
**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 under § 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

aTyr Pharma, Inc.
10240 Sorrento Valley Road, Suite #300
San Diego, CA 92121

NOTICE OF ANNUAL MEETING OF STOCKHOLDERS

To Be Held On May 17, 2023

Dear Stockholder:

You are cordially invited to attend the 2023 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 on Wednesday, May 17, 2023 at 9:00 a.m. Pacific Time at the Company's corporate headquarters located at 10240 Sorrento Valley Road, Suite #300, San Diego, CA 92121. The Annual Meeting is being held for the following purposes:

1. To elect two Class II directors, as nominated by the Company's Board of Directors (the "Board of Directors"), to hold office until the 2026 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, 2023;
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 Company's Restated Certificate of Incorporation to increase the number of authorized shares of common stock from 85,000,000 to 170,000,000 shares;
6. 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 or 5; and
7. 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 for our Annual Meeting ("Proxy Statement") accompanying this Notice of Annual Meeting of Stockholders. On or about _____, 2023, we expect to mail to our stockholders a Notice of Internet Availability of Proxy Materials containing instructions on how to access our proxy materials, which include the Proxy Statement and our Annual Report on Form 10-K for the fiscal year ended December 31, 2022 ("Annual Report"), in lieu of mailing printed copies. The Notice of Internet Availability of Proxy Materials provides instructions on how to vote online or by telephone and how to receive a paper copy of your proxy materials by mail.

Proposal 1 relates solely to the election of two Class II 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 _____, March _____, 2023 as the record date for the determination of stockholders entitled to notice of, and to vote at, the Annual Meeting.

All stockholders are cordially invited to attend the Annual Meeting. Whether or not you expect to attend the Annual Meeting in person, in order to ensure your representation at the Annual Meeting, you are requested to complete, date, sign and return a proxy card if one is mailed to you, or vote over the telephone or the Internet as instructed in the Notice of Internet Availability of Proxy Materials that you will receive in the mail. You may request a paper proxy card at any time on or before May 5, 2023 to submit your vote by mail. If you attend the Annual Meeting and file with the Secretary of the Company an instrument revoking your proxy or a duly executed proxy bearing a later date, your proxy will not be used. Please note, however, that if your shares are held of record by a broker, bank or other nominee and you wish to vote at the meeting, you must obtain a proxy issued in your name from that record holder.

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 , 2023

Your vote is important, whether or not you expect to attend the Annual Meeting in person. You are urged to vote either via the Internet or telephone, or by mail by requesting a printed copy of the proxy card, as instructed in the Notice of Internet Availability of Proxy Materials that you will receive in the mail. Voting promptly will help avoid the additional expense of further solicitation to assure a quorum at the meeting.

TABLE OF CONTENTS

<u>PROXY STATEMENT</u>	1
<u>PROPOSAL 1—ELECTION OF DIRECTORS</u>	5
<u>PROPOSAL 2—RATIFICATION OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM</u>	14
<u>PROPOSAL 3 – ADVISORY VOTE ON NAMED EXECUTIVE OFFICER COMPENSATION</u>	15
<u>PROPOSAL 4—APPROVAL OF AN AMENDMENT TO THE 2015 STOCK OPTION AND INCENTIVE PLAN, AS AMENDED</u>	16
<u>PROPOSAL 5—APPROVAL OF AN AMENDMENT TO THE COMPANY’S RESTATED CERTIFICATE OF INCORPORATION TO INCREASE THE NUMBER OF AUTHORIZED SHARES OF COMMON STOCK</u>	23
<u>PROPOSAL 6—AUTHORIZATION TO ADJOURN THE ANNUAL MEETING, IF NECESSARY, TO SOLICIT ADDITIONAL PROXIES</u>	25
<u>EXECUTIVE OFFICERS</u>	26
<u>EXECUTIVE COMPENSATION</u>	26
<u>PAY VERSUS PERFORMANCE</u>	40
<u>DIRECTOR COMPENSATION</u>	45
<u>CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS</u>	46
<u>SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT</u>	48
<u>AUDIT COMMITTEE REPORT</u>	51
<u>HOUSEHOLDING OF PROXY MATERIALS</u>	52
<u>OTHER MATTERS</u>	52

ATYR PHARMA, INC.

