on the immediately preceding December 31, and (iii) an amount as determined by the Compensation Committee. The number of shares of common stock available for issuance under the ESPP was automatically increased each January 1, from January 1, 2016 until January 1, 2019, by the lesser of (i) 1% of the number of outstanding shares of common stock on the immediately preceding December 31 or (ii) such lesser amount of shares as determined by the Compensation Committee. The number of shares of common stock available includes shares available under the 2014 Stock Plan, however, we no longer grant new awards under our 2014 Stock Plan. Any awards previously granted under the 2014

Stock Plan prior to our initial public offering that are forfeited, canceled, reacquired by us prior to vesting, satisfied without the issuance of stock or otherwise terminated (other than by exercise) are added to shares available for issuance under the 2015 Stock Plan.

- (4) Does not include purchase rights accruing under the 2015 ESPP because the purchase right (and therefore the number of shares to be purchased) will not be determined until the end of the purchase period.
- (5) In July 2018, we granted a non-qualified stock option to purchase 14,285 shares in connection with the hiring of Ms. Broadfoot. In October 2021, we granted a non-qualified option to purchase 70,000 shares of our common stock in connection with the hiring of our Vice President, Regulatory Affairs, and in December 2021, we granted a non-qualified option to purchase 70,000 shares of our common stock in connection with the hiring of our Vice President, Human Resources. These options were inducement grants issued outside of our 2015 Stock Plan in accordance with Nasdaq Listing Rule 5635(c)(4). The options were granted pursuant to a form of non-qualified stock option agreement non-plan inducement grant previously approved by the Board of Directors. Certain terms of the options are governed by the terms and conditions of the 2015 Stock Plan (other than those applicable to the share reserve) as if they had actually been issued under the 2015 Stock Plan.

Required Vote

The approval of the amendment to the 2015 Stock Plan requires the affirmative vote of a majority of the votes cast on the proposal at the Annual Meeting. Abstentions and broker non-votes are not considered votes cast for the foregoing purpose, and will have no effect on the vote for this proposal.

Recommendation of the Board of Directors

The Board of Directors unanimously recommends that the stockholders vote “FOR” the approval of the amendment to the 2015 Stock Plan.

PROPOSAL 5

APPROVAL OF AN AMENDMENT TO THE 2015 ESPP

The Company is requesting stockholder approval of an amendment to the 2015 ESPP, which became effective in connection with the Company's initial public offering in May 2015. On March 2, 2022, the Board of Directors approved an amendment to the 2015 ESPP, subject to stockholder approval, to (i) increase the aggregate number of shares authorized for issuance under the 2015 ESPP by 750,000 shares to 843,246 shares of common stock, and (ii) increase the number of shares that may be purchased by any one employee during each offering period from 178 shares of common stock to 2,500 shares of common stock.

This amendment was designed to allow us to continue to provide our employees with the opportunity to acquire an ownership interest in the Company through their participation in the 2015 ESPP, thereby encouraging them to remain in our service and more closely aligning their interests with those of our stockholders. A copy of the 2015 ESPP (as amended by the proposed amendment) is attached as Annex B to this Proxy Statement and is incorporated herein by reference.

Summary of the 2015 ESPP

The material features of the 2015 ESPP (as amended by the proposed amendment) are outlined below.

Purpose. The purpose of the 2015 ESPP is to provide a means by which certain employees may be given an opportunity to purchase our common stock through payroll deductions, to attract, motivate, and retain the services of those individuals, and to provide incentives for those individuals to exert maximum efforts toward our success.

Participation. As of December 31, 2021, 12 employees, or approximately 27% of the Company's eligible workforce, participated in the 2015 ESPP.

Administration. The 2015 ESPP is administered by the person or persons (the "Plan Administrator") appointed by the Board of Directors for such purpose. The Administrator has authority at any time to: (i) adopt, alter and repeal such rules, guidelines and practices for the administration of the 2015 ESPP and for its own acts and proceedings as it shall deem advisable; (ii) interpret the terms and provisions of the 2015 ESPP; (iii) make all determinations it deems advisable for the administration of the 2015 ESPP; (iv) decide all disputes arising in connection with the 2015 ESPP; and (v) otherwise supervise the administration of the 2015 ESPP. Our Board of Directors delegated the members of the Compensation Committee as the Plan Administrator.

Stock Subject to 2015 ESPP. As of March 7, 2022, a total of 71,933 shares of our common stock remained available for issuance under the 2015 ESPP. We do not maintain any other employee stock purchase plans.

Offering Periods. We may make one or more offerings to our employees to purchase stock under the 2015 ESPP. Unless otherwise determined by the Plan Administrator, six month offering periods will begin each May 16th and November 16th, respectively, each referred to as offering periods. The Plan Administrator may designate different offering periods in its discretion but no offering shall exceed 12 months in duration or overlap with another offering.

Eligibility. All employees (including our named Executive Officers) who have been employed by us or our designated subsidiaries for at least six months and whose customary employment is for more than 20 hours a week are eligible to participate in the 2015 ESPP. Any employee who owns, or would own upon such purchase under the 2015 ESPP, 5% or more of the voting power or value of our stock is not eligible to purchase shares under our the 2015 ESPP. As of March 7, 2022, approximately 45 employees were eligible to participate in the 2015 ESPP.

Participation in the 2015 ESPP. Each employee who is a participant in the 2015 ESPP may purchase shares by authorizing payroll deductions at a minimum of 1% and up to 15% of his or her eligible compensation for each pay period. Unless the participating employee has previously withdrawn from the offering, his or her accumulated payroll deductions will be used to purchase common stock on the last business day of the offering period at a price equal to 85% of the fair market value of the common stock on either the first or the last day of the offering period, whichever is lower. Under applicable tax rules, an employee may purchase no more than \$25,000 worth of common stock, valued at the start of the purchase period, under the 2015 ESPP in any calendar year.

Purchase Price. Unless the participating employee has previously withdrawn from the offering, his or her accumulated payroll deductions will be used to purchase common stock on the last business day of the offering period at a

price equal to 85% of the fair market value of the common stock on either the first or the last day of the offering period, whichever is lower. As of March 7, 2022, the closing price of our common stock as reported on Nasdaq was \$4.85 per share.

Payment of Purchase Price; Payroll Deductions. The purchase price of the shares is funded by payroll deductions accumulated over the offering period. During an offering, a participant may change his or her rate of payroll deductions, as determined by our Board in the offering. All payroll deductions made for a participant are credited to his or her account under the 2015 ESPP and deposited with our general funds.

Purchase of Stock. By executing an agreement to participate in the 2015 ESPP, an employee is entitled to purchase shares under the 2015 ESPP. No more than 2,500 shares of common stock or such other lesser maximum number established by the Plan Administrator may be purchased by any one employee during each offering period. If the aggregate number of shares to be purchased upon exercise of outstanding purchase rights in the offering would exceed the maximum aggregate number of shares of common stock available, the shares then available will be apportioned among participants in proportion to the amount of payroll deductions accumulated on behalf of each participant. Unless an employee's participation is discontinued, his or her right to purchase shares is exercised automatically on the next purchase date at the applicable price. See "Withdrawal" below.

Withdrawal. Participants may withdraw from a given offering period by delivering a notice of withdrawal and terminating their payroll deductions. Such withdrawal may occur at any time prior to the end of an offering. Upon such withdrawal, we will refund accumulated payroll deductions without interest to the employee, and such employee's right to participate in that offering will terminate. An employee's withdrawal from an offering does not affect such employee's eligibility to participate in subsequent offerings under the 2015 ESPP.

Termination of Employment. Purchase rights granted pursuant to any offering under the 2015 ESPP terminate immediately upon cessation of employment for any reason, and we will refund all accumulated payroll deductions to the terminated employee without interest.

Restrictions on Transfer and Sales. Purchase rights granted under the 2015 ESPP are not transferable and may be exercised only by the person to whom such rights are granted.

Changes in Capitalization. In the event of a subdivision of outstanding shares of common stock, the payment of a dividend in common stock or any other change affecting the common stock, the number of shares approved for the 2015 ESPP and the share limitation for an individual's purchase in any offering period shall be equitably or proportionately adjusted to give proper effect to such event.

Termination and Amendment. The 2015 ESPP may be terminated or amended by our Board of Directors at any time. Amendments that increase the number of shares of our common stock authorized under the 2015 ESPP and certain other amendments require the approval of our stockholders.

Except as provided in the 2015 ESPP, purchase rights granted before amendment or termination of the 2015 ESPP will not be altered or impaired by any amendment or termination of the 2015 ESPP without the consent of the employee to whom such purchase rights were granted.

Plan Benefits Under 2015 ESPP

The following table shows, for each of the individuals and the various groups indicated and as of March 7, 2022, the number of shares purchased under the 2015 ESPP.

Name and Position	Number of Shares (#)
Sanjay S. Shukla, M.D., M.S., <i>President and Chief Executive Officer</i>	—
Jill M. Broadfoot, <i>Chief Financial Officer</i>	890
Nancy E. Denyes, <i>General Counsel</i>	2,139
All current executive officers, as a group	3,029
All current directors who are not executive officers, as a group	—

Each nominee for election as a director:

John K. Clarke

Paul Schimmel, Ph.D.

Sara A. Zaknoen

Each associate of any executive officers, current directors or director nominees

Each other persons who received or is to receive 5% of purchase rights

All employees, including all current officers who are not executive officers, as a group

10,466

New Plan Benefits Under the 2015 ESPP

Participation in the 2015 ESPP is voluntary and each eligible employee will make his or her own decision regarding whether and to what extent to participate in the 2015 ESPP. In addition, we have not approved any grants of purchase rights that are conditioned on stockholder approval of this Proposal 5. Accordingly, we cannot determine the benefits or amounts that will be received in the future by individual employees or groups of employees under the 2015 ESPP. Our non-employee directors will not be eligible to participate in the 2015 ESPP.

Federal Income Tax Information

The following is a summary of the principal United States federal income taxation consequences to employees and us with respect to participation in the 2015 ESPP. This summary is not intended to be exhaustive, and does not discuss the income tax laws of any city, state or foreign jurisdiction in which a participant may reside.

The 2015 ESPP is intended to qualify as an “employee stock purchase plan” within the meaning of Section 423 of the Code. Under such an arrangement, a participant will be taxed on amounts withheld for the purchase of shares of our common stock as if such amounts were paid directly to the participant. However, no taxable income will be recognized by a participant, and no deductions will be allowable to the Company, upon either the grant or exercise of purchase rights. Taxable income is not be recognized until there is a sale or other disposition of the shares acquired under the 2015 ESPP, or in the event the participant should die while still owning the purchased shares.

If a participant sells or otherwise disposes of the purchased shares within two years after the beginning of the offering period in which such shares were acquired or within one year after the actual purchase date of those shares, then the participant will recognize ordinary income in the year of sale or disposition equal to the amount by which the fair market value of the shares on the purchase date exceeded the purchase price paid for those shares, and the Company will be entitled to an income tax deduction, for the taxable year in which such disposition occurs, equal in amount to such excess. The participant will also recognize a capital gain to the extent the amount realized upon the sale of the shares exceeds the sum of the aggregate purchase price for those shares and the ordinary income recognized in connection with their acquisition.

If the participant sells or disposes of the purchased shares more than two years after the beginning of the offering period in which such shares were acquired and more than one year after the actual purchase date of those shares, the participant will generally recognize ordinary income in the year of sale or disposition equal to the lesser of (a) the excess of the fair market value of the shares at the time of such disposition over the purchase price or (b) the excess of the fair market value of the shares as of the beginning of the offering period over the purchase price. Any further gain or any loss will be taxed as a long-term capital gain or loss. At present, such capital gains generally are subject to lower tax rates than ordinary income.

If the participant still owns the purchased shares at the time of death, then a transfer by the estate will be considered a distribution and the lesser of the following amounts will be treated as ordinary income: (a) the excess of the fair market value of the shares at the time of death over the purchase price or (b) the excess of the fair market value of the shares as of the beginning of the offering period over the purchase price. Any further gain or any loss will be taxed as a long-term capital gain or loss. At present, such capital gains generally are subject to lower tax rates than ordinary income.

There are no federal income tax consequences to us by reason of the grant or exercise of rights under the 2015 ESPP. We are entitled to a deduction to the extent amounts are taxed as ordinary income to a participant for shares sold or otherwise

disposed of before the expiration of the holding periods described above (subject to the requirement of reasonableness and the satisfaction of tax reporting obligations).

Vote Required

The approval of the amendment to the 2015 ESPP requires the affirmative vote of a majority of the votes cast on the proposal at the Annual Meeting. Abstentions and broker non-votes are not considered votes cast for the foregoing purpose, and will have no effect on the vote for this proposal.

Recommendation of the Board of Directors

The Board of Directors unanimously recommends that the stockholders vote “FOR” the approval of the amendment to the 2015 ESPP.

PROPOSAL 6

APPROVAL OF INCREASE IN NUMBER OF AUTHORIZED SHARES OF COMMON STOCK

Our Board of Directors is recommending that the stockholders approve an amendment to the Company's Restated Certificate of Incorporation (the "Charter") to increase the Company's number of authorized shares of common stock from 42,500,000 to 85,000,000. The form of the proposed Certificate of Amendment is attached to this proxy statement as Annex C and is incorporated by reference into this proposal.

As of March 7, 2022, there were: (i) 27,795,794 shares of common stock outstanding; (ii) 13,760 shares of common stock reserved for issuance upon exercise of warrants; (iii) 1,606,611 shares of common stock reserved for issuance upon exercise of outstanding stock options or vesting and settlement of outstanding RSUs; (iv) 61,833 shares available for issuance in connection with additional grants under our 2015 Stock Plan (not including the increase set forth in Proposal 4); and (v) 71,933 shares of common stock reserved for issuance under our 2015 ESPP (not including the share reserve increase set forth in Proposal 5). Thus, as of March 7, 2022, we had 11,700,069 unissued and unreserved authorized shares of common stock (not including the share reserve increases set forth in Proposals 4 and 5).

Rationale for the Increase in Authorized Shares

Our Board of Directors believes it is in the best interest of our company to increase the number of authorized shares of common stock to give our company greater flexibility in considering and planning for future potential business needs. The increase in the number of authorized shares of common stock to 85,000,000 is expected to create capital liquidity to permit and enhance opportunities for growth. Unless further stockholder approval is required for a proposed issuance of additional shares by the rules of the Nasdaq Stock Market or other applicable laws or regulations, the additional shares may be issued for various purposes without further stockholder approval. These purposes may include: raising capital; establishing strategic relationships or licensing arrangements with other companies; expanding our business through the acquisition of other businesses, products or technologies; providing equity incentives to employees, officers and directors; and other purposes.

As of the date of this Proxy Statement, the Board of Directors has not approved any plans or proposals to issue any of the additional authorized shares of our common stock contemplated by this proposal and has no commitments to do so. However, in the future, the Board of Directors could authorize certain of the additional authorized shares to be issued (i) pursuant to our equity compensation plans, (ii) pursuant to a sales agreement with JonesTrading Institutional Services LLC ("JonesTrading") entered into in March 2021 to create an at-the-market offering program under which we may offer and sell shares of our common stock having an aggregate offering price of up to \$25.0 million, and (iii) pursuant to a common stock purchase agreement with Aspire Capital Fund, LLC ("Aspire Capital") entered into in September 2020, which provides that, upon the terms and subject to the conditions and limitations set forth therein, Aspire Capital is committed to purchase up to an aggregate of \$20.0 million of shares of our common stock at our request from time to time during the 30-month term of such agreement. To date, we have issued \$15.3 million of shares of our common stock to Aspire Capital pursuant to this common stock purchase agreement and \$4.7 million of shares of our common stock to JonesTrading pursuant to the sales agreement with JonesTrading. The Board of Directors desires to have additional authorized shares available to provide additional flexibility to use our common stock for financing and business purposes in the future. From our inception through December 31, 2021, we have financed our operations primarily through the sale of equity securities and debt financings. To date, we have not derived any revenue from product sales. We expect our expenses to increase in connection with our ongoing activities, particularly as we continue to advance our lead product candidate, efzofitimid (the non-proprietary name of ATYR1923), in clinical development, advance ATYR2810 into clinical development and continue our research and development activities for other potential product candidates based on tRNA synthetase biology and Neuropilin-2 biology, and seek marketing approval for products that we may develop. In addition, if we obtain marketing approval for any of our product candidates, we expect to incur significant commercialization expenses related to product sales, marketing, manufacturing and distribution. Until we can generate sufficient product revenues, if ever, we expect to finance our cash needs through a combination of equity offerings, grant funding, collaborations, strategic partnerships and/or licensing arrangements, and when we are closer to commercialization of our product candidates, potentially through debt financings. We may use some of the additional authorized shares for capital raising transactions if we have an appropriate opportunity. If the increase in the number of authorized shares of common stock is postponed until the foregoing specific needs arise, the delay and expense incident to obtaining approval of the stockholders at that time could impair our ability to meet our objectives.

If this proposal is not approved by our stockholders, we may be limited in our ability to pursue otherwise attractive equity financing alternatives to fund our operations due to an insufficient number of unissued and unreserved authorized shares

of common stock, and stockholder value may be harmed by this limitation. In addition, our future success depends upon our ability to attract, retain and motivate highly-skilled scientific, commercial and managerial employees, and if this proposal is not approved by our stockholders, the lack of sufficient unissued and unreserved authorized shares of common stock to provide future equity incentive opportunities as our Board of Directors or the Compensation Committee deems appropriate could adversely impact our ability to achieve these goals. In short, if our stockholders do not approve this proposal, we may not be able to access the capital markets, complete corporate collaborations, partnerships or other strategic transactions, attract, retain and motivate employees, and pursue other business opportunities integral to our growth and success.

Effects of the Increase in Number of Authorized Shares

The additional shares of common stock to be authorized by adoption of the amendment would have rights identical to our currently outstanding common stock. Adoption of the proposed amendment and issuance of the common stock would not affect the rights of the holders of our currently outstanding common stock, but will, with respect to the issuance of additional shares, result in effects incidental to increasing the number of shares of our common stock outstanding, such as dilution of earnings per share, if any, and voting rights of current holders of our common stock.

The additional shares of common stock that would become available for issuance if the proposal is adopted could also be used by us to oppose a hostile takeover attempt or to delay or prevent changes in control or management of our company. For example, without further stockholder approval, the Board of Directors could strategically sell shares of common stock in a private transaction to purchasers who would oppose a takeover or favor the current Board of Directors. Although this proposal to increase the number of authorized shares common stock has been prompted by business and financial considerations and not by the threat of any hostile takeover attempt (nor is our Board of Directors currently aware of any such attempts directed at our company), stockholders should be aware that approval of the proposal could facilitate future efforts by us to deter or prevent changes in control of our company, including transactions in which our stockholders might otherwise receive a premium for their shares over then current market prices.

Timing of the Proposed Charter Amendment

If the authorized share increase is approved, as soon as practicable after the Annual Meeting, we will file the Certificate of Amendment with the office of the Secretary of State of Delaware to implement the increase in the number of authorized shares of our common stock. Upon approval and following such filing with the Secretary of State of Delaware, the Certificate of Amendment will become effective on the date it is filed.

Required Vote

The affirmative vote of a majority of the shares of stock outstanding and entitled to vote as of the Record Date is required to approve the amendment of the Charter. You may vote “FOR” or “AGAINST” this proposal. For purposes of determining whether this proposal has passed, abstentions and broker non-votes will have the effect of a vote “AGAINST” the increase in authorized shares of common stock.

Recommendation of the Board of Directors

The Board of Directors unanimously recommends that stockholders vote “FOR” the amendment to the Charter to increase the Company’s number of authorized shares of common stock from 42,500,000 to 85,000,000 shares.

PROPOSAL 7

AUTHORIZATION TO ADJOURN THE ANNUAL MEETING

General

If the Annual Meeting is convened and a quorum is present, but there are not sufficient votes to approve Proposals 4, 5 or 6, our proxy holders may move to adjourn the Annual Meeting at that time in order to enable our Board of Directors to solicit additional proxies.

In this proposal, we are asking our stockholders to authorize the holder of any proxy solicited by our Board of Directors to vote in favor of granting discretionary authority to the proxy holders, and each of them individually, to adjourn the Annual Meeting to another time and place, if necessary, to solicit additional proxies in the event that there are not sufficient votes to approve Proposals 4, 5 or 6. If our stockholders approve this proposal, we could adjourn the Annual Meeting and any adjourned session of the Annual Meeting and use the additional time to solicit additional proxies, including the solicitation of proxies from our stockholders that have previously voted. Among other things, approval of this proposal could mean that, even if we had received proxies representing a sufficient number of votes to defeat Proposals 4, 5 or 6, we could adjourn the Annual Meeting without a vote on such proposals and seek to convince our stockholders to change their votes in favor of such proposals.

If it is necessary to adjourn the Annual Meeting, no notice of the adjourned meeting is required to be given to our stockholders, other than an announcement at the Annual Meeting of the time and place to which the Annual Meeting is adjourned, so long as the meeting is adjourned for 30 days or less and no new record date is fixed for the adjourned meeting. At the adjourned meeting, we may transact any business which might have been transacted at the original meeting.

Required Vote

Approval of this Proposal 7 requires the affirmative vote of the majority of the votes cast. Abstentions and broker non-votes will have no effect on the vote for this proposal.

Recommendation of the Board of Directors

The Board of Directors unanimously recommends that stockholders vote “FOR” the proposal to authorize the adjournment of the Annual Meeting.

EXECUTIVE OFFICERS

The following table sets forth certain information about our executive officers as of March 7, 2022:

Name	Age	Position
Sanjay S. Shukla, M.D., M.S.	50	President, Chief Executive Officer and Director
Jill M. Broadfoot	60	Chief Financial Officer
Nancy E. Denyes	54	General Counsel and Corporate Secretary

Executive Officers

Sanjay S. Shukla, M.D., M.S. Please see Dr. Shukla’s biography included in “Proposal 1—Election of Directors” above.

Jill M. Broadfoot has served as our Chief Financial Officer since July 2018. From January 2017 to July 2018, Ms. Broadfoot served as Chief Financial Officer of Emerald Health Pharmaceuticals Inc. and Emerald Health Bioceuticals Inc., where she was responsible for establishing operations for the U.S.-based pharmaceutical and bioceutical entities as well as the establishment of operations, corporate governance, finance and accounting and investor relations functions, among others. Prior to Emerald Health, Ms. Broadfoot served as Vice President, U.S. Corporate Controller at GW Pharmaceuticals, from May 2016 to January 2017. While at GW Pharmaceuticals, her responsibilities included establishing U.S. commercial operations and implementing U.S. public company financial and accounting standards in connection with the transfer of corporate operations from the U.K. to the U.S. Prior to joining GW Pharmaceuticals, Ms. Broadfoot served as Chief Financial Officer of Vical Inc., from October 2004 to March 2013, where she had oversight of finance, investor relations, manufacturing, information technology, human resources, and business development. Prior to that, Ms. Broadfoot held various positions at DJO Global, Inc., most recently as Vice President of Finance, and served as an audit manager at Ernst & Young LLP. Ms. Broadfoot serves on the board of directors of AcclRx Pharmaceuticals, Inc. and Otonomy, Inc., both biotechnology companies. Ms. Broadfoot holds a B.S. in business administration and accounting from San Diego State University and is a Certified Public Accountant.

Nancy E. Denyes has served as our General Counsel since February 2019 and as our Corporate Secretary since January 2015. Ms. Denyes served as our Vice President, Legal Affairs from October 2014 to February 2019, and provided consulting services to us from 2013 to 2014. Ms. Denyes practiced law in the corporate department at Cooley LLP and was named partner in 2000. Her practice at Cooley was focused on securities and corporate matters, including private financings, public offerings, mergers and acquisitions and corporate governance and disclosure issues. Ms. Denyes holds a J.D. from the University of California, Berkeley School of Law and a B.A. in economics and business from the University of California, Los Angeles.

EXECUTIVE COMPENSATION

We are a “smaller reporting company” under Item 10 of Regulation S-K promulgated under the Exchange Act and the following compensation disclosure is intended to comply with the requirements applicable to smaller reporting companies. Although the rules allow the Company to provide less detail about its executive compensation program, the Compensation Committee is committed to providing the information necessary to help stockholders understand its executive compensation-related decisions. Accordingly, this section includes supplemental narratives that describe the 2021 executive compensation program for our principal executive officer and the next two most highly compensated executive officers (“Named Executive Officers”).

Overview

We are a biotherapeutics company engaged in the discovery and development of innovative medicines based on novel biological pathways. We have concentrated our research and development efforts on a newly discovered area of biology, the extracellular functionality and signaling pathways of tRNA synthetases. Built on more than a decade of foundational science on extracellular tRNA synthetase biology and its effect on immune responses, we have built a global intellectual property estate directed to a potential pipeline of protein compositions derived from 20 tRNA synthetase genes and their extracellular targets, such as neuropilin-2 (“NRP2”).

Our lead therapeutics candidate, efzofitmod (the non-proprietary name for ATYR1923), is a fusion protein comprised of the immunomodulatory domain of histidyl-tRNA synthetase fused to the fragment crystallizable region of a human antibody, and serves as a selective modulator of NRP2 that downregulates innate and adaptive immune response in inflammatory disease states. We are developing efzofitmod as a potential disease-modifying therapy for patients with fibrotic lung diseases with

high unmet medical need. This includes interstitial lung diseases (“ILD”), a group of rare immune-mediated disorders that cause progressive fibrosis of the lung. We designed a Phase 1b/2a multiple-ascending dose, double-blind, placebo-controlled clinical trial in patients with pulmonary sarcoidosis, a major form of ILD, to evaluate the safety, tolerability, immunogenicity, steroid-sparing effect and other exploratory assessments of efficacy, such as lung function. In September 2021, we announced positive results and clinical proof-of-concept from the Phase 1b/2a clinical trial in 37 patients with pulmonary sarcoidosis. Efgofitimid was safe and well-tolerated at all doses with no drug-related serious adverse events or signal of immunogenicity. Additionally, the study demonstrated consistent dose response for efgofitimid on key efficacy endpoints and improvements compared to placebo, including measures of steroid reduction, lung function, sarcoidosis symptom measures and inflammatory biomarkers. Based on the results of the Phase 1b/2a study, we believe efgofitimid has potential in other ILDs, such as chronic hypersensitivity pneumonitis (“CHP”) and connective tissue disease related ILD (“CTD-ILD”).

Named Executive Officers. This section discusses our executive compensation decisions for the year ended December 31, 2021 for our Named Executive Officers. Our Named Executive Officers are the following:

- Sanjay S. Shukla, M.D., M.S., our President and Chief Executive Officer;
- Jill M. Broadfoot, our Chief Financial Officer; and
- Nancy E. Denyes, our General Counsel and Corporate Secretary.

Executive Summary

Corporate Performance Highlights

In 2021, we executed on our plans to advance the clinical development of efgofitimid, advance our pipeline, foster our partnerships and enhance sustainability through meeting financial objectives. The Compensation Committee considered the achievements described below in determining achievement of our corporate goals. Certain elements of executive compensation are tied to the level of corporate goal achievement as described further below.

Highlights of our performance in 2021 include:

- ***Advancement of efgofitimid clinical program.*** The highlight of 2021 for our company was the announcement of positive results and clinical proof-of-concept from the Phase 1b/2a clinical trial in 37 patients with pulmonary sarcoidosis in September. Efgofitimid was safe and well-tolerated at all doses with no drug-related serious adverse events or signal of immunogenicity. Additionally, the study demonstrated consistent dose response for efgofitimid on key efficacy endpoints and improvements compared to placebo, including measures of steroid reduction, lung function, sarcoidosis symptom measures and inflammatory biomarkers. This was a major milestone in the development of efgofitimid.
- ***Pipeline advancement.*** In conjunction with our clinical development of efgofitimid, we have in parallel been advancing our discovery pipeline of NRP2 antibodies and tRNA synthetases. In November 2020, we declared our lead Investigational New Drug (“IND”) candidate in oncology from our NRP2 antibody program, ATYR2810. ATYR2810 is a fully humanized monoclonal antibody that is designed to specifically and functionally block the interaction between NRP2 and one of its primary ligands, vascular endothelial growth factor (“VEGF”). NRP2 is a cell surface receptor that is highly expressed on certain tumors and increased NRP2 expression is associated with worse outcomes in many cancers, such as overall survival, metastasis and resistance to targeted therapies. The role of NRP2 and VEGF signaling in the tumor microenvironment and its importance in the progression of certain aggressive cancers is becoming increasingly validated. ATYR2810 is in preclinical development for the potential treatment of certain aggressive cancers where NRP2 is implicated.
- ***Fostered partnerships.*** In January 2020, we entered into a license agreement with Kyorin Pharmaceutical Co., Ltd. (“Kyorin”) for the development and commercialization of efgofitimid for ILD in Japan. Under the collaboration and license agreement with Kyorin, Kyorin received an exclusive right to develop and commercialize efgofitimid in Japan for all forms of ILD. Kyorin completed and funded a Phase 1 clinical trial. This was a placebo-controlled clinical trial to evaluate the safety, pharmacokinetics (“PK”) and immunogenicity of efgofitimid in 32 healthy Japanese male volunteers. In 2021, results of the Phase 1 clinical trial were announced. Efgofitimid was observed to be generally well-tolerated with no drug-related

serious adverse events and PK findings were consistent with previous studies of efzofitimid. We have received \$10.0 million in payments under the license agreement and we are eligible to receive an additional \$165.0 million in the aggregate upon achievement of certain development, regulatory and sales milestones, as well as tiered royalties ranging from the mid-single digits to mid-teens on net sales in Japan. Further, we successfully advanced multiple academic collaborations and published our results at conferences throughout 2021.

- Enhanced sustainability through meeting financial objectives. We ended 2021 with \$107.9 million in cash as of December 31, 2021. In the first quarter of 2021, we raised \$9.6 million in net proceeds through our at-the-market offering program with H.C. Wainwright & Co., LLC. We then initiated an at-the-market offering program with Jones Trading and raised \$4.4 million in net proceeds under that program. In September 2021, following the announcement of positive data from our Phase 1b/2a clinical trial of efzofitimid in patients with pulmonary sarcoidosis, we successfully raised approximately \$80.6 million in net proceeds in an underwritten public offering.

2021 Compensation Actions

- We structured a significant proportion of target compensation for our Named Executive Officers as variable or at-risk pay, consisting of annual performance bonus and equity awards in the form of stock options. “Target compensation” consists of base salary, target performance bonus opportunity and equity awards granted in 2021.
- Based on 2021 performance, the Compensation Committee and the Board of Directors determined that performance-based bonuses should be paid at 115% of target to our Named Executive Officers.
- We granted equity awards in the form of stock options to our Named Executive Officers to incentivize and reward for stockholder value creation as part of our annual performance evaluation in February.
- In May 2021, we granted additional equity awards in the form of stock options to our Named Executive Officers to further incentivize them and provide long-term retention value due in part to unusually intense competition for talent across the biotechnology industry and also to capital-raising activities in the first half of 2021 that caused dilution to the existing equity awards of our Named Executive Officers.

Executive Compensation Practices

Our Compensation Committee conducts oversight of our compensation program and policies. Our executive compensation philosophy is based on the following objectives:

- Aligning executive interests and stockholder interests through long-term incentives linked to Company performance;
- Attracting, retaining and motivating superior executive talent who exemplify and enhance the Company culture; and
- Providing incentives that reward the achievement of performance goals that directly correlate to the enhancement of stockholder value, as well as to facilitate executive retention.

Our executive compensation program generally consists of the following three principal components: base salary, annual performance-based bonuses and long-term incentive compensation. We also provide our executive officers with severance and change-in-control payments and benefits, as well as other benefits generally available to all our employees, including retirement benefits under our tax-qualified retirement plan (“401(k) Plan”) and participation in employee benefit plans.

In evaluating our executive compensation program and policies, as well as the short- and long-term value of our executive compensation plans and arrangements, the Compensation Committee focuses on providing a competitive compensation package that provides significant short- and long-term incentives for the achievement of measurable corporate objectives and individual contribution towards our corporate performance. We believe that this approach provides an appropriate blend of short- and long-term incentives to maximize stockholder value.

We do not currently have formal policies for allocating compensation among base salary, annual performance bonuses and equity awards, short- and long-term compensation or among cash and non-cash compensation. Instead, the Compensation Committee uses its judgment to establish a target total direct compensation opportunity for executive officers that is a mix of current, short- and long-term incentive compensation, and cash and non-cash compensation, that it believes appropriate to achieve the goals of our executive compensation program and our corporate objectives. A significant portion of our Named Executive Officers' target total direct compensation opportunity is comprised of "at-risk" compensation in the form of an annual performance bonus opportunity and equity awards tied to stockholder returns, in order to align the executive officers' incentives with the interests of our stockholders and our corporate goals.

Oversight of Executive Compensation

The Compensation Committee reviews and makes decisions with respect to all compensation paid to our executive officers, including our Named Executive Officers, except for the Chief Executive Officer. With respect to the Chief Executive Officer, the Compensation Committee recommends, and the Board of Directors determines, compensation. The Chief Executive Officer evaluates and provides to the Compensation Committee performance assessments and compensation recommendations. In making these recommendations, the Chief Executive Officer reviews third-party compensation surveys and, if retained, compensation data provided by the independent compensation consultant to the Compensation Committee, as described below. While the Chief Executive Officer discusses these recommendations with the Compensation Committee and the Board, he does not participate in the deliberations concerning, or the determination of, his own compensation. The Compensation Committee makes a recommendation to the Board and the Board discusses and makes final determinations with respect to executive compensation matters without the Chief Executive Officer present during discussions of the Chief Executive Officer's compensation. From time to time, various other members of management and other employees as well as outside advisors or consultants may be invited by the Compensation Committee or the Board to make presentations, provide financial or other background information or advice or otherwise participate in the Compensation Committee or Board meetings.

The Compensation Committee meets periodically throughout the year to manage and evaluate our executive compensation program and determines the principal components of compensation (base salary, performance bonus and equity awards) for our executive officers on an annual basis, typically in early February; however, decisions may occur during the year for new hires, promotions or other special circumstances as the Compensation Committee determines appropriate. Neither the Board nor the Compensation Committee delegates authority to approve executive officer compensation. The Compensation Committee does not maintain a formal policy regarding the timing of equity awards to our executive officers, although awards are generally approved at a meeting of the Compensation Committee in February of each year.

The Compensation Committee has the sole authority to retain compensation consultants to assist in its evaluation of executive compensation, including the authority to approve the consultant's reasonable fees and other retention terms. In 2020 and 2021, the Compensation Committee retained Radford, which is part of the Rewards Solutions practice at Aon plc, to provide a competitive assessment of the Company's executive compensation program compared to executive compensation paid to executives at selected publicly traded peer companies and, in 2021, to provide the Compensation Committee with advice regarding executive officers' compensation, including base salaries, performance-based bonuses and long-term equity compensation. The cost of Radford's consulting services directly related to Compensation Committee support for 2021 was approximately \$30,000. The Compensation Committee's direct engagement of Radford in 2021 was not the result of any recommendation by management, and the Compensation Committee approved all fees payable to Radford for its consulting services. The compensation consultant reports directly to the Compensation Committee, which maintains the authority to direct its work and engagement. The compensation consultant interacts with management to gain access to company information that is required to perform its services and to understand the culture and policies of our organization.

When designing our executive compensation program for 2021, the Compensation Committee reviewed market data for each executive officer's position, compiled by Radford, from the following peer group of companies for 2021:

Bellerophon Therapeutics	Idera Pharmaceuticals
Capricor Therapeutics	Infinity Pharmaceuticals
Catabasis Pharmaceuticals	Proteostasis Therapeutics
Cidara Therapeutics	Pulmatrix
CohBar	Savara

Eloxx Pharmaceuticals	Soleno Therapeutics
Equillium	Spring Bank Pharmaceuticals
EyeGate Pharmaceuticals	Sunesis Pharmaceuticals
Genocea Biosciences	

The peer group for 2021 was recommended by Radford and targeted U.S.-based, publicly traded, pre-commercial companies operating in the biopharmaceutical industry, with development programs in Phase I, II or III clinical trials, market capitalizations generally under \$150 million and headcount generally under 100 employees, and with a particular focus on companies headquartered in biotechnology hub markets.

The Compensation Committee considered Radford’s independence, taking into account the following factors: (i) the amount of fees paid to Radford, as a percentage of the firm’s total revenue; (ii) the provision of other services to us by Radford; (iii) Radford’s policies and procedures designed to prevent conflicts of interest; (iv) any business or personal relationship of Radford with any member of the Compensation Committee; (v) any business or personal relationship of Radford or the individual compensation advisors employed by Radford with any of our executive officers or any members of the Compensation Committee; and (vi) any shares of our common stock owned by the Radford or the individual compensation advisors employed by Radford.

The Compensation Committee’s general aim is for compensation to remain competitive with the market. We have not developed a specific market positioning or “benchmark” that we consistently aim for in setting compensation levels; instead the Compensation Committee determines each element of compensation, and total target cash and direct compensation, for our executive officers based on various facts and circumstances appropriate for our company in any given year. Competitive market positioning is only one of several factors, as described below under “—Factors Used in Determining Executive Compensation,” that the Compensation Committee considers in making compensation recommendations and decisions, and therefore individual executive officer compensation may fall at varying levels as compared to the market data.

Factors Used in Determining Executive Compensation

The Compensation Committee sets, or recommends to the Board of Directors, the compensation of our executive officers at levels the Committee determines to be competitive and appropriate for each executive officer, using the Committee’s professional experience and judgment. Compensation decisions are not made by use of a formulaic approach; the Compensation Committee believes that these decisions require consideration of a multitude of relevant factors that may vary from year to year. In making executive compensation decisions, the Compensation Committee generally takes into consideration the following factors:

- our corporate performance and business needs;
- each executive officer’s individual performance, experience, job function, change in position or responsibilities, and expected future contributions to our company;
- internal pay equity among our executive officers and positions;
- the need to attract new talent to our executive team and retain existing talent in a highly competitive industry;
- a range of market data reference points;
- the total compensation cost and stockholder dilution from executive compensation actions
- trends and compensation paid to similarly situated executives within our market
- its compensation consultant’s recommendations, if applicable;
- a review of each executive officer’s total targeted and historical compensation and equity ownership;

- our Chief Executive Officer’s recommendations, based on the Chief Executive Officer’s direct knowledge of the performance of each Named executive officer and review of competitive market data, including peer group data provided by a compensation consultant.

SUMMARY COMPENSATION TABLE

The following table presents all of the compensation earned by or paid to our Named Executive Officers during the fiscal years ending December 31, 2021 and 2020.

Name and Principal Position	Year	Salary (\$)	Stocks Awards (\$ (1))	Option Awards (\$ (1))	Non-Equity Incentive Plan Compensation (\$ (2))	All Other Compensation (\$ (3)(4))	Total (\$)
Sanjay S. Shukla, M.D., M.S. <i>President and CEO</i>	2021	510,221	—	1,076,297	293,377	12,813	1,892,708
	2020	470,250	—	381,811	223,369	8,427	1,083,857
Jill M. Broadfoot <i>Chief Financial Officer</i>	2021	376,723	—	355,683	173,282	11,755	917,443
	2020	365,750	—	182,671	138,985	11,374	698,780
Nancy E. Denyes <i>General Counsel</i>	2021	360,577	—	353,702	165,876	11,133	891,288
	2020	350,075	—	148,121	116,400	10,661	625,257

- (1) Amounts shown reflect aggregate full grant date fair value of equity-based awards granted during the year in accordance with FASB ASC Topic 718. Pursuant to FASB ASC Topic 718, the amounts shown exclude the impact of estimated forfeitures related to service-based vesting conditions.
- (2) The amounts reported reflect the cash bonus determined by our Compensation Committee (for the Named Executive Officers other than Dr. Shukla), and by our Board of Directors upon recommendation of our Compensation Committee (for Dr. Shukla), based on certain performance goals and achievement of certain developmental, clinical or regulatory milestones as specified by our Board of Directors upon recommendation of our Compensation Committee.
- (3) The amounts reported in 2020 in this column include: (i) 401(k) Plan employer match of \$7,987 and life insurance premium of \$441 to Dr. Shukla; (ii) 401(k) Plan employer match of \$10,933 and life insurance premium of \$441 to Ms. Broadfoot; and (iii) 401(k) Plan employer match of \$10,220 and life insurance premium of \$441 to Ms. Denyes.
- (4) The amounts reported in 2021 in this column include: (i) 401(k) Plan employer match of \$11,608, life insurance premium of \$441, and 5-year anniversary bonus of \$764 to Dr. Shukla; (ii) 401(k) Plan employer match of \$11,314 and life insurance premium of \$441 to Ms. Broadfoot; and (iii) 401(k) Plan employer match of \$10,692 and life insurance premium of \$441 to Ms. Denyes.

Narrative Disclosure to Summary Compensation Table

As described above, the three principal components of our executive compensation program for our Named Executive Officers in 2021 were base salary, annual performance-based bonuses and long-term equity compensation. In line with our pay for performance philosophy, we structured a significant portion of our Named Executive Officers’ 2021 compensation to be variable, at-risk and tied directly to our measurable performance in the form of annual performance-based bonuses and long-term equity compensation.

Base Salary

Our Compensation Committee reviews the base salaries of our executive officers, including our Named Executive Officers, from time to time and makes adjustments as it determines to be reasonable and necessary to reflect the scope of an executive officer’s performance, contributions, responsibilities, experience, prior salary level, position (in the case of a promotion) and market conditions.

Base salary provides financial stability and security to our executive officers through a fixed amount of cash for performing job responsibilities. In February 2021, the Compensation Committee reviewed the base salaries for our executive officers, peer group data, the scope of each executive officer’s responsibilities for 2021, each executive officer’s prior experience and internal pay equity in order to determine 2021 base salaries for Ms. Broadfoot and Ms. Denyes and to recommend the 2021 base salary for Dr. Shukla. Each of the Named Executive Officers’ 2021 annual base salary rates (effective January 1, 2021), as approved by the Compensation Committee or the Board of Directors, as applicable, are listed in the table below which reflected an 8.5% increase for Dr. Shukla and a 3.0% increase for Ms. Broadfoot and Ms. Denyes from 2020 base salaries to account for closer alignment of Dr. Shukla’s base salary with the 2021 peer group data provided by Radford and general market increases as recommended by Radford according to market data.

Named Executive Officer	2021 Base Salary
Sanjay S. Shukla, M.D., M.S.	\$510,221
Jill M. Broadfoot	\$376,723
Nancy E. Denyes	\$360,577

Annual Performance-Based Bonuses

In January 2016, the Board of Directors adopted our Senior Executive Cash Incentive Bonus Plan (“Bonus Plan”), which applies to certain key executives (“Executives”), that are recommended by the Compensation Committee and selected by the Board of Directors. The Bonus Plan provides for bonus payments based upon the attainment of performance targets established by the Board of Directors and related to operational and financial metrics with respect to our company or any of our subsidiaries (“Performance Goals”). Any bonuses paid under the Bonus Plan will be based upon objectively determinable bonus formulas that tie such bonuses to one or more performance targets relating to the Performance Goals. The bonus formulas will be adopted in each performance period by the Compensation Committee and communicated to each Executive. No bonuses will be paid under the Bonus Plan unless and until the Compensation Committee makes a determination with respect to the attainment of the Performance Goals. Notwithstanding the foregoing, the Compensation Committee may adjust bonuses payable under the Bonus Plan based on individual performance or pay bonuses (including, without limitation, discretionary bonuses) to Executives under the Bonus Plan based upon such other terms and conditions as the Compensation Committee may in its discretion determine.

Each of our Named Executive Officers were eligible to receive performance-based bonuses based entirely on our achievement of Performance Goals established by the Board of Directors for 2021. The actual amount of any performance-based bonus paid, if any, is calculated by multiplying the Executives’ annual base salary, target bonus percentage, and the percentage attainment of the Performance Goals for 2021. For 2021, the target bonus percentages for Dr. Shukla, Ms. Broadfoot and Ms. Denyes were 50%, 40% and 40%, respectively.

The Performance Goals for 2021 on which our Named Executive Officer performance-based bonuses were based, included the following:

- Advance the efzofitimid program;
- Progress ATYR2810 IND-enabling and pipeline activities;
- Foster our partnerships;
- Reboot our culture and adapt our organization towards post-pandemic environment; and
- Enhance sustainability through financing/partnering activities.

For each goal listed above, we developed a list of objectives and each goal was weighted. In evaluating our performance for 2021, the Compensation Committee reviewed the objectives and the 2021 performance highlights described earlier in this section. Given our success in advancing the efzofitimid program and our successful financing in September 2021, the Compensation Committee determined that our performance exceeded weighting for those objectives.

Based on our achievement of the Performance Goals discussed above, the Compensation Committee or the Board of Directors, as applicable, awarded our Named Executive Officers 115% of their target bonuses for 2021 as reflected in the table below:

Named Executive Officer	Bonus
Sanjay S. Shukla, M.D., M.S.	\$293,377
Jill M. Broadfoot	\$173,282
Nancy E. Denyes	\$165,876

Equity-Based Incentive Awards

Equity incentives are a key component of our executive compensation program that the Compensation Committee believes motivate executive officers to achieve our business objectives by tying incentives to the appreciation of our common

stock over a longer time horizon. Equity compensation for our executive officers are generally reviewed and determined at the beginning of each year or as appropriate during the year for new hires, promotions or other special circumstances, such as to encourage retention or as a reward for significant achievement. Individual grants are determined based on a number of factors, including current corporate and individual performance, outstanding equity holdings and their retention value and total ownership, historical value of our stock, internal equity amongst executives and market data.

In February 2021, the Compensation Committee or the Board of Directors, as applicable, approved the following annual stock option grants for our Named Executive Officers. These stock options vest monthly over a four-year period and have an exercise price of \$4.52 per share, the closing price of our common stock on the grant date:

Named Executive Officer	Stock Option Grant (# shares)
Sanjay S. Shukla, M.D., M.S.	112,469 (1)
Jill M. Broadfoot	50,000
Nancy E. Denyes	45,000

- (1) The grant to our CEO was originally intended to be for 120,000 shares. However, that size of award was in excess of an annual grant limit in our equity plan and, as a result, the portion of the award that was in excess of the plan limit was disgorged. Other option disclosures within this Proxy Statement have been adjusted to reflect such disgorgement. The annual grant limit was imposed in order to exempt certain performance-based compensation from a \$1 million deduction limitation imposed by Code Section 162(m), but that exemption has since been eliminated. At our 2021 annual meeting of stockholders, our stockholders approved an amendment that, among other things, eliminated the per-person grant limits under the 2015 Stock Plan.

In addition, in May 2021, the Compensation Committee determined that our employees, including our Named Executive Officers, did not hold stock awards sufficient to retain and incentivize them in accordance with our executive compensation philosophy. This was due in part to unusually intense competition for talent across the biotechnology industry and also to capital-raising activities in the first half of 2020 that caused dilution to the existing equity awards of our Named Executive Officers. Consequently, each of our employees, including our Named Executive Officers, received a stock option grant approved by the Board of Directors to further incentivize our employees and provide long-term retention value. The May 2021 stock option grants for executives vest monthly over a four-year period and have an exercise price of \$4.45 per share, the closing price of our common stock on the grant date:

Named Executive Officer	Stock Option Grant (# shares)
Sanjay S. Shukla, M.D., M.S.	207,000
Jill M. Broadfoot	54,000
Nancy E. Denyes	59,000

Other Compensation

Our Named Executive Officers are eligible to participate in all of our employee benefit plans, including our medical, dental vision, group life and disability insurance plans, in each case on the same basis as other employees. We also pay the premiums for term life insurance and long-term disability for all of our employees, including our Named Executive Officers. None of our Named Executive Officers participate in or have account balances in qualified or non-qualified defined benefit plans sponsored by us. We generally do not provide perquisites or personal benefits to our Named Executive Officers, although we may from time to time provide signing bonuses or other reasonable benefits as our Compensation Committee determines appropriate.

We maintain our 401(k) Plan that provides eligible U.S. employees, including our Named Executive Officers, with an opportunity to save for retirement on a tax-advantaged basis. Eligible employees are able to defer eligible compensation subject to applicable annual Code limits. Employees' pre-tax contributions are allocated to each participant's individual account and are then invested in selected investment alternatives according to the participants' directions. Employees are immediately and fully vested in their contributions. Our 401(k) Plan is intended to be qualified under Section 401(a) of the Code with our 401(k) Plan's related trust intended to be tax exempt under Section 501(a) of the Code. As a tax-qualified retirement plan, contributions to our 401(k) Plan and earnings on those contributions are not taxable to the employees until distributed from our 401(k) Plan. We match employee contributions under the 401(k) Plan in an amount up to 3% of each applicable employee's compensation (equivalent to a 50% match with respect to up to 6% of such employee's compensation). We also pay, on behalf of our employees, a significant portion of premiums for health, life and disability insurance.

Employment Arrangements with Our Named Executive Officers

We consider it essential to the best interests of our stockholders to attract high quality executives and foster the continuous employment of our key management personnel. In this regard, we believe some severance arrangements are necessary. We also recognize that the possibility of a change in control may exist and that the uncertainty and questions that it may raise among management could result in the departure or distraction of management personnel to the detriment of our company and our stockholders. In order to reinforce and encourage the continued attention and dedication of certain key members of management, on December 21, 2015, the Compensation Committee approved the Executive Severance and Change in Control Policy (“Policy”). The purpose of the Policy is to provide certain of our senior management employees with compensation and benefits in the event of a termination of employment without Cause or for Good Reason.

Under the Policy, the terms below are generally defined as follows:

“Cause” generally means termination by the Company due to the employee’s (i) dishonest statements; (ii) commission of a felony or any misdemeanor involving moral turpitude, deceit, dishonesty or fraud; (iii) failure to substantially perform the duties, functions and responsibilities of his or her position; (iv) gross negligence, willful misconduct or insubordination; or (v) a material breach by the employee of any provision of any agreement with the Company relating to noncompetition, nonsolicitation, nondisclosure and/or assignment of inventions.

“Good Reason” generally means (i) a material reduction in the employee’s responsibilities, authority or duties; (ii) a material reduction in the employee’s base compensation; or (iii) relocation of our executive headquarters to a location more than 50 miles from San Diego, California.

“Sale Event” generally means (i) the sale or other transfer of all or substantially all of the assets of our company, (ii) a merger to which the Company is a party and the Company’s stockholders do not own more than 50% of the combined voting power of the surviving entity or its parent company; (iii) the sale of all of the Company’s stock to an unrelated person, entity or group, or (iv) any other transaction in which the Company’s stockholders do not own more than 50% of the combined voting power of any successor entity.

The post-termination compensation and benefits under the Policy include the (i) acceleration of time-based vesting provisions of outstanding equity awards that would have vested within 12 months of the termination, (ii) severance in the amount of 12 months of base salary, and (iii) if the employee timely elects continued coverage under a group health plan sponsored by us under the Consolidated Omnibus Budget Reconciliation Act of 1985 (“COBRA”), payment or reimbursement of the employer portion of group health care benefits under COBRA for up to 12 months after termination.

In addition, if the termination occurs within two months prior to or one year after the closing of a Sale Event, then, in lieu of the benefits described above, such eligible employee is entitled to (i) full acceleration of time-based vesting provisions of all outstanding equity awards, (ii) severance in the amount of 12 months of base salary, (iii) if the employee timely elects continued coverage under a group health plan sponsored by us under COBRA, payment or reimbursement of the employee’s bonus target for the calendar year in which the termination occurred, and (iv) payment of the employer portion of group health care benefits under COBRA for up to 12 months after termination.

In each case, receipt of any compensation or benefits under the Policy is subject to the eligible employee’s execution of a severance agreement and release.

To the extent Section 280G of the Code is applicable with respect to payments to an eligible employee, such eligible employee shall be entitled to receive either: (a) payment of the full amounts set forth above to which the eligible employee is entitled or (b) payment of such lesser amount that does not trigger excise taxes under Section 4999 of the Code, whichever results in the employee receiving a higher amount after taking into account all federal, state, and local income, excise and employment taxes.

Employees who are party to an agreement or an arrangement with us that provides greater benefits in the aggregate than set forth in the Policy are not eligible to receive any payments or benefits under the Policy.

In addition, we have also entered into a written employment agreement with our President and Chief Executive Officer that provides for payments in connection with his resignation, retirement or other termination, or a change in control, as described below.

Sanjay S. Shukla, M.D., M.S.

Under the terms of an employment agreement with Dr. Shukla entered into on November 1, 2017 in connection with his transition into the role of our President, Chief Executive Officer and principal executive officer (as amended in February 2021, the “CEO Employment Agreement”), Dr. Shukla is entitled to an initial annual base salary of \$450,000, subject to annual review and increase as determined by the Compensation Committee. For 2021, Dr. Shukla’s annual base salary was \$510,221. In addition, Dr. Shukla is eligible for an annual bonus target, in the amount of 50% of his then-current base salary for the calendar year, as determined by the Board of Directors.

Dr. Shukla’s employment is at-will. In the event that Dr. Shukla’s employment is terminated by Dr. Shukla for Good Reason or by us without Cause (as such terms are defined below), Dr. Shukla will be entitled to receive (i) the amount of his accrued but unpaid salary and unpaid expense reimbursements and any accrued but unused vacation as of the date of termination, (ii) any vested benefits Dr. Shukla may have under any employee benefit plan, which shall be paid in accordance with the terms of such employee benefit plans, as of the date of termination, (iii) any earned but unpaid incentive compensation from the prior calendar year, (iv) an amount equal to Dr. Shukla’s current annual base salary plus his annual target incentive compensation in the year of termination, (v) acceleration of the time-based vesting provisions of all stock options or other stock-based awards that would have vested within 12 months of the termination, and (vi) if he timely elects continued coverage under a group health plan sponsored by us under COBRA, payment or reimbursement of the employer portion of group health care benefits under COBRA for up to 12 months after termination, in the case of each of (iv), (v) and (vi), subject to the execution of a separation agreement and release.

In the event that Dr. Shukla’s employment is terminated by us without Cause or by Dr. Shukla for Good Reason within two months prior and 12 months after any Change in Control, as such terms are defined below, Dr. Shukla is entitled to (i) a cash payment equal to his then-current base salary plus his annual target incentive compensation in the year of termination, (ii) full acceleration of the time-based vesting provisions of all outstanding stock options or other stock-based awards, and (iii) if he timely elects continued coverage under a group health plan sponsored by us under COBRA, payment or reimbursement of the employer portion of group health care benefits under COBRA for up to 12 months after termination. On February 4, 2021, the Board of Directors approved an amendment to the CEO Employment Agreement to increase the cash payment payable to Dr. Shukla as described in (i) above to 1.5 times his then-current base salary plus his annual target incentive compensation in the year of termination.

Under the CEO Employment Agreement, the terms below are generally defined as follows:

“Cause” generally means termination by the Company due to Dr. Shukla’s (i) material act of willful misconduct in connection with the performance of his duties; (ii) conviction of, or the entry of a pleading of guilty or nolo contendere to, any crime involving fraud or embezzlement or any felony; (iii) willful and repeated failure to substantially perform the duties, functions and responsibilities of his positions; or (iv) a material breach by the employee of any of the material provisions contained in the CEO Employment Agreement; and

“Change in Control” generally means (i) any person or entity becomes the owner of more than 50% of the Company’s combined voting power; (ii) a majority of the members of the Board of Directors is replaced during any 12-month period by directors whose appointment or election is not endorsed by a majority of the members of the Board of Directors before the date of the appointment or election; or (iii) the consummation of (A) a merger to which the Company is a party and the Company’s stockholders do not own more than 50% of the combined voting power of the surviving entity or its parent company, or (B) any sale or other transfer of all or substantially all of the assets of our company.

“Good Reason” generally means (i) a material reduction in Dr. Shukla’s responsibilities, authority or duties; (ii) a material reduction in Dr. Shukla’s Base Salary; or (iii) relocation of our executive headquarters to a location more than 50 miles from San Diego, California.

Jill M. Broadfoot

Ms. Broadfoot entered into an at-will employment offer letter with us on July 16, 2018, which provided for an initial base salary of \$350,000, subject to adjustments as determined by us in our sole discretion. For 2021, Ms. Broadfoot’s annual base salary was \$376,723. Pursuant to the terms of her employment offer letter, Ms. Broadfoot is eligible for an annual bonus, currently in a target amount of up to 40% of her then-current base salary, as determined by our Compensation Committee based on corporate achievements of goals and achievement of Ms. Broadfoot’s individual goals.

Ms. Broadfoot is also eligible to receive certain post-termination compensation and benefits in accordance with the Policy described above.

Nancy E. Denyes

Ms. Denyes entered into an at-will employment offer letter with us on October 7, 2014, which provided for an initial base salary of \$240,000, subject to adjustments as determined by us in our sole discretion. For 2021, Ms. Denyes' annual base salary was \$360,577.

Ms. Denyes is also eligible to receive certain post-termination compensation and benefits in accordance with the Policy described above.

Change in Control and Severance Benefits

Under the terms of the employment arrangements with each of our Named Executive Officers described above, either we or the executive officer may terminate the executive officer's employment at any time. Each of our Named Executive Officers is eligible, under the terms of the CEO Employment Agreement with Dr. Shukla or the terms of the Policy for Ms. Broadfoot and Ms. Denyes, to receive, in exchange for a release of claims, severance benefits upon termination of employment either by us or by the executive officer for Good Reason (as defined in the CEO Employment Agreement or the Policy, as applicable), with additional severance benefits provided in the event the termination is in connection with a change in control. In addition, the terms of equity awards granted to our Named Executive Officers are subject to the terms of our equity compensation plans and award agreements thereunder, which include accelerated vesting provisions upon certain change in control transactions. We do not provide any excise tax gross-ups or change-in-control benefits.

Outstanding Equity Awards at Fiscal Year-End

The following table sets forth certain information with respect to outstanding equity awards held by each of our Named Executive Officers as of December 31, 2021:

Name	Option Awards							Stock Awards			
	Vesting Commencement Date	Number of Securities		Number of Securities Underlying Unexercised Options (#) Unexercisable	Equity Incentive Plan Awards: Number of Securities Underlying Unexercised Options (#) Unearned		Option Exercise Price (\$)	Option Expiration Date	Number of Shares of Stock that have Vested (#)	Number of Shares of Stock that have not Vested (#)	Market Value of Shares of Stock that have not Vested (\$)
		Underlying Options (#)	Unexercised Exercisable		Options (#)	Options (#)					
Sanjay S. Shukla, M.D., M.S.	3/30/2016	11,642	(1)	—	—	68.04	6/30/2026	—	—	—	
	9/13/2016	1,964	(2)	—	—	42.84	9/13/2026	—	—	—	
	2/7/2017	4,642	(2)	—	(2)	46.20	2/7/2027	—	—	—	
	11/1/2017	32,142	(2)	—	(2)	56.00	11/1/2027	—	—	—	
	2/6/2018	20,535	(2)	893	(2)	46.20	2/6/2028	—	—	—	
	2/6/2019	10,119	(2)	4,166	(2)	7.24	2/6/2029	—	—	—	
	2/6/2019	—		—		—	—	3,571	(3)	—	
	2/5/2020	18,025	(2)	21,302	(2)	4.51	2/5/2030	—	—	—	
	5/26/2020	14,476	(2)	22,095	(2)	4.06	5/26/2030	—	—	—	
	2/4/2021	23,431	(2)	89,038	(2)	4.52	2/4/2031	—	—	—	
	5/21/2021	30,188	(2)	176,812	(2)	4.45	5/21/2031	—	—	—	
Jill M. Broadfoot	7/30/2018	12,202	(1)	2,083	(1)	11.41	7/30/2028	—	—	—	
	2/6/2019	2,529	(2)	1,042	(2)	7.24	2/6/2029	—	—	—	
	2/6/2019	—		—		—	—	1,785	(3)	—	
	2/5/2020	10,706	(2)	12,653	(2)	4.51	2/5/2030	—	—	—	
	5/26/2020	5,938	(2)	9,062	(2)	4.06	2/5/2030	—	—	—	
	2/4/2021	10,417	(2)	39,583	(2)	4.52	2/4/2031	—	—	—	
	5/21/2021	7,875	(2)	46,125	(2)	4.45	5/21/2031	—	—	—	
Nancy E. Denyes	10/10/2014	2,542	(1)	—	—	248.36	10/10/2024	—	—	—	
	4/17/2015	448	(2)	—	—	128.10	4/17/2025	—	—	—	
	5/6/2015	628	(2)	—	—	196.00	5/6/2025	—	—	—	
	10/1/2015	1,214	(2)	—	—	143.36	10/1/2025	—	—	—	
	1/27/2016	1,428	(2)	—	—	85.96	1/27/2026	—	—	—	
	9/13/2016	2,607	(2)	—	—	42.84	9/13/2026	—	—	—	
	2/7/2017	2,500	(2)	—	—	46.20	2/7/2027	—	—	—	
	2/6/2018	3,422	(2)	149	(2)	46.20	2/6/2028	—	—	—	
	5/16/2018	3,571	(4)	—	—	11.90	5/16/2028	—	—	—	
	5/16/2018	—		—		—	—	1,785	(3)	—	
	2/6/2019	6,324	(2)	2,604	(2)	7.24	2/6/2029	—	—	—	
	2/5/2020	6,315	(2)	7,463	(2)	4.51	2/5/2030	—	—	—	
	5/26/2020	5,938	(2)	9,062	(2)	4.06	5/26/2030	—	—	—	
	2/4/2021	9,375	(2)	35,625	(2)	4.52	2/4/2031	—	—	—	
	5/21/2021	8,604	(2)	50,396	(2)	4.45	5/21/2031	—	—	—	

- (1) 1/4th of the shares subject to the option vest one year from Vesting Commencement Date and the remaining shares subject to the option vest in 36 equal monthly installments following the one-year anniversary of the Vesting Commencement Date. The option is subject to full acceleration in the event the employee is terminated by us without Cause or resigns for Good Reason within the period commencing two months prior to and ending 12 months following a Change in Control or Sale Event (as such capitalized terms are defined in the 2015 Stock Plan or the respective stock option agreements evidencing such stock option, as applicable).
- (2) 1/48th of the total shares subject to the option vest monthly from the Vesting Commencement Date set forth in the table above. The option is subject to full acceleration in the event the employee is terminated by us without Cause or resigns for Good Reason within the period commencing two months prior to and ending 12 months following a Change in Control or Sale Event (as such capitalized terms are defined in the 2015 Stock Plan or the respective stock option agreements evidencing such stock option, as applicable).
- (3) Vested in two equal annual installments from Vesting Commencement Date set forth in the table above.
- (4) 1/36th of the total shares subject to the option vest monthly from the Vesting Commencement Date set forth in the table above. The option is subject to full acceleration in the event the employee is terminated by our company without Cause or resigns for Good Reason within the period

Equity Compensation Plans

2022 Inducement Plan

The Compensation Committee adopted the aTyr Pharma, Inc. 2022 Inducement Plan (“2022 Inducement Plan”) in March 2022, which became effective upon adoption. The 2022 Inducement Plan was adopted without stockholder approval, as permitted by the Nasdaq listing rules. The 2022 Inducement Plan provides for the grant of equity-based awards, including nonstatutory stock options, stock appreciation rights, restricted stock awards, restricted stock unit awards, performance-based stock awards, performance-based cash awards and other forms of equity compensation, and its terms are substantially similar to the stockholder-approved 2015 Stock Plan. In accordance with relevant Nasdaq listing rules, awards under the 2022 Inducement Plan may only be made to individuals who were not previously employees or non-employee directors of ours (or following such individuals’ bona fide period of non-employment with us), as an inducement material to the individual’s entry into employment with us. In addition, awards must be approved by either a majority of the Company’s “independent directors” (as such term is defined in Nasdaq Listing Rule 5605(a)(2)) or the Compensation Committee, provided such committee is comprised solely of independent directors.

The maximum number of shares of our common stock that may be issued under our 2022 Inducement Plan is 300,000 shares. Shares subject to stock awards granted under our 2022 Inducement Plan that expire or terminate without being exercised in full, or that are paid out in cash rather than in shares, do not reduce the number of shares available for issuance under our 2022 Inducement Plan. Additionally, shares become available for future grant under our 2022 Inducement Plan if they were issued under stock awards granted under our 2022 Inducement Plan and we repurchase or reacquire them or they are forfeited.

2015 Stock Plan

A description of this plan is included in “Proposal 4—Approval of Amendment to the 2015 Stock Plan.”

2014 Stock Plan

Our 2014 Stock Plan was originally adopted by our Board of Directors and our stockholders in 2007, and was subsequently amended and restated in 2014. Our Board of Directors has determined not to grant any further awards under our 2014 Stock Plan. The shares of common stock underlying any awards that are forfeited, canceled, reacquired by us prior to vesting, satisfied without the issuance of stock or otherwise terminated (other than by exercise) under the 2014 Stock Plan will be added to the shares of common stock available for issuance under the 2015 Stock Plan.

2015 ESPP

A description of this plan is included in “Proposal 5—Approval of Amendment to the 2015 ESPP.”

CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS

Other than the compensation agreements and other arrangements described under “Executive Compensation” and the transactions described below, since January 1, 2020, there has not been and there is not currently proposed, any transaction or series of similar transactions to which we were, or will be, a party in which the amount involved exceeded, or will exceed the lesser of \$120,000 or 1% of the average of our total assets at year end for the last two completed fiscal years and in which any director, executive officer, holder of five percent or more of any class of our capital stock or any member of the immediate family of, or entities affiliated with, any of the foregoing persons, had, or will have, a direct or indirect material interest.

Executive Officer and Director Compensation

Employment Agreements

We have entered into offer letters or employment agreements with each of our Named Executive Officers. For more information regarding these arrangements, see “Executive Compensation—Employment Arrangements with Our Named Executive Officers.”

Stock Option Awards

For information regarding stock option awards and other equity incentive awards granted to our Named Executive Officers and directors, see “Election of Directors—Director Compensation” and “Executive Compensation.”

Participation in Offerings

In February 2020, we completed an underwritten public offering of 4,235,294 shares of our common stock at a price to the public of \$4.25 per share. In March 2020, the underwriters fully exercised their over-allotment option resulting in the issuance of an additional 635,294 shares of common stock. The total gross proceeds of the public offering, including the overallotment, was approximately \$20.7 million, before deducting underwriting discounts, commissions and offering expenses payable by us. Dr. Paul Schimmel (then and now a member of our Board of Director), funds affiliated with Federated Hermes Inc. and FMR LLC (each then and now beneficial owners of more than 5% of common stock), participated in this underwritten public offering.

In September 2020, we entered into a common stock purchase agreement with Aspire Capital which provides that, upon the terms and subject to the conditions and limitations set forth therein, Aspire Capital is committed to purchase up to an aggregate of \$20.0 million of shares of our common stock at our request from time to time during the 30-month term of such agreement. To date, we have issued \$15.3 million of shares of our common stock to Aspire Capital pursuant to this agreement. As a result of such issuances, Aspire Capital obtained more than 5% of our common stock.

In September 2021, we completed an underwritten follow-on public offering of 10,781,250 shares of our common stock, including the full exercise of the underwriters’ option to purchase additional shares, at a price to the public of \$8.00 per share. The total net proceeds from the offering were approximately \$80.6 million, after deducting underwriting discounts, commissions and offering expenses payable by us. Dr. Paul Schimmel (then and now a member of our Board of Director), funds affiliated with Federated Hermes Inc. and FMR LLC (each then and now beneficial owners of more than 5% of common stock), participated in this underwritten public offering.

Indemnification Agreements

We have entered into agreements to indemnify our directors and executive officers. These agreements will, among other things, require us to indemnify these individuals for certain expenses (including attorneys’ fees), judgments, fines and settlement amounts reasonably incurred by such person in any action or proceeding, including any action by or in our right, on account of any services undertaken by such person on behalf of our company or that person’s status as a member of our Board of Directors to the maximum extent allowed under Delaware law.

Procedures for Approval of Related Person Transactions

The Audit Committee conducts an appropriate review of all related person transactions for potential conflict of interest situations on an ongoing basis, and the approval of the Audit Committee is required for all such transactions. The Audit Committee follows the policies and procedures set forth in our written Related Person Transaction Policy in order to facilitate such review.

SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

The following table sets forth the beneficial ownership of the Company’s common stock as of March 7, 2022 by: (i) each of the executive officers named in the table under the heading “Summary Compensation Table,” (ii) each current director, (iii) all current directors and executive officers as a group, and (iv) all persons known to the Company to be the beneficial owners of more than 5% of the Company’s common stock. The table is based upon information supplied by our executive officers, directors and principal stockholders and a review of filings by the beneficial owners with the SEC pursuant to Sections 13(d) and 13(g) of the Exchange Act. A total of 27,795,794 shares of the Company’s common stock were issued and outstanding as of March 7, 2022.

Beneficial Owner(1)	Number of Shares of Common Stock Owned(2)	Number of Shares of Common Stock Acquirable Within 60 Days (3)	Total Number of Shares of Common Stock Beneficially Owned(4)	Percentage of Shares Beneficially Owned
5% Stockholders:				
Federated Hermes Inc. (5) 1001 Liberty Avenue Pittsburgh, PA 15222	5,222,250	—	5,222,250	18.79%
FMR LLC (6) 245 Summer Street, Boston, Massachusetts 02210	4,168,601	—	4,168,601	15.00%
Venrock (7) 7 Bryant Park, 23 rd Floor New York, NY 10018	1,565,000	—	1,565,000	5.63%
Sanjay S. Shukla, M.D., M.S. (8)	25,798	205,655	231,453	*
Jill M. Broadfoot (9)	12,112	64,620	76,732	*
Nancy E. Denyes (10)	3,269	68,285	71,554	*
John K. Clarke (11)	13,797	10,261	24,058	*
Timothy P. Coughlin (12)	—	9,425	9,425	*
Jane A. Gross, Ph.D. (13)	—	5,014	5,014	*
Svetlana Lucas, Ph.D. (14)	—	5,014	5,014	*
Paul Schimmel, Ph.D. (15)	795,056	10,763	805,819	2.9%
Sara A. Zaknoen, M.D. (16)	—	698	698	*
All directors and executive officers as a group (9 persons) (17)	850,032	379,735	1,229,767	4.36%

* Represents beneficial ownership of less than 1% of the shares of common stock.

(1) Unless otherwise indicated, the address for each beneficial owner is c/o aTyr Pharma, Inc., 3545 John Hopkins Court, Suite #250, San Diego, CA 92121.

(2) Represents shares of common stock owned, excluding shares of common stock that are listed under the heading “Number of Shares of Common Stock Acquirable Within 60 Days,” by the named parties as of March 7, 2022.

(3) Shares of common stock subject to stock options, restricted stock units or warrants acquirable within 60 days of March 7, 2022, regardless of exercise price, are deemed to be outstanding for computing the percentage ownership of the person holding such options and the percentage ownership of any group of which the holder is a member, but are not deemed outstanding for computing the percentage of any other person.

(4) Beneficial ownership is determined in accordance with the rules of the SEC and generally includes voting or investment power with respect to securities. Except as indicated by footnote, and subject to community property laws where applicable, the Company believes that the persons named in the table have sole voting and investment power with respect to all shares of common stock shown as beneficially owned by them, subject to applicable community property laws.

(5) Based on Schedule 13G/A filed with the SEC on February 24, 2022. Shares of common stock owned can vary since the date of such filing. Federated Hermes, Inc. (the “Parent”) is the parent holding company of Federated Equity Management Company of Pennsylvania and Federated Global Investment Management Corp. (the “Investment Advisers”), which act as investment advisers to registered investment companies and separate accounts that own shares of common stock in us (the “Reported Securities”). The Investment Advisers are wholly owned subsidiaries of FII Holdings, Inc., which is a wholly owned subsidiary of Federated Investors, Inc., the Parent. All of the Parent’s outstanding voting stock is held in the Voting Shares Irrevocable Trust (the “Trust”) for which Thomas R. Donahue, Rhodora J. Donahue and

- J. Christopher Donahue act as trustees (collectively, the “Trustees”). The Parent, the Trust, and each of the Trustees expressly disclaim beneficial ownership of the Reported Securities in which they do not have an actual pecuniary interest.
- (6) Based on Schedule 13G/A filed with the SEC on February 9, 2022. Shares of common stock owned can vary since the date of such filing. FMR LLC had sole voting power with respect to 1,401,237 shares of common stock and had sole power to dispose or to direct the disposition of 4,168,601 shares of common stock. Abigail P. Johnson is a Director, the Chairman and the Chief Executive Officer of FMR LLC. Members of the Johnson family including Abigail P. Johnson, are the predominant owners, directly or through trusts, of Series B voting common shares of FMR LLC, representing 49% of the voting power of FMR LLC. The Johnson family group and all other Series B shareholders have entered into a shareholders’ voting agreement under which all Series B voting common shares will be voted in accordance with the majority vote of Series B voting common shares. Accordingly, through their ownership of voting common shares and the execution of the shareholders’ voting agreement, members of the Johnson family may be deemed, under the Investment Company Act of 1940, to form a controlling group with respect to FMR LLC. Neither FMR LLC nor Abigail P. Johnson have the sole power to vote or direct the voting of the shares owned directly by the various investment companies registered under the Investment Company Act (“Fidelity Funds”) advised by Fidelity Management & Research Company (“FMR Co”), a wholly owned subsidiary of FMR LLC, which power resides with the Fidelity Funds’ Boards of Trustees. Fidelity Management & Research Company carries out the voting of the shares under written guidelines established by the Fidelity Funds’ Boards of Trustees.
- (7) Based on Schedule 13G filed with the SEC on February 14, 2022. Shares of common stock owned can vary since the date of such filing. Consists of (i) 257,664 shares held by Venrock Healthcare Capital Partners II, L.P., (ii) 104,470 shares held by VHCP Co-Investment Holdings II, LLC, (iii) 527,720 shares held by Venrock Healthcare Capital Partners III, L.P., (iv) 52,802 shares held by VHCP Co-Investment Holdings III, LLC and (v) 622,344 shares held by Venrock Healthcare Capital Partners EG, L.P. VHCP Management II, LLC is the general partner of Venrock Healthcare Capital Partners II, L.P. and the manager of VHCP Co-Investment Holdings II, LLC. VHCP Management III, LLC is the general partner of Venrock Healthcare Capital Partners III, L.P. and the manager of VHCP Co-Investment Holdings III, LLC. VHCP Management EG, LLC is the general partner of Venrock healthcare Capital Partners EG, L.P. Nimish Shah and Bong Koh are the voting members of VHCP Management II, LLC, VHCP Management III, LLC and VHCP Management EG, LLC.
- (8) Includes (i) 25,798 shares of common stock held by Dr. Shukla; and (ii) 205,655 shares of common stock that Dr. Shukla has the right to acquire from us within 60 days of March 7, 2022 pursuant to the exercise of stock options.
- (9) Includes (i) 12,112 shares of common stock held by Ms. Broadfoot; and (ii) 64,620 shares of common stock that Ms. Broadfoot has the right to acquire from us within 60 days of March 7, 2022 pursuant to the exercise of stock options.
- (10) Includes (i) 3,269 shares of common stock held by Ms. Denyes; and (ii) 68,285 shares of common stock that Ms. Denyes has the right to acquire from us within 60 days of March 7, 2022 pursuant to the exercise of stock options.
- (11) Includes (i) 13,797 shares of common stock held by our director, Mr. Clarke; and (ii) 10,261 shares of common stock that Mr. Clarke has the right to acquire from us within 60 days of March 7, 2022 pursuant to the exercise of stock options.
- (12) Represents 9,425 shares of common stock that Mr. Coughlin has the right to acquire from us within 60 days of March 7, 2022 pursuant to the exercise of stock options.
- (13) Represents 5,014 shares of common stock that Dr. Gross has the right to acquire from us within 60 days of March 7, 2022 pursuant to the exercise of stock options.
- (14) Represents 5,014 shares of common stock that Dr. Lucas has the right to acquire from us within 60 days of March 7, 2022 pursuant to the exercise of stock options.
- (15) Includes (i) 2,890 shares of common stock held by our director, Dr. Schimmel; (ii) 113,023 shares of common stock held by the Paul Schimmel Prototype PSP, Paul Schimmel, Trustee, FBO Paul Schimmel (“Prototype PSP”); (iii) 679,143 shares of common stock held by the Schimmel Revocable Trust U/A Dtd 9/6/2000; and (iv) 10,763 shares of common stock that Dr. Schimmel has the right to acquire from us within 60 days of March 7, 2022 pursuant to the exercise of stock options.
- (16) Represents 698 shares of common stock that Dr. Zaknoen has the right to acquire from us within 60 days of March 7, 2022 pursuant to the exercise of stock options.
- (17) Includes the number of shares beneficially owned by the Named Executive Officers and directors listed in the above table.

DELINQUENT SECTION 16(a) REPORTS

Section 16(a) of the Exchange Act requires our officers and directors, and persons who own more than 10% of a registered class of our equity securities, to file reports of ownership and changes in ownership (Forms 3, 4 and 5) with the SEC. Officers, directors and greater than 10% stockholders are required to furnish us with copies of all such forms which they file.

To our knowledge, based solely on our review of such reports or written representations from certain reporting persons, we believe that all of the filing requirements applicable to our officers, directors, greater than 10% beneficial owners and other persons subject to Section 16 of the Exchange Act were complied with during the year ended December 31, 2021.

The following Audit Committee Report is not considered proxy solicitation material and is not deemed filed with the SEC. Notwithstanding anything to the contrary set forth in any of the Company's filings made under the Securities Act of 1933, as amended, or the Exchange Act that might incorporate filings made by the Company under those statutes, the Audit Committee Report shall not be incorporated by reference into any prior filings or into any future filings made by the Company under those statutes.

AUDIT COMMITTEE REPORT

The Audit Committee of the Board of Directors (the "Audit Committee") has furnished this report concerning the independent audit of the Company's financial statements. Each member of the Audit Committee meets the enhanced independence standards established by the Sarbanes-Oxley Act of 2002 and rulemaking of the Securities and Exchange Commission (the "SEC") and the Nasdaq Stock Market regulations. A copy of the Audit Committee Charter is available on the Company's website at <http://www.atyrpharma.com>.

The Audit Committee's responsibilities include assisting the Board of Directors regarding the oversight of the integrity of the Company's financial statements, the Company's compliance with legal and regulatory requirements, the independent registered public accounting firm's qualifications and independence, and the performance of the Company's internal audit function and the independent registered public accounting firm.

In fulfilling its oversight responsibilities, the Audit Committee reviewed and discussed the Company's audited financial statements for the fiscal year ended December 31, 2021 with the Company's management and Ernst & Young LLP. In addition, the Audit Committee has discussed with Ernst & Young LLP, with and without management present, their evaluation of the Company's internal accounting controls and overall quality of the Company's financial reporting. The Audit Committee also discussed with Ernst & Young LLP the matters required to be discussed by Statement on Auditing Standards No. 114 (formerly SAS 61), as amended (AICPA, Professional Standards, Vol. 1 AU section 380), as adopted by the Public Company Accounting Oversight Board in Rule 3200T. The Audit Committee also received the written disclosures and the letter from Ernst & Young LLP required by the Public Company Accounting Oversight Board Rule 3526 and the Audit Committee discussed the independence of Ernst & Young LLP with that firm.

Based on the Audit Committee's review and discussions noted above, the Audit Committee recommended to the Board of Directors, and the Board of Directors approved, that the audited financial statements be included in the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2021.

The Audit Committee and the Board of Directors have recommended the selection of Ernst & Young LLP as the Company's independent registered public accounting firm for the year ending December 31, 2022.

AUDIT COMMITTEE

TIMOTHY P. COUGHLIN, CHAIRMAN
JOHN K. CLARKE
SVETLANA LUCAS

HOUSEHOLDING OF PROXY MATERIALS

We have made available a procedure approved by the SEC known as “householding.” This procedure allows multiple stockholders residing at the same address the convenience of receiving a single copy of our proxy materials. This allows us to save money by reducing the number of documents we must print and mail, and helps protect the environment as well.

Householding is available to both registered stockholders (i.e., those stockholders with certificates registered in their name) and streetname holders (i.e., those stockholders who hold their shares through a brokerage).

Registered Stockholders

If you are a registered stockholder and would like to consent to a mailing of proxy materials and other stockholder information only to one account in your household, as identified by you, we will deliver or mail a single copy of our proxy materials for all registered stockholders residing at the same address. Your consent will be perpetual unless you revoke it, which you may do at any time by contacting the Householding Department of American Stock Transfer & Trust Company, LLC (“AST”), at 6201 15th Avenue, Brooklyn, New York 11219 or by calling AST’s toll-free number which is (800) 934-5449.

Registered stockholders who have not consented to householding will continue to receive copies of proxy materials for each registered stockholder residing at the same address. As a registered stockholder, you may elect to participate in householding and receive only a single copy of proxy materials for all registered stockholders residing at the same address by contacting AST as outlined above.

Street Name Holders

Stockholders who hold their shares through a brokerage may elect to participate in householding or revoke their consent to participate in householding by contacting their respective brokers.

OTHER MATTERS

We are not aware of any matters that may come before the meeting other than those referred to in the Notice of Annual Meeting of Stockholders and Proxy Statement. If any other matter shall properly come before the Annual Meeting, however, the persons named in the accompanying proxy intend to vote all proxies in accordance with their best judgment.

Accompanying this Proxy Statement is our Annual Report on Form 10-K. Copies of our Annual Report on Form 10-K are available free of charge on our website at www.atyrpharma.com or you can request a copy free of charge by calling Investor Relations at (858) 223-1163 or sending an e-mail request to investorrelations@atyrpharma.com. Please include your contact information with the request.

By Order of the Board of Directors,



Sanjay S. Shukla, M.D., M.S.
President, Chief Executive Officer and Director

March 23, 2022

ANNEX A

ATYR PHARMA, INC.

2015 STOCK OPTION AND INCENTIVE PLAN

(as amended)

SECTION 1. GENERAL PURPOSE OF THE PLAN; DEFINITIONS

The name of the plan is the aTyr Pharma, Inc. 2015 Stock Option and Incentive Plan (the “Plan”). The purpose of the Plan is to encourage and enable the officers, employees, Non-Employee Directors and Consultants of aTyr Pharma, Inc., a Delaware corporation (the “Company”), and its Subsidiaries upon whose judgment, initiative and efforts the Company largely depends for the successful conduct of its business to acquire a proprietary interest in the Company. It is anticipated that providing such persons with a direct stake in the Company’s welfare will assure a closer identification of their interests with those of the Company and its stockholders, thereby stimulating their efforts on the Company’s behalf and strengthening their desire to remain with the Company.

The following terms shall be defined as set forth below:

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

“Administrator” means either the Board or the compensation committee of the Board or a similar committee performing the functions of the compensation committee and which is comprised of not less than two Non-Employee Directors who are independent.

“Award” or “Awards,” except where referring to a particular category of grant under the Plan, shall include Incentive Stock Options, Non-Qualified Stock Options, Stock Appreciation Rights, Restricted Stock Units, Restricted Stock Awards, Unrestricted Stock Awards, Cash-Based Awards, Performance Share Awards and Dividend Equivalent Rights.

“Award Certificate” means a written or electronic document setting forth the terms and provisions applicable to an Award granted under the Plan. Each Award Certificate is subject to the terms and conditions of the Plan.

“Board” means the Board of Directors of the Company.

“Cash-Based Award” means an Award entitling the recipient to receive a cash-denominated payment.

“Code” means the Internal Revenue Code of 1986, as amended, and any successor Code, and related rules, regulations and interpretations.

“Consultant” means any natural person that provides bona fide services to the Company, and such services are not in connection with the offer or sale of securities in a capital-raising transaction and do not directly or indirectly promote or maintain a market for the Company’s securities.

“Covered Employee” means an employee who is a “Covered Employee” within the meaning of Section 162(m) of the Code.

“Dividend Equivalent Right” means an Award entitling the grantee to receive credits based on cash dividends that would have been paid on the shares of Stock specified in the Dividend Equivalent Right (or other award to which it relates) if such shares had been issued to and held by the grantee.

“Effective Date” means the date set forth in Section 21.

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

“*Fair Market Value*” of the Stock on any given date means the fair market value of the Stock determined in good faith by the Administrator; provided, however, that if the Stock is admitted to quotation on the National Association of Securities Dealers Automated Quotation System (“NASDAQ”), NASDAQ Global Market or another national securities exchange, the determination shall be made by reference to market quotations. If there are no market quotations for such date, the determination shall be made by reference to the last date preceding such date for which there are market quotations; provided further, however, that if the date for which Fair Market Value is determined is the first day when trading prices for the Stock are reported on a national securities exchange, the Fair Market Value shall be the “Price to the Public” (or equivalent) set forth on the cover page for the final prospectus relating to the Company’s Initial Public Offering.

“*Incentive Stock Option*” means any Stock Option designated and qualified as an “incentive stock option” as defined in Section 422 of the Code.

“*Initial Public Offering*” means the consummation of the first underwritten, firm commitment public offering pursuant to an effective registration statement under the Act covering the offer and sale by the Company of its equity securities, or such other event as a result of or following which the Stock shall be publicly held.

“*Non-Employee Director*” means a member of the Board who is not also an employee of the Company or any Subsidiary.

“*Non-Qualified Stock Option*” means any Stock Option that is not an Incentive Stock Option.

“*Option*” or “*Stock Option*” means any option to purchase shares of Stock granted pursuant to Section 5.

“*Performance-Based Award*” means any Restricted Stock Award, Restricted Stock Units, Performance Share Award or Cash-Based Award granted to a Covered Employee that is intended to qualify as “performance-based compensation” under Section 162(m) of the Code and the regulations promulgated thereunder.

“*Performance Criteria*” means the criteria that the Administrator selects for purposes of establishing the Performance Goal or Performance Goals for an individual for a Performance Cycle. The Performance Criteria (which shall be applicable to the organizational level specified by the Administrator, including, but not limited to, the Company or a unit, division, group, or Subsidiary of the Company) that will be used to establish Performance Goals are limited to the following: achievement of specified research and development, publication, clinical and/or regulatory milestones, total shareholder return, earnings before interest, taxes, depreciation and amortization, net income (loss) (either before or after interest, taxes, depreciation and/or amortization), changes in the market price of the Stock, economic value-added, funds from operations or similar measure, sales or revenue, acquisitions or strategic transactions, operating income (loss), cash flow (including, but not limited to, operating cash flow and free cash flow), return on capital, assets, equity, or investment, return on sales, gross or net profit levels, productivity, expense, margins, operating efficiency, customer satisfaction, working capital, earnings (loss) per share of Stock, sales or market shares and number of customers, any of which may be measured either in absolute terms or as compared to any incremental increase or as compared to results of a peer group. The Committee may appropriately adjust any evaluation performance under a Performance Criterion to exclude any of the following events that occurs during a Performance Cycle: (i) asset write-downs or impairments, (ii) litigation or claim judgments or settlements, (iii) the effect of changes in tax law, accounting principles or other such laws or provisions affecting reporting results, (iv) accruals for reorganizations and restructuring programs, (v) any extraordinary non-recurring items, including those described in the Financial Accounting Standards Board’s authoritative guidance and/or in management’s discussion and analysis of financial condition of operations appearing the Company’s annual report to stockholders for the applicable year, and (vi) any other extraordinary items adjusted from the Company U.S. GAAP results.

“*Performance Cycle*” means one or more periods of time, which may be of varying and overlapping durations, as the Administrator may select, over which the attainment of one or more Performance Criteria will be measured for the purpose of determining a grantee’s right to and the payment of a Restricted Stock Award, Restricted Stock Units, Performance Share Award or Cash-Based Award, the vesting and/or payment of which is subject to the attainment of one or more Performance Goals. Each such period shall not be less than 12 months.

“*Performance Goals*” means, for a Performance Cycle, the specific goals established in writing by the Administrator for a Performance Cycle based upon the Performance Criteria.

“*Performance Share Award*” means an Award entitling the recipient to acquire shares of Stock upon the attainment of specified performance goals.

“*Restricted Shares*” means the shares of Stock underlying a Restricted Stock Award that remain subject to a risk of forfeiture or the Company’s right of repurchase.

“*Restricted Stock Award*” means an Award of Restricted Shares subject to such restrictions and conditions as the Administrator may determine at the time of grant.

“*Restricted Stock Units*” means an Award of stock units subject to such restrictions and conditions as the Administrator may determine at the time of grant.

“*Sale Event*” shall mean (i) the sale of all or substantially all of the assets of the Company on a consolidated basis to an unrelated person or entity, (ii) a merger, reorganization or consolidation pursuant to which the holders of the Company’s outstanding voting power and outstanding stock immediately prior to such transaction do not own a majority of the outstanding voting power and outstanding stock or other equity interests of the resulting or successor entity (or its ultimate parent, if applicable) immediately upon completion of such transaction, (iii) the sale of all of the Stock of the Company to an unrelated person, entity or group thereof acting in concert, or (iv) any other transaction in which the owners of the Company’s outstanding voting power immediately prior to such transaction do not own at least a majority of the outstanding voting power of the Company or any successor entity immediately upon completion of the transaction other than as a result of the acquisition of securities directly from the Company.

“*Sale Price*” means the value as determined by the Administrator of the consideration payable, or otherwise to be received by stockholders, per share of Stock pursuant to a Sale Event.

“*Section 409A*” means Section 409A of the Code and the regulations and other guidance promulgated thereunder.

“*Stock*” means the Common Stock, par value \$0.001 per share, of the Company, subject to adjustments pursuant to Section 3.

“*Stock Appreciation Right*” means an Award entitling the recipient to receive shares of Stock having a value equal to the excess of the Fair Market Value of the Stock on the date of exercise over the exercise price of the Stock Appreciation Right multiplied by the number of shares of Stock with respect to which the Stock Appreciation Right shall have been exercised.

“*Subsidiary*” means any corporation or other entity (other than the Company) in which the Company has at least a 50 percent interest, either directly or indirectly.

“*Ten Percent Owner*” means an employee who owns or is deemed to own (by reason of the attribution rules of Section 424(d) of the Code) more than 10 percent of the combined voting power of all classes of stock of the Company or any parent or subsidiary corporation.

“*Unrestricted Stock Award*” means an Award of shares of Stock free of any restrictions.

SECTION 2. ADMINISTRATION OF PLAN; ADMINISTRATOR AUTHORITY TO SELECT GRANTEES AND DETERMINE AWARDS

(a) Administration of Plan. The Plan shall be administered by the Administrator.

(b) Powers of Administrator. The Administrator shall have the power and authority to grant Awards consistent with the terms of the Plan, including the power and authority:

- (i) to select the individuals to whom Awards may from time to time be granted;

(ii) to determine the time or times of grant, and the extent, if any, of Incentive Stock Options, Non-Qualified Stock Options, Stock Appreciation Rights, Restricted Stock Awards, Restricted Stock Units, Unrestricted Stock Awards, Cash-Based Awards, Performance Share Awards and Dividend Equivalent Rights, or any combination of the foregoing, granted to any one or more grantees;

(iii) to determine the number of shares of Stock to be covered by any Award;

(iv) to determine and modify from time to time the terms and conditions, including restrictions, not inconsistent with the terms of the Plan, of any Award, which terms and conditions may differ among individual Awards and grantees, and to approve the forms of Award Certificates;

(v) to accelerate at any time the exercisability or vesting of all or any portion of any Award in circumstances involving the grantee's death, disability, retirement or termination of employment, or a change in control of the Company (including a Sale Event);

(vi) subject to the provisions of Section 5(c), to extend at any time the period in which Stock Options may be exercised; and

(vii) at any time to adopt, alter and repeal such rules, guidelines and practices for administration of the Plan and for its own acts and proceedings as it shall deem advisable; to interpret the terms and provisions of the Plan and any Award (including related written instruments); to make all determinations it deems advisable for the administration of the Plan; to decide all disputes arising in connection with the Plan; and to otherwise supervise the administration of the Plan.

All decisions and interpretations of the Administrator shall be binding on all persons, including the Company and Plan grantees.

(c) Delegation of Authority to Grant Awards. Subject to applicable law, the Administrator, in its discretion, may delegate to the Chief Executive Officer of the Company all or part of the Administrator's authority and duties with respect to the granting of Awards to individuals who are (i) not subject to the reporting and other provisions of Section 16 of the Exchange Act and (ii) not Covered Employees. Any such delegation by the Administrator shall include a limitation as to the amount of Stock underlying Awards that may be granted during the period of the delegation and shall contain guidelines as to the determination of the exercise price and the vesting criteria. The Administrator may revoke or amend the terms of a delegation at any time but such action shall not invalidate any prior actions of the Administrator's delegate or delegates that were consistent with the terms of the Plan.

(d) Award Certificate. Awards under the Plan shall be evidenced by Award Certificates that set forth the terms, conditions and limitations for each Award which may include, without limitation, the term of an Award and the provisions applicable in the event employment or service terminates.

(e) Indemnification. Neither the Board nor the Administrator, nor any member of either or any delegate thereof, shall be liable for any act, omission, interpretation, construction or determination made in good faith in connection with the Plan, and the members of the Board and the Administrator (and any delegate thereof) shall be entitled in all cases to indemnification and reimbursement by the Company in respect of any claim, loss, damage or expense (including, without limitation, reasonable attorneys' fees) arising or resulting therefrom to the fullest extent permitted by law and/or under the Company's certificate of incorporation or bylaws or any directors' and officers' liability insurance coverage which may be in effect from time to time and/or any indemnification agreement between such individual and the Company.

(f) Foreign Award Recipients. Notwithstanding any provision of the Plan to the contrary, in order to comply with the laws in other countries in which the Company and its Subsidiaries operate or have employees or other individuals eligible for Awards, the Administrator, in its sole discretion, shall have the power and authority to: (i) determine which Subsidiaries shall be covered by the Plan; (ii) determine which individuals outside the United States are eligible to participate in the Plan; (iii) modify the terms and conditions of any Award granted to individuals outside the United States to comply with applicable foreign laws; (iv) establish subplans and modify exercise procedures and other terms and procedures, to the extent the Administrator determines such actions to be necessary or advisable (and such subplans and/or modifications shall be attached to this Plan as appendices); provided, however, that no such subplans and/or modifications shall increase the share limitations contained in Section 3(a) hereof; and (v) take any action, before or after an Award is made, that the Administrator determines to be necessary or advisable to obtain approval or comply with any local governmental regulatory exemptions or approvals. Notwithstanding the foregoing, the Administrator may not take any actions hereunder, and no Awards shall be granted, that would violate the Exchange Act or any other applicable United States securities law, the Code, or any other applicable United States governing statute or law.

SECTION 3. STOCK ISSUABLE UNDER THE PLAN; MERGERS; SUBSTITUTION

(a) Stock Issuable. The maximum number of shares of Stock reserved and available for issuance under the Plan shall be 1,706,439¹ shares, subject to adjustment as provided in Section 3(c) and herein. Subject to such overall limitation, the maximum aggregate number of shares of Stock that may be issued in the form of Incentive Stock Options shall not exceed 488,087, subject in all cases to adjustment as provided in Section 3(c). The shares of Stock underlying any Awards under the Plan and under the Company's 2014 Stock Plan, as amended, that are forfeited, canceled, reacquired by the Company prior to vesting, satisfied without the issuance of Stock or otherwise terminated (other than by exercise) shall be added back to the shares of Stock available for issuance under the Plan. In the event the Company repurchases shares of Stock on the open market, such shares shall not be added to the shares of Stock available for issuance under the Plan. Subject to such overall limitations, shares of Stock may be issued up to such maximum number pursuant to any type or types of Award. The shares available for issuance under the Plan may be authorized but unissued shares of Stock or shares of Stock reacquired by the Company.

(b) [Reserved].

(c) Changes in Stock. Subject to Section 3(d) hereof, if, as a result of any reorganization, recapitalization, reclassification, stock dividend, stock split, reverse stock split or other similar change in the Company's capital stock, the outstanding shares of Stock are increased or decreased or are exchanged for a different number or kind of shares or other securities of the Company, or additional shares or new or different shares or other securities of the Company or other non-cash assets are distributed with respect to such shares of Stock or other securities, or, if, as a result of any merger or consolidation, sale of all or substantially all of the assets of the Company, the outstanding shares of Stock are converted into or exchanged for securities of the Company or any successor entity (or a parent or subsidiary thereof), the Administrator shall make an appropriate or proportionate adjustment in (i) the maximum number of shares reserved for issuance under the Plan, including the maximum number of shares that may be issued in the form of Incentive Stock Options, (ii) the number of Stock Options or Stock Appreciation Rights that can be granted to any one individual grantee and the maximum number of shares that may be granted under a Performance-Based Award, (iii) the number and kind of shares or other securities subject to any then outstanding Awards under the Plan, (iv) the repurchase price, if any, per share subject to each outstanding Restricted Stock Award, and (v) the exercise price for each share subject to any then outstanding Stock Options and Stock Appreciation Rights under the Plan, without changing the aggregate exercise price (i.e., the exercise price multiplied by the number of Stock Options and Stock Appreciation Rights) as to which such Stock Options and Stock Appreciation Rights remain exercisable. The Administrator shall also make equitable or proportionate adjustments in the number of shares subject to outstanding Awards and the exercise price and the terms of outstanding Awards to take into consideration cash dividends paid other than in the ordinary course or any other extraordinary corporate event. The adjustment by the Administrator shall be final, binding and conclusive. No fractional shares of Stock shall be issued under the Plan resulting from any such adjustment, but the Administrator in its discretion may make a cash payment in lieu of fractional shares.

¹ All numbers herein reflect the 1-for-14 reverse stock split (rounded down to the nearest whole share) of the Company's issued and outstanding common stock that was effectuated as of June 28, 2019. The original maximum number of shares of Stock reserved and available for issuance under the Plan was 112,469 shares, plus on January 1, 2016 until January 1, 2019, the number of shares of Stock reserved and available for issuance under the Plan was increased by the lesser of (i) 131,428 shares of Stock (subject to adjustment as provided in Section 3(c)), (ii) four percent (4%) of the number of shares of Stock issued and outstanding on the immediately preceding December 31 and (iii) an amount as determined by the Administrator. As such, immediately prior to the amendment in March 2019, there were 488,087 shares of Stock reserved and available for issuance under the Plan (which includes shares of Stock underlying the Company's 2014 Stock Plan, as amended, that were added back into this Plan because such shares were forfeited, canceled, reacquired by the Company prior to vesting, satisfied without the issuance of Stock or otherwise terminated (other than by exercise)). The Plan was amended by the Board of Directors in March 2019 to increase the maximum number of shares of Stock reserved and available for issuance under the Plan by 71,428 shares, resulting in 559,516 shares as of March 2019, subject to approval by the Company's stockholders. The Company's stockholders approved such amendment to the Plan at the Company's 2019 Annual Meeting of Stockholders held on May 8, 2019. The Plan was amended by the Board of Directors in March 2020 to increase the maximum number of shares of Stock reserved and available for issuance under the Plan by 350,000 shares, resulting in 951,945 shares as of March 2020, subject to approval by the Company's stockholders. The Company's stockholders approved such amendment to the Plan at the Company's 2020 Annual Meeting of Stockholders held on May 6, 2020. The Plan was amended by the Board of Directors in March 2021 to increase the maximum number of shares of Stock reserved and available for issuance under the Plan by 750,000 shares, resulting in 1,706,439 shares as of March 2021, subject to approval by the Company's stockholders. The Plan was amended by the Board of Directors in March 2022 to increase the maximum number of shares of Stock reserved and available for issuance under the Plan by 2,000,000 shares, resulting in 3,709,693 shares as of March 2022, subject to approval by the Company's stockholders.

(d) Mergers and Other Transactions. Except as the Administrator may otherwise specify with respect to particular Awards in the relevant Award Certificate, in the case of and subject to the consummation of a Sale Event, the parties thereto may cause the assumption or continuation of Awards theretofore granted by the successor entity, or the substitution of such Awards with new Awards of the successor entity or parent thereof, with appropriate adjustment as to the number and kind of shares and, if appropriate, the per share exercise prices, as such parties shall agree. To the extent the parties to such Sale Event do not provide for the assumption, continuation or substitution of Awards, the Plan and all outstanding Awards hereunder will terminate at the effective time of such Sale Event. Notwithstanding the foregoing, the Administrator may in its discretion, or to the extent specified in the relevant Award Certificate, cause certain Awards to become vested and/or exercisable immediately prior to such Sale Event. In the event of such termination, (i) the Company shall have the right, but not the obligation, to make or provide for a cash payment to the grantees holding Options and Stock Appreciation Rights, in exchange for the cancellation thereof, in an amount equal to the difference between (A) the Sale Price multiplied by the number of shares of Stock subject to outstanding Options and Stock Appreciation Rights (to the extent then exercisable after taking into account any acceleration thereunder at prices not in excess of the Sale Price) and (B) the aggregate exercise price of all such outstanding Options and Stock Appreciation Rights; or (ii) each grantee shall be permitted, within a specified period of time prior to the consummation of the Sale Event as determined by the Administrator, to exercise all outstanding Options and Stock Appreciation Rights (to the extent then exercisable) held by such grantee, including those that will become exercisable upon the consummation of the Sale Event (provided, that such exercise shall be subject to the consummation of the Sale Event). The Company shall also have the right, but not the obligation, to make or provide a cash payment to the grantees holding other Awards, in exchange for cancellation thereof, an amount equal to the Sale Price multiplied by the number of shares subject to such Awards, to be paid at the time of the Sale Event or upon the later vesting of such Awards.

SECTION 4. ELIGIBILITY

Grantees under the Plan will be such full or part-time officers and other employees, Non-Employee Directors and Consultants of the Company and its Subsidiaries as are selected from time to time by the Administrator in its sole discretion.

SECTION 5. STOCK OPTIONS

(a) Award of Stock Options. The Administrator may grant Stock Options under the Plan. Any Stock Option granted under the Plan shall be in such form as the Administrator may from time to time approve.

Stock Options granted under the Plan may be either Incentive Stock Options or Non-Qualified Stock Options. Incentive Stock Options may be granted only to employees of the Company or any Subsidiary that is a "subsidiary corporation" within the meaning of Section 424(f) of the Code. To the extent that any Option does not qualify as an Incentive Stock Option, it shall be deemed a Non-Qualified Stock Option.

Stock Options granted pursuant to this Section 5 shall be subject to the following terms and conditions and shall contain such additional terms and conditions, not inconsistent with the terms of the Plan, as the Administrator shall deem desirable. If the Administrator so determines, Stock Options may be granted in lieu of cash compensation at the optionee's election, subject to such terms and conditions as the Administrator may establish.

(b) Exercise Price. The exercise price per share for the Stock covered by a Stock Option granted pursuant to this Section 5 shall be determined by the Administrator at the time of grant but shall not be less than 100 percent of the Fair Market Value on the date of grant. In the case of an Incentive Stock Option that is granted to a Ten Percent Owner, the option price of such Incentive Stock Option shall be not less than 110 percent of the Fair Market Value on the grant date.

(c) Option Term. The term of each Stock Option shall be fixed by the Administrator, but no Stock Option shall be exercisable more than ten years after the date the Stock Option is granted. In the case of an Incentive Stock Option that is granted to a Ten Percent Owner, the term of such Stock Option shall be no more than five years from the date of grant.

(d) Exercisability; Rights of a Stockholder. Stock Options shall become exercisable at such time or times, whether or not in installments, as shall be determined by the Administrator at or after the grant date. The Administrator may at any time accelerate the exercisability of all or any portion of any Stock Option. An optionee shall have the rights of a stockholder only as to shares acquired upon the exercise of a Stock Option and not as to unexercised Stock Options.

(e) Method of Exercise. Stock Options may be exercised in whole or in part, by giving written or electronic notice of exercise to the Company, specifying the number of shares to be purchased. Payment of the purchase price may be made by one or more of the following methods except to the extent otherwise provided in the Option Award Certificate:

(i) In cash, by certified or bank check or other instrument acceptable to the Administrator;

(ii) Through the delivery (or attestation to the ownership in accordance with such procedures as the Company may prescribe) of shares of Stock that are not then subject to restrictions under any Company plan. Such surrendered shares shall be valued at Fair Market Value on the exercise date;

(iii) By the optionee delivering to the Company a properly executed exercise notice together with irrevocable instructions to a broker to promptly deliver to the Company cash or a check payable and acceptable to the Company for the purchase price; provided that in the event the optionee chooses to pay the purchase price as so provided, the optionee and the broker shall comply with such procedures and enter into such agreements of indemnity and other agreements as the Administrator shall prescribe as a condition of such payment procedure; or

(iv) With respect to Stock Options that are not Incentive Stock Options, by a “net exercise” arrangement pursuant to which the Company will reduce the number of shares of Stock issuable upon exercise by the largest whole number of shares with a Fair Market Value that does not exceed the aggregate exercise price.

Payment instruments will be received subject to collection. The transfer to the optionee on the records of the Company or of the transfer agent of the shares of Stock to be purchased pursuant to the exercise of a Stock Option will be contingent upon receipt from the optionee (or a purchaser acting in his stead in accordance with the provisions of the Stock Option) by the Company of the full purchase price for such shares and the fulfillment of any other requirements contained in the Option Award Certificate or applicable provisions of laws (including the satisfaction of any withholding taxes that the Company is obligated to withhold with respect to the optionee). In the event an optionee chooses to pay the purchase price by previously-owned shares of Stock through the attestation method, the number of shares of Stock transferred to the optionee upon the exercise of the Stock Option shall be net of the number of attested shares. In the event that the Company establishes, for itself or using the services of a third party, an automated system for the exercise of Stock Options, such as a system using an internet website or interactive voice response, then the paperless exercise of Stock Options may be permitted through the use of such an automated system.

(f) Annual Limit on Incentive Stock Options. To the extent required for “incentive stock option” treatment under Section 422 of the Code, the aggregate Fair Market Value (determined as of the time of grant) of the shares of Stock with respect to which Incentive Stock Options granted under this Plan and any other plan of the Company or its parent and subsidiary corporations become exercisable for the first time by an optionee during any calendar year shall not exceed \$100,000. To the extent that any Stock Option exceeds this limit, it shall constitute a Non-Qualified Stock Option.

SECTION 6. STOCK APPRECIATION RIGHTS

(a) Award of Stock Appreciation Rights. The Administrator may grant Stock Appreciation Rights under the Plan. A Stock Appreciation Right is an Award entitling the recipient to receive shares of Stock having a value equal to the excess of the Fair Market Value of a share of Stock on the date of exercise over the exercise price of the Stock Appreciation Right multiplied by the number of shares of Stock with respect to which the Stock Appreciation Right shall have been exercised.

(b) Exercise Price of Stock Appreciation Rights. The exercise price of a Stock Appreciation Right shall not be less than 100 percent of the Fair Market Value of the Stock on the date of grant.

(c) Grant and Exercise of Stock Appreciation Rights. Stock Appreciation Rights may be granted by the Administrator independently of any Stock Option granted pursuant to Section 5 of the Plan.

(d) Terms and Conditions of Stock Appreciation Rights. Stock Appreciation Rights shall be subject to such terms and conditions as shall be determined from time to time by the Administrator. The term of a Stock Appreciation Right may not exceed ten years.

SECTION 7. RESTRICTED STOCK AWARDS

(a) Nature of Restricted Stock Awards. The Administrator may grant Restricted Stock Awards under the Plan. A Restricted Stock Award is any Award of Restricted Shares subject to such restrictions and conditions as the Administrator may determine at the time of grant. Conditions may be based on continuing employment (or other service relationship) and/or achievement of pre-established performance goals and objectives. The terms and conditions of each such Award Certificate shall be determined by the Administrator, and such terms and conditions may differ among individual Awards and grantees.

(b) Rights as a Stockholder. Upon the grant of the Restricted Stock Award and payment of any applicable purchase price, a grantee shall have the rights of a stockholder with respect to the voting of the Restricted Shares and receipt of dividends; provided that if the lapse of restrictions with respect to the Restricted Stock Award is tied to the attainment of performance goals, any dividends paid by the Company during the performance period shall accrue and shall not be paid to the grantee until and to the extent the performance goals are met with respect to the Restricted Stock Award. Unless the Administrator shall otherwise determine, (i) uncertificated Restricted Shares shall be accompanied by a notation on the records of the Company or the transfer agent to the effect that they are subject to forfeiture until such Restricted Shares are vested as provided in Section 7(d) below, and (ii) certificated Restricted Shares shall remain in the possession of the Company until such Restricted Shares are vested as provided in Section 7(d) below, and the grantee shall be required, as a condition of the grant, to deliver to the Company such instruments of transfer as the Administrator may prescribe.

(c) Restrictions. Restricted Shares may not be sold, assigned, transferred, pledged or otherwise encumbered or disposed of except as specifically provided herein or in the Restricted Stock Award Certificate. Except as may otherwise be provided by the Administrator either in the Award Certificate or, subject to Section 18 below, in writing after the Award is issued, if a grantee's employment (or other service relationship) with the Company and its Subsidiaries terminates for any reason, any Restricted Shares that have not vested at the time of termination shall automatically and without any requirement of notice to such grantee from or other action by or on behalf of, the Company be deemed to have been reacquired by the Company at its original purchase price (if any) from such grantee or such grantee's legal representative simultaneously with such termination of employment (or other service relationship), and thereafter shall cease to represent any ownership of the Company by the grantee or rights of the grantee as a stockholder. Following such deemed reacquisition of Restricted Shares that are represented by physical certificates, a grantee shall surrender such certificates to the Company upon request without consideration.

(d) Vesting of Restricted Shares. The Administrator at the time of grant shall specify the date or dates and/or the attainment of pre-established performance goals, objectives and other conditions on which the non-transferability of the Restricted Shares and the Company's right of repurchase or forfeiture shall lapse. Subsequent to such date or dates and/or the attainment of such pre-established performance goals, objectives and other conditions, the shares on which all restrictions have lapsed shall no longer be Restricted Shares and shall be deemed "vested."

SECTION 8. RESTRICTED STOCK UNITS

(a) Nature of Restricted Stock Units. The Administrator may grant Restricted Stock Units under the Plan. A Restricted Stock Unit is an Award of stock units that may be settled in shares of Stock upon the satisfaction of such restrictions and conditions at the time of grant. Conditions may be based on continuing employment (or other service relationship) and/or achievement of pre-established performance goals and objectives. The terms and conditions of each such Award Certificate shall be determined by the Administrator, and such terms and conditions may differ among individual Awards and grantees. Except in the case of Restricted Stock Units with a deferred settlement date that complies with Section 409A, at the end of the vesting period, the Restricted Stock Units, to the extent vested, shall be settled in the form of shares of Stock. Restricted Stock Units with deferred settlement dates are subject to Section 409A and shall contain such additional terms and conditions as the Administrator shall determine in its sole discretion in order to comply with the requirements of Section 409A.

(b) Election to Receive Restricted Stock Units in Lieu of Compensation. The Administrator may, in its sole discretion, permit a grantee to elect to receive a portion of future cash compensation otherwise due to such grantee in the form of an award of Restricted Stock Units. Any such election shall be made in writing and shall be delivered to the Company no later than the date specified by the Administrator and in accordance with Section 409A and such other rules and procedures established by the Administrator. Any such future cash compensation that the grantee elects to defer shall be converted to a fixed number of Restricted Stock Units based on the Fair Market Value of Stock on the date the compensation would otherwise have been paid to the grantee if such payment had not been deferred as provided herein. The Administrator shall have the sole right to determine whether and under what circumstances to permit such elections and to impose such limitations and other terms and conditions thereon as the Administrator deems appropriate. Any Restricted Stock Units that are elected to be received in lieu of cash compensation shall be fully vested, unless otherwise provided in the Award Certificate.

(c) Rights as a Stockholder. A grantee shall have the rights as a stockholder only as to shares of Stock acquired by the grantee upon settlement of Restricted Stock Units; provided, however, that the grantee may be credited with Dividend Equivalent Rights with respect to the stock units underlying his Restricted Stock Units, subject to the provisions of Section 11 and such terms and conditions as the Administrator may determine.

(d) Termination. Except as may otherwise be provided by the Administrator either in the Award Certificate or, subject to Section 18 below, in writing after the Award is issued, a grantee's right in all Restricted Stock Units that have not vested shall automatically terminate upon the grantee's termination of employment (or cessation of service relationship) with the Company and its Subsidiaries for any reason.

SECTION 9. UNRESTRICTED STOCK AWARDS

Grant or Sale of Unrestricted Stock. The Administrator may grant (or sell at par value or such higher purchase price determined by the Administrator) an Unrestricted Stock Award under the Plan. An Unrestricted Stock Award is an Award pursuant to which the grantee may receive shares of Stock free of any restrictions under the Plan. Unrestricted Stock Awards may be granted in respect of past services or other valid consideration, or in lieu of cash compensation due to such grantee.

SECTION 10. CASH-BASED AWARDS

Grant of Cash-Based Awards. The Administrator may grant Cash-Based Awards under the Plan. A Cash-Based Award is an Award that entitles the grantee to a payment in cash upon the attainment of specified Performance Goals. The Administrator shall determine the maximum duration of the Cash-Based Award, the amount of cash to which the Cash-Based Award pertains, the conditions upon which the Cash-Based Award shall become vested or payable, and such other provisions as the Administrator shall determine. Each Cash-Based Award shall specify a cash-denominated payment amount, formula or payment ranges as determined by the Administrator. Payment, if any, with respect to a Cash-Based Award shall be made in accordance with the terms of the Award and may be made in cash.

SECTION 11. PERFORMANCE SHARE AWARDS

(a) Nature of Performance Share Awards. The Administrator may grant Performance Share Awards under the Plan. A Performance Share Award is an Award entitling the grantee to receive shares of Stock upon the attainment of performance goals. The Administrator shall determine whether and to whom Performance Share Awards shall be granted, the performance goals, the periods during which performance is to be measured, which may not be less than one year except in the case of a Sale Event, and such other limitations and conditions as the Administrator shall determine.

(b) Rights as a Stockholder. A grantee receiving a Performance Share Award shall have the rights of a stockholder only as to shares of Stock actually received by the grantee under the Plan and not with respect to shares subject to the Award but not actually received by the grantee. A grantee shall be entitled to receive shares of Stock under a Performance Share Award only upon satisfaction of all conditions specified in the Performance Share Award Certificate (or in a performance plan adopted by the Administrator).

(c) Termination. Except as may otherwise be provided by the Administrator either in the Award agreement or, subject to Section 18 below, in writing after the Award is issued, a grantee's rights in all Performance Share Awards shall automatically terminate upon the grantee's termination of employment (or cessation of service relationship) with the Company and its Subsidiaries for any reason.

SECTION 12. PERFORMANCE-BASED AWARDS TO COVERED EMPLOYEES

(a) Performance-Based Awards. The Administrator may grant one or more Performance-Based Awards in the form of a Restricted Stock Award, Restricted Stock Units, Performance Share Awards or Cash-Based Award payable upon the attainment of Performance Goals that are established by the Administrator and relate to one or more of the Performance Criteria, in each case on a specified date or dates or over any period or periods determined by the Administrator. The Administrator shall define in an objective fashion the manner of calculating the Performance Criteria it selects to use for any Performance Cycle. Depending on the Performance Criteria used to establish such Performance Goals, the Performance Goals may be expressed in terms of overall Company performance or the performance of a division, business unit, or an individual. Each Performance-Based Award shall comply with the provisions set forth below.

(b) Grant of Performance-Based Awards. With respect to each Performance-Based Award granted to a Covered Employee, the Administrator shall select, within the first 90 days of a Performance Cycle (or, if shorter, within the maximum period allowed under Section 162(m) of the Code) the Performance Criteria for such grant, and the Performance Goals with respect to each Performance Criterion (including a threshold level of performance below which no amount will become payable with respect to such Award). Each Performance-Based Award will specify the amount payable, or the formula for determining the amount payable, upon achievement of the various applicable performance targets. The Performance Criteria established by the Administrator may be (but need not be) different for each Performance Cycle and different Performance Goals may be applicable to Performance-Based Awards to different Covered Employees.

(c) Payment of Performance-Based Awards. Following the completion of a Performance Cycle, the Administrator shall meet to review and certify in writing whether, and to what extent, the Performance Goals for the Performance Cycle have been achieved and, if so, to also calculate and certify in writing the amount of the Performance-Based Awards earned for the Performance Cycle. The Administrator shall then determine the actual size of each Covered Employee's Performance-Based Award.

SECTION 13. DIVIDEND EQUIVALENT RIGHTS

(a) Dividend Equivalent Rights. The Administrator may grant Dividend Equivalent Rights under the Plan. A Dividend Equivalent Right is an Award entitling the grantee to receive credits based on cash dividends that would have been paid on the shares of Stock specified in the Dividend Equivalent Right (or other Award to which it relates) if such shares had been issued to the grantee. A Dividend Equivalent Right may be granted hereunder to any grantee as a component of an award of Restricted Stock Units, Restricted Stock Award or Performance Share Award or as a freestanding award. The terms and conditions of Dividend Equivalent Rights shall be specified in the Award Certificate. Dividend equivalents credited to the holder of a Dividend Equivalent Right may be paid currently or may be deemed to be reinvested in additional shares of Stock, which may thereafter accrue additional equivalents. Any such reinvestment shall be at Fair Market Value on the date of reinvestment or such other price as may then apply under a dividend reinvestment plan sponsored by the Company, if any. Dividend Equivalent Rights may be settled in cash or shares of Stock or a combination thereof, in a single installment or installments. A Dividend Equivalent Right granted as a component of an Award of Restricted Stock Units or Performance Share Award shall provide that such Dividend Equivalent Right shall be settled only upon settlement or payment of, or lapse of restrictions on, such other Award, and that such Dividend Equivalent Right shall expire or be forfeited or annulled under the same conditions as such other Award.

(b) Termination. Except as may otherwise be provided by the Administrator either in the Award Certificate or, subject to Section 18 below, in writing after the Award is issued, a grantee's rights in all Dividend Equivalent Rights shall automatically terminate upon the grantee's termination of employment (or cessation of service relationship) with the Company and its Subsidiaries for any reason.

SECTION 14. TRANSFERABILITY OF AWARDS

(a) Transferability. Except as provided in Section 14(b) below, during a grantee's lifetime, his or her Awards shall be exercisable only by the grantee, or by the grantee's legal representative or guardian in the event of the grantee's incapacity. No Awards shall be sold, assigned, transferred or otherwise encumbered or disposed of by a grantee other than by will or by the laws of descent and distribution or pursuant to a domestic relations order. No Awards shall be subject, in whole or in part, to attachment, execution, or levy of any kind, and any purported transfer in violation hereof shall be null and void.

(b) Administrator Action. Notwithstanding Section 14(a), the Administrator, in its discretion, may provide either in the Award Certificate regarding a given Award or by subsequent written approval that the grantee (who is an employee or director) may transfer his or her Non-Qualified Options to his or her immediate family members, to trusts for the benefit of such family members, or to partnerships in which such family members are the only partners, provided that the transferee agrees in writing with the Company to be bound by all of the terms and conditions of this Plan and the applicable Award. In no event may an Award be transferred by a grantee for value.

(c) Family Member. For purposes of Section 14(b), "family member" shall mean a grantee's child, stepchild, grandchild, parent, stepparent, grandparent, spouse, former spouse, sibling, niece, nephew, mother-in-law, father-in-law, son-in-law, daughter-in-law, brother-in-law, or sister-in-law, including adoptive relationships, any person sharing the grantee's household (other than a tenant of the grantee), a trust in which these persons (or the grantee) have more than 50 percent of the beneficial interest, a foundation in which these persons (or the grantee) control the management of assets, and any other entity in which these persons (or the grantee) own more than 50 percent of the voting interests.

(d) Designation of Beneficiary. To the extent permitted by the Company, each grantee to whom an Award has been made under the Plan may designate a beneficiary or beneficiaries to exercise any Award or receive any payment under any Award payable on or after the grantee's death. Any such designation shall be on a form provided for that purpose by the Administrator and shall not be effective until received by the Administrator. If no beneficiary has been designated by a deceased grantee, or if the designated beneficiaries have predeceased the grantee, the beneficiary shall be the grantee's estate.

SECTION 15. TAX WITHHOLDING

(a) Payment by Grantee. Each grantee shall, no later than the date as of which the value of an Award or of any Stock or other amounts received thereunder first becomes includable in the gross income of the grantee for Federal income tax purposes, pay to the Company, or make arrangements satisfactory to the Administrator regarding payment of, any Federal, state, or local taxes of any kind required by law to be withheld by the Company with respect to such income. The Company and its Subsidiaries shall, to the extent permitted by law, have the right to deduct any such taxes from any payment of any kind otherwise due to the grantee. The Company's obligation to deliver evidence of book entry (or stock certificates) to any grantee is subject to and conditioned on tax withholding obligations being satisfied by the grantee.

(b) Payment in Stock. Subject to approval by the Administrator, a grantee may elect to have the Company's minimum required tax withholding obligation satisfied, in whole or in part, by authorizing the Company to withhold from shares of Stock to be issued pursuant to any Award a number of shares with an aggregate Fair Market Value (as of the date the withholding is effected) that would satisfy the withholding amount due. The Administrator may also require Awards to be subject to mandatory share withholding up to the required withholding amount. For purposes of share withholding, the Fair Market Value of withheld shares shall be determined in the same manner as the value of Stock includible in income of the Participants.

SECTION 16. SECTION 409A AWARDS

To the extent that any Award is determined to constitute "nonqualified deferred compensation" within the meaning of Section 409A (a "409A Award"), the Award shall be subject to such additional rules and requirements as specified by the Administrator from time to time in order to comply with Section 409A. In this regard, if any amount under a 409A Award is payable upon a "separation from service" (within the meaning of Section 409A) to a grantee who is then considered a "specified employee" (within the meaning of Section 409A), then no such payment shall be made prior to the date that is the earlier of (i) six months and one day after the grantee's separation from service, or (ii) the grantee's death, but only to the extent such delay is necessary to prevent such payment from being subject to interest, penalties and/or additional tax imposed pursuant to Section 409A. Further, the settlement of any such Award may not be accelerated except to the extent permitted by Section 409A.

SECTION 17. TERMINATION OF EMPLOYMENT, TRANSFER, LEAVE OF ABSENCE, ETC.

- (a) Termination of Employment. If the grantee's employer ceases to be a Subsidiary, the grantee shall be deemed to have terminated employment for purposes of the Plan.
- (b) For purposes of the Plan, the following events shall not be deemed a termination of employment:
- (i) a transfer to the employment of the Company from a Subsidiary or from the Company to a Subsidiary, or from one Subsidiary to another; or
 - (ii) an approved leave of absence for military service or sickness, or for any other purpose approved by the Company, if the employee's right to re-employment is guaranteed either by a statute or by contract or under the policy pursuant to which the leave of absence was granted or if the Administrator otherwise so provides in writing.

SECTION 18. AMENDMENTS AND TERMINATION

The Board may, at any time, amend or discontinue the Plan and the Administrator may, at any time, amend or cancel any outstanding Award for the purpose of satisfying changes in law or for any other lawful purpose, but no such action shall adversely affect rights under any outstanding Award without the holder's consent. Except as provided in Section 3(c) or 3(d), without prior stockholder approval, in no event may the Administrator exercise its discretion to reduce the exercise price of outstanding Stock Options or Stock Appreciation Rights or effect repricing through cancellation and re-grants or cancellation of Stock Options or Stock Appreciation Rights in exchange for cash. To the extent required under the rules of any securities exchange or market system on which the Stock is listed, to the extent determined by the Administrator to be required by the Code to ensure that Incentive Stock Options granted under the Plan are qualified under Section 422 of the Code, or to ensure that compensation earned under Awards qualifies as performance-based compensation under Section 162(m) of the Code, Plan amendments shall be subject to approval by the Company stockholders entitled to vote at a meeting of stockholders. Nothing in this Section 18 shall limit the Administrator's authority to take any action permitted pursuant to Section 3(c) or 3(d).

SECTION 19. STATUS OF PLAN

With respect to the portion of any Award that has not been exercised and any payments in cash, Stock or other consideration not received by a grantee, a grantee shall have no rights greater than those of a general creditor of the Company unless the Administrator shall otherwise expressly determine in connection with any Award or Awards. In its sole discretion, the Administrator may authorize the creation of trusts or other arrangements to meet the Company's obligations to deliver Stock or make payments with respect to Awards hereunder, provided that the existence of such trusts or other arrangements is consistent with the foregoing sentence.

SECTION 20. GENERAL PROVISIONS

- (a) No Distribution. The Administrator may require each person acquiring Stock pursuant to an Award to represent to and agree with the Company in writing that such person is acquiring the shares without a view to distribution thereof.
- (b) Delivery of Stock Certificates. Stock certificates to grantees under this Plan shall be deemed delivered for all purposes when the Company or a stock transfer agent of the Company shall have mailed such certificates in the United States mail, addressed to the grantee, at the grantee's last known address on file with the Company. Uncertificated Stock shall be deemed delivered for all purposes when the Company or a Stock transfer agent of the Company shall have given to the grantee by electronic mail (with proof of receipt) or by United States mail, addressed to the grantee, at the grantee's last known address on file with the Company, notice of issuance and recorded the issuance in its records (which may include electronic "book entry" records). Notwithstanding anything herein to the contrary, the Company shall not be required to issue or deliver any certificates evidencing shares of Stock pursuant to the exercise of any Award, unless and until the Administrator has determined, with advice of counsel (to the extent the Administrator deems such advice necessary or advisable), that the issuance and delivery of such certificates is in compliance with all applicable laws, regulations of governmental authorities and, if applicable, the requirements of any exchange on which the shares of Stock are listed, quoted or traded. All Stock certificates delivered pursuant to the Plan shall be subject to any stop-transfer orders and other restrictions as the Administrator deems necessary or advisable to comply with federal, state or foreign jurisdiction, securities or other laws, rules and quotation system on which the Stock is listed, quoted or traded. The Administrator may place legends on any Stock certificate to reference restrictions applicable to the Stock. In addition to the terms and conditions provided herein, the Administrator may

require that an individual make such reasonable covenants, agreements, and representations as the Administrator, in its discretion, deems necessary or advisable in order to comply with any such laws, regulations, or requirements. The Administrator shall have the right to require any individual to comply with any timing or other restrictions with respect to the settlement or exercise of any Award, including a window-period limitation, as may be imposed in the discretion of the Administrator.

(c) Stockholder Rights. Until Stock is deemed delivered in accordance with Section 20(b), no right to vote or receive dividends or any other rights of a stockholder will exist with respect to shares of Stock to be issued in connection with an Award, notwithstanding the exercise of a Stock Option or any other action by the grantee with respect to an Award.

(d) Other Compensation Arrangements; No Employment Rights. Nothing contained in this Plan shall prevent the Board from adopting other or additional compensation arrangements, including trusts, and such arrangements may be either generally applicable or applicable only in specific cases. The adoption of this Plan and the grant of Awards do not confer upon any employee any right to continued employment with the Company or any Subsidiary.

(e) Trading Policy Restrictions. Option exercises and other Awards under the Plan shall be subject to the Company's insider trading policies and procedures, as in effect from time to time.

(f) Clawback Policy. Awards under the Plan shall be subject to the Company's clawback policy, as in effect from time to time.

SECTION 21. EFFECTIVE DATE OF PLAN

This Plan shall become effective upon the effectiveness of the Company's registration statement on Form S-1 in connection with its Initial Public Offering, following stockholder approval of the Plan in accordance with applicable state law, the Company's bylaws and certificate of incorporation, and applicable stock exchange rules or pursuant to written consent. No grants of Stock Options and other Awards may be made hereunder after the tenth anniversary of the Effective Date and no grants of Incentive Stock Options may be made hereunder after the tenth anniversary of the date the Plan is approved by the Board.

SECTION 22. GOVERNING LAW

This Plan and all Awards and actions taken thereunder shall be governed by, and construed in accordance with, the laws of the State of Delaware, applied without regard to conflict of law principles.

DATE APPROVED BY THE BOARD OF DIRECTORS: April 25, 2015

DATE APPROVED BY THE STOCKHOLDERS: April 25, 2015

AMENDMENT APPROVED BY THE BOARD OF DIRECTORS: March 4, 2019

AMENDMENT APPROVED BY THE STOCKHOLDERS: May 8, 2019

AMENDMENT APPROVED BY THE BOARD OF DIRECTORS: March 16, 2020

AMENDMENT APPROVED BY THE STOCKHOLDERS: May 6, 2020

AMENDMENT APPROVED BY THE BOARD OF DIRECTORS: March 5, 2021

AMENDMENT APPROVED BY THE STOCKHOLDERS: April 28, 2021

AMENDMENT APPROVED BY THE BOARD OF DIRECTORS: March 2, 2022

AMENDMENT APPROVED BY THE STOCKHOLDERS: [_____, 2022]

ANNEX B

ATYR PHARMA, INC.

2015 EMPLOYEE STOCK PURCHASE PLAN

The purpose of the aTyr Pharma, Inc. 2015 Employee Stock Purchase Plan (the “Plan”) is to provide eligible employees of aTyr Pharma, Inc. (the “Company”) and each Designated Subsidiary (as defined in Section 11) with opportunities to purchase shares of the Company’s common stock, par value \$0.001 per share (the “Common Stock”). Effective March 2, 2022, the number of shares of Common Stock reserved and available for issuance under the Plan shall be 843,246,¹ which number consists of the 93,246 shares reserved and available for issuance prior to an additional 750,000 shares authorized for issuance pursuant to an amendment to the Plan adopted by the Company’s Board of Directors (the “Board”) on March 2, 2022 subject to the approval of the Company’s stockholders. The Plan is intended to constitute an “employee stock purchase plan” within the meaning of Section 423(b) of the Internal Revenue Code of 1986, as amended (the “Code”), and shall be interpreted in accordance with that intent.

1. Administration. The Plan will be administered by the person or persons (the “Administrator”) appointed by the Board”) for such purpose. The Administrator has authority at any time to: (i) adopt, alter and repeal such rules, guidelines and practices for the administration of the Plan and for its own acts and proceedings as it shall deem advisable; (ii) interpret the terms and provisions of the Plan; (iii) make all determinations it deems advisable for the administration of the Plan; (iv) decide all disputes arising in connection with the Plan; and (v) otherwise supervise the administration of the Plan. All interpretations and decisions of the Administrator shall be binding on all persons, including the Company and the Participants. No member of the Board or individual exercising administrative authority with respect to the Plan shall be liable for any action or determination made in good faith with respect to the Plan or any option granted hereunder.

2. Offerings. The Company will make one or more offerings to eligible employees to purchase Common Stock under the Plan (“Offerings”). Unless otherwise determined by the Administrator, the initial Offering will begin on January 1st of the year designated by the Administrator and will end on the following June 30th (the “Initial Offering”). Thereafter, unless otherwise determined by the Administrator, an Offering will begin on the first business day occurring on or after each January 1st and July 1st and will end on the last business day occurring on or before the following June 30th and December 31st, respectively. The Administrator may, in its discretion, designate a different period for any Offering, provided that no Offering shall exceed 12 months in duration or overlap any other Offering.

3. Eligibility. All individuals classified as employees on the payroll records of the Company and each Designated Subsidiary are eligible to participate in any one or more of the Offerings under the Plan, provided that as of the first day of the applicable Offering (the “Offering Date”) they are customarily employed by the Company or a Designated Subsidiary for more than 20 hours a week and have completed at least six months of employment. Notwithstanding any other provision herein, individuals who are not contemporaneously classified as employees of the Company or a Designated Subsidiary for purposes of the Company’s or applicable Designated Subsidiary’s payroll system are not considered to be eligible employees of the Company or any Designated Subsidiary and shall not be eligible to participate in the Plan. In the event any such individuals are reclassified as employees of the Company or a Designated Subsidiary for any purpose, including, without limitation, common law or statutory employees, by any action of any third party, including, without limitation, any government agency, or as a result of any private lawsuit, action or administrative proceeding, such individuals shall, notwithstanding such reclassification, remain ineligible for participation. Notwithstanding the foregoing, the exclusive means for individuals who are not contemporaneously classified as employees of the Company or a Designated Subsidiary on the Company’s or Designated Subsidiary’s payroll system to become eligible to participate in this Plan is through an amendment to this Plan, duly executed by the Company, which specifically renders such individuals eligible to participate herein.

¹ Reflects the 1-for-14 reverse stock split (rounded down to the nearest whole share) of the Company’s issued and outstanding common stock that was effectuated as of June 28, 2019.

4. Participation.

(a) Participants in Offering. An eligible employee who is not a Participant on any Offering Date may participate in such Offering by submitting an enrollment form to his or her appropriate payroll location at least 15 business days before the Offering Date (or by such other deadline as shall be established by the Administrator for the Offering).

(b) Enrollment. The enrollment form will (a) state a whole percentage to be deducted from an eligible employee's Compensation (as defined in Section 11) per pay period, (b) authorize the purchase of Common Stock in each Offering in accordance with the terms of the Plan and (c) specify the exact name or names in which shares of Common Stock purchased for such individual are to be issued pursuant to Section 10. An employee who does not enroll in accordance with these procedures will be deemed to have waived the right to participate. Unless a Participant files a new enrollment form or withdraws from the Plan, such Participant's deductions and purchases will continue at the same percentage of Compensation for future Offerings, provided he or she remains eligible.

(c) Notwithstanding the foregoing, participation in the Plan will neither be permitted nor be denied contrary to the requirements of the Code.

5. Employee Contributions. Each eligible employee may authorize payroll deductions at a minimum of one percent (1%) up to a maximum of fifteen percent (15%) of such employee's Compensation for each pay period. The Company will maintain book accounts showing the amount of payroll deductions made by each Participant for each Offering. No interest will accrue or be paid on payroll deductions.

6. Deduction Changes. Except as may be determined by the Administrator in advance of an Offering, a Participant may not increase or decrease his or her payroll deduction during any Offering, but may increase or decrease his or her payroll deduction with respect to the next Offering (subject to the limitations of Section 5) by filing a new enrollment form at least 15 business days before the next Offering Date (or by such other deadline as shall be established by the Administrator for the Offering). The Administrator may, in advance of any Offering, establish rules permitting a Participant to increase, decrease or terminate his or her payroll deduction during an Offering.

7. Withdrawal. A Participant may withdraw from participation in the Plan by delivering a written notice of withdrawal to his or her appropriate payroll location. The Participant's withdrawal will be effective as of the next business day. Following a Participant's withdrawal, the Company will promptly refund such individual's entire account balance under the Plan to him or her (after payment for any Common Stock purchased before the effective date of withdrawal). Partial withdrawals are not permitted. Such an employee may not begin participation again during the remainder of the Offering, but may enroll in a subsequent Offering in accordance with Section 4.

8. Grant of Options. On each Offering Date, the Company will grant to each eligible employee who is then a Participant in the Plan an option ("Option") to purchase on the last day of such Offering (the "Exercise Date"), at the Option Price (as defined herein) for, the lowest of (a) a number of shares of Common Stock determined by dividing such Participant's accumulated payroll deductions on such Exercise Date by the Option Price (as defined herein), (b) 2,500 shares; or (c) such other lesser maximum number of shares as shall have been established by the Administrator in advance of the Offering; provided, however, that such Option shall be subject to the limitations set forth below. Each Participant's Option shall be exercisable only to the extent of such Participant's accumulated payroll deductions on the Exercise Date. The purchase price for each share purchased under each Option (the "Option Price") will be eighty-five percent (85%) of the Fair Market Value of the Common Stock on the Offering Date or the Exercise Date, whichever is less.

Notwithstanding the foregoing, no Participant may be granted an Option hereunder if such Participant, immediately after the Option was granted, would be treated as owning stock possessing five percent (5%) or more of the total combined voting power or value of all classes of stock of the Company or any Parent or Subsidiary (as defined in Section 11). For purposes of the preceding sentence, the attribution rules of Section 424(d) of the Code shall apply in determining the stock ownership of a Participant, and all stock which the Participant has a contractual right to purchase shall be treated as stock owned by the Participant. In addition, no Participant may be granted an Option which permits his or her rights to purchase stock under the Plan, and any other employee stock purchase plan of the Company and its Parents and Subsidiaries, to accrue at a rate which exceeds \$25,000 of the fair market value of such stock (determined on the Option grant date or dates) for each calendar year in which the Option is outstanding at any time. The purpose of the limitation in the preceding sentence is to

comply with Section 423(b)(8) of the Code and shall be applied taking Options into account in the order in which they were granted.

9. Exercise of Option and Purchase of Shares. Each employee who continues to be a Participant in the Plan on the Exercise Date shall be deemed to have exercised his or her Option on such date and shall acquire from the Company such number of whole shares of Common Stock reserved for the purpose of the Plan as his or her accumulated payroll deductions on such date will purchase at the Option Price, subject to any other limitations contained in the Plan. Any amount remaining in a Participant's account at the end of an Offering solely by reason of the inability to purchase a fractional share will be carried forward to the next Offering; any other balance remaining in a Participant's account at the end of an Offering will be refunded to the Participant promptly.

10. Issuance of Certificates. Certificates representing shares of Common Stock purchased under the Plan may be issued only in the name of the employee, in the name of the employee and another person of legal age as joint tenants with rights of survivorship, or in the name of a broker authorized by the employee to be his, her or their, nominee for such purpose.

11. Definitions.

The term "Compensation" means the amount of base pay, prior to salary reduction pursuant to Sections 125, 132(f) or 401(k) of the Code, but excluding overtime, commissions, incentive or bonus awards, allowances and reimbursements for expenses such as relocation allowances or travel expenses, income or gains on the exercise of Company stock options, and similar items.

The term "Designated Subsidiary" means any present or future Subsidiary (as defined below) that has been designated by the Board to participate in the Plan. The Board may so designate any Subsidiary, or revoke any such designation, at any time and from time to time, either before or after the Plan is approved by the stockholders.

The term "Fair Market Value of the Common Stock" on any given date means the fair market value of the Common Stock determined in good faith by the Administrator; provided, however, that if the Common Stock is admitted to quotation on the NASDAQ Capital Market, the NASDAQ Global Market, the NASDAQ Global Select Market or another national securities exchange, the determination shall be made by reference to the closing price on such date. If there is no closing price for such date, the determination shall be made by reference to the last date preceding such date for which there is a closing price.

The term "Initial Public Offering" means the consummation of the first underwritten firm commitment public offering pursuant to an effective registration statement under the Securities Act of 1933, as amended, covering the offer and sale by the Company of its Common Stock.

The term "Parent" means a "parent corporation" with respect to the Company, as defined in Section 424(e) of the Code.

The term "Participant" means an individual who is eligible as determined in Section 3 and who has complied with the provisions of Section 4.

The term "Subsidiary" means a "subsidiary corporation" with respect to the Company, as defined in Section 424(f) of the Code.

12. Rights on Termination of Employment. If a Participant's employment terminates for any reason before the Exercise Date for any Offering, no payroll deduction will be taken from any pay due and owing to the Participant and the balance in the Participant's account will be paid to such Participant or, in the case of such Participant's death, to his or her designated beneficiary as if such Participant had withdrawn from the Plan under Section 7. An employee will be deemed to have terminated employment, for this purpose, if the corporation that employs him or her, having been a Designated Subsidiary, ceases to be a Subsidiary, or if the employee is transferred to any corporation other than the Company or a Designated Subsidiary. An employee will not be deemed to have terminated employment for this purpose, if the employee is on an approved leave of absence for military service or sickness or for any other purpose approved by the Company, if the employee's right to reemployment is guaranteed either by a statute or by contract or under the policy pursuant to which the leave of absence was granted or if the Administrator otherwise provides in writing.

13. Special Rules. Notwithstanding anything herein to the contrary, the Administrator may adopt special rules applicable to the employees of a particular Designated Subsidiary, whenever the Administrator determines that such rules are necessary or appropriate for the implementation of the Plan in a jurisdiction where such Designated Subsidiary has employees; provided that such rules are consistent with the requirements of Section 423(b) of the Code. Any special rules established pursuant to this Section 13 shall, to the extent possible, result in the employees subject to such rules having substantially the same rights as other Participants in the Plan.

14. Optionees Not Stockholders. Neither the granting of an Option to a Participant nor the deductions from his or her pay shall constitute such Participant a holder of the shares of Common Stock covered by an Option under the Plan until such shares have been purchased by and issued to him or her.

15. Rights Not Transferable. Rights under the Plan are not transferable by a Participant other than by will or the laws of descent and distribution, and are exercisable during the Participant's lifetime only by the Participant.

16. Application of Funds. All funds received or held by the Company under the Plan may be combined with other corporate funds and may be used for any corporate purpose.

17. Adjustment in Case of Changes Affecting Common Stock. In the event of a subdivision of outstanding shares of Common Stock, the payment of a dividend in Common Stock or any other change affecting the Common Stock, the number of shares approved for the Plan and the share limitation set forth in Section 8 shall be equitably or proportionately adjusted to give proper effect to such event.

18. Amendment of the Plan. The Board may at any time and from time to time amend the Plan in any respect, except that without the approval within 12 months of such Board action by the stockholders, no amendment shall be made increasing the number of shares approved for the Plan or making any other change that would require stockholder approval in order for the Plan, as amended, to qualify as an "employee stock purchase plan" under Section 423(b) of the Code.

19. Insufficient Shares. If the total number of shares of Common Stock that would otherwise be purchased on any Exercise Date plus the number of shares purchased under previous Offerings under the Plan exceeds the maximum number of shares issuable under the Plan, the shares then available shall be apportioned among Participants in proportion to the amount of payroll deductions accumulated on behalf of each Participant that would otherwise be used to purchase Common Stock on such Exercise Date.

20. Termination of the Plan. The Plan may be terminated at any time by the Board. Upon termination of the Plan, all amounts in the accounts of Participants shall be promptly refunded.

21. Governmental Regulations. The Company's obligation to sell and deliver Common Stock under the Plan is subject to obtaining all governmental approvals required in connection with the authorization, issuance, or sale of such stock.

22. Governing Law. This Plan and all Options and actions taken thereunder shall be governed by, and construed in accordance with, the laws of the State of Delaware, applied without regard to conflict of law principles.

23. Issuance of Shares. Shares may be issued upon exercise of an Option from authorized but unissued Common Stock, from shares held in the treasury of the Company, or from any other proper source.

24. Tax Withholding. Participation in the Plan is subject to any minimum required tax withholding on income of the Participant in connection with the Plan. Each Participant agrees, by entering the Plan, that the Company and its Subsidiaries shall have the right to deduct any such taxes from any payment of any kind otherwise due to the Participant, including shares issuable under the Plan.

25. Notification Upon Sale of Shares. Each Participant agrees, by entering the Plan, to give the Company prompt notice of any disposition of shares purchased under the Plan where such disposition occurs within two years after the date of grant of the Option pursuant to which such shares were purchased.

26. Effective Date and Approval of Shareholders. The Plan shall take effect upon the effectiveness of the Company's registration statement on Form S-1 in connection with its Initial Public Offering, following stockholder approval

of the Plan in accordance with applicable state law, the Company's bylaws and certificate of incorporation, and applicable stock exchange rules or pursuant to written consent.

DATE APPROVED BY THE BOARD OF DIRECTORS: April 25, 2015

DATE APPROVED BY THE STOCKHOLDERS: April 25, 2015

AMENDMENT APPROVED BY THE BOARD OF DIRECTORS: March 2, 2022

AMENDMENT APPROVED BY THE STOCKHOLDERS: [____], 2022

ANNEX C

**CERTIFICATE OF AMENDMENT
TO THE
RESTATED CERTIFICATE OF INCORPORATION
OF
ATYR PHARMA, INC.**

aTyr Pharma, Inc. (the “**Corporation**”), a corporation organized and existing under the laws of the State of Delaware, hereby certifies as follows:

FIRST: That the name of the Corporation is aTyr Pharma, Inc. The date of the filing of its original Certificate of Incorporation with the Secretary of State of Delaware was September 8, 2005.

SECOND: That the Board of Directors of the Corporation duly adopted resolutions approving the following amendment of the Restated Certificate of Incorporation, declaring said amendment to be advisable and providing for such consideration of such amendment at the Corporation’s annual meeting of the stockholders.

THIRD: On April 28, 2021, the Corporation’s annual meeting of the stockholders was duly called and held, upon notice in accordance with Section 222 of the Delaware General Corporation Law, at which meeting the necessary number of shares as required by statute were voted in favor of the amendment.

FOURTH: The first sentence of Article IV of the Restated Certificate of Incorporation of the Corporation is hereby amended and restated to read in its entirety as follows:

The total number of shares of capital stock which the Corporation shall have authority to issue is Ninety Two Million Two Hundred Eighty-Five Thousand Four Hundred Fifty-Six (92,285,456), of which (i) Eighty Five Million (85,000,000) shares shall be a class designated as common stock, par value \$0.001 per share (the “**Common Stock**”), and (ii) Seven Million Two Hundred Eighty-Five Thousand Four Hundred Fifty Six (7,285,456) shares shall be a class designated as preferred stock, par value \$0.001 per share (the “**Preferred Stock**”), of which 72,000 shares are designated Series B Convertible Preferred Stock (“**Series B Preferred Stock**”), 15,957 shares are designated Series C Convertible Preferred Stock (“**Series C Preferred Stock**”), 2,197,499 shares are designated Series D Convertible Preferred Stock (“**Series D Preferred Stock**”, and together with the Series B Preferred Stock and Series C Preferred Stock, the “**Designated Preferred Stock**”), and Five Million (5,000,000) shares shall be undesignated preferred stock (the “Undesignated Preferred Stock”).

FIFTH: That this Certificate of Amendment to the Restated Certificate of Incorporation shall be effective on and as of the date of filing with the Secretary of State of the State of Delaware.




IN WITNESS WHEREOF, this Certificate of Amendment to the Restated Certificate of Incorporation has been executed by a duly authorized officer of this Corporation on this [___] day of [___], 2022.

By: _____
Sanjay S. Shukla, M.D., M.S.
President and Chief Executive Officer



P.O. BOX 8016, CARY, NC 27512-9803

YOUR VOTE IS IMPORTANT! PLEASE VOTE BY:

	INTERNET Go To: www.proxypush.com/LIFE <ul style="list-style-type: none">• Cast your vote online• Have your Proxy Card ready• Follow the simple instructions to record your vote
	PHONE Call 1-866-284-6674 <ul style="list-style-type: none">• Use any touch-tone telephone• Have your Proxy Card ready• Follow the simple recorded instructions
	MAIL <ul style="list-style-type: none">• Mark, sign and date your Proxy Card• Fold and return your Proxy Card in the postage-paid envelope provided

aTyr Pharma, Inc.
Annual Meeting of Stockholders



For Stockholders of record as of March 7, 2022

TIME: Tuesday, April 26, 2022 at 8:30 AM, Pacific Time
PLACE: Annual Meeting to be held live via live webcast - please visit www.proxydocs.com/LIFE for more details.

This proxy is being solicited on behalf of the Board of Directors

The undersigned hereby appoints Sanjay S. Shukla, M.D., M.S. and Nancy E. Denyes (the "Named Proxies"), and each or either of them, as the true and lawful attorneys of the undersigned, with full power of substitution and revocation, and authorizes them, and each of them, to vote all the shares of capital stock of aTyr Pharma, Inc. which the undersigned is entitled to vote at said meeting and any adjournment thereof upon the matters specified and upon such other matters as may be properly brought before the meeting or any adjournment thereof, conferring authority upon such true and lawful attorneys to vote in their discretion on such other matters as may properly come before the meeting and revoking any proxy heretofore given.

THE SHARES REPRESENTED BY THIS PROXY WILL BE VOTED AS DIRECTED OR, IF NO DIRECTION IS GIVEN, SHARES WILL BE VOTED IDENTICAL TO THE BOARD OF DIRECTORS' RECOMMENDATION. This proxy, when properly executed, will be voted in the manner directed herein. In their discretion, the Named Proxies are authorized to vote upon such other matters that may properly come before the meeting or any adjournment or postponement thereof.

You are encouraged to specify your choice by marking the appropriate box (SEE REVERSE SIDE) but you need not mark any box if you wish to vote in accordance with the Board of Directors' recommendation. The Named Proxies cannot vote your shares unless you sign (on the reverse side) and return this card.

PLEASE BE SURE TO SIGN AND DATE THIS PROXY CARD AND MARK ON THE REVERSE SIDE

aTyr Pharma, Inc.

Annual Meeting of Stockholders

Please make your marks like this:

THE BOARD OF DIRECTORS RECOMMENDS A VOTE:
FOR ON PROPOSALS 1, 2, 3, 4, 5, 6 AND 7

PROPOSAL	YOUR VOTE			BOARD OF DIRECTORS RECOMMENDS
1. To elect three Class I directors, as nominated by the Company's Board of Directors, to hold office until the 2025 annual meeting of stockholders or until their successors are duly elected and qualified;	FOR		WITHHOLD	↓ FOR
1.01 John K. Clarke	<input type="checkbox"/>		<input type="checkbox"/>	FOR
1.02 Paul Schimmel, Ph.D.	<input type="checkbox"/>		<input type="checkbox"/>	FOR
1.03 Sara L. Zaknoen, M.D.	<input type="checkbox"/>		<input type="checkbox"/>	FOR
2. To ratify the appointment of Ernst & Young LLP as the independent registered public accounting firm of the Company for its fiscal year ending December 31, 2022;	FOR	AGAINST	ABSTAIN	FOR
3. To approve, on an advisory basis, the compensation of the Company's named executive officers;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	FOR
4. To approve an amendment to the aTyr Pharma, Inc. 2015 Stock Option and Incentive Plan, as amended;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	FOR
5. To approve an amendment to the aTyr Pharma, Inc. 2015 Employee Stock Purchase Plan;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	FOR
6. To approve an amendment to the Company's Restated Certificate of Incorporation to increase the authorized number of shares of common stock from 42,500,000 to 85,000,000 shares;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	FOR
7. To approve the authorization to adjourn the Annual Meeting, if necessary, to solicit additional proxies if there are not sufficient votes in favor of Proposals 4, 5 or 6.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	FOR

You must pre-register to attend the meeting online and/or participate at the internet address indicated.

Authorized Signatures - Must be completed for your instructions to be executed.

Please sign exactly as your name(s) appears on your account. If held in joint tenancy, all persons should sign. Trustees, administrators, etc., should include title and authority. Corporations should provide full name of corporation and title of authorized officer signing the Proxy/Vote Form.

 Signature (and Title if applicable)

 Date

 Signature (if held jointly)

 Date