PROXY STATEMENT
FOR THE 2023 ANNUAL MEETING OF STOCKHOLDERS
To Be Held On May 17, 2023

INFORMATION CONCERNING SOLICITATION AND VOTING

General

This proxy statement ("Proxy Statement") is furnished in connection with the solicitation of proxies for the 2023 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 on Wednesday, May 17, 2023 at 9:00 a.m. Pacific Time for the following purposes, which are more fully described in this Proxy Statement:

1. To elect two Class II directors, as nominated by the Company's Board of Directors ("Board of Directors"), to hold office until the 2026 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, 2023;
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 Company's Restated Certificate of Incorporation (as amended, the "Restated Certificate of Incorporation") to increase the number of authorized shares of common stock from 85,000,000 to 170,000,000 shares;
6. 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 or 5; and
7. To transact such other business as may properly come before the Annual Meeting or any adjournment or postponement thereof.

The Annual Meeting will be held at the Company's corporate headquarters located at 10240 Sorrento Valley Road, Suite #300, San Diego, California 92121. On or about March 1, 2023, we mailed to all stockholders entitled to vote at the Annual Meeting a Notice of Internet Availability of Proxy Materials ("Notice") containing instructions on how to access this Proxy Statement and our 2022 Annual Report, including our Annual Report on Form 10-K for the year ended December 31, 2022 ("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.

Important Notice Regarding the Availability of Proxy Materials for the Stockholders' Meeting to Be Held on May 17, 2023

In accordance with rules and regulations of the U.S. Securities and Exchange Commission (the "SEC"), instead of mailing a printed copy of our proxy materials to each stockholder of record, the Company may furnish proxy materials via the Internet. Accordingly, all of the Company's stockholders will receive a Notice, to be mailed on or about March 1, 2023.

On the date of mailing the Notice, stockholders will be able to access all of the proxy materials, which include this Proxy Statement and our Annual Report via the Internet at www.proxydocs.com/LIFE. The proxy materials will be available free of charge. The Notice will instruct you as to how you may access and review all of the important information contained in the proxy materials (including the Annual Report) over the Internet or through other methods specified on the website. The website contains instructions as to how to vote by Internet, over the telephone, or by proxy card. The Notice also instructs you as to how you may request a paper or email copy of the proxy card. If you received a Notice and would like to receive printed copies of the proxy materials, you should follow the instructions for requesting such materials included in the Notice.

Voting Rights and Outstanding Shares

Only holders of record of our common stock as of the close of business on March , 2023 (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 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 voting power 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, 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 Increase in Authorized Common Stock	Majority Outstanding	Yes ⁽¹⁾
6. Approval of the Authorization to Adjourn the Annual Meeting, if Necessary	Majority Cast	Yes ⁽¹⁾

(1) Although our shares of common stock are not listed with The New York Stock Exchange (“NYSE”), the NYSE regulates broker-dealers and their discretion to vote on stockholder proposals. The 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. Given such discretionary authority, we do not anticipate broker non-votes for 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 matter.

“Plurality” means a plurality of the votes properly cast on such matter. For the election of directors, the two nominees receiving the most “FOR” 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 Accounting Firm. 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 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 matter. 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 5 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 5.

Proposal 6—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 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.

As a stockholder of record, you may vote in person at the meeting or vote by proxy. Whether or not you plan to attend the meeting, we request that you vote your shares by proxy over the Internet, by telephone or by using a proxy card that you may request. 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 two 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, 2023; (iii) the approval of the compensation of the Company’s named executive officers; (iv) the amendment to the 2015 Stock Plan; (v) the amendment to the Company’s Restated Certificate of Incorporation to increase the number of authorized shares of common stock from 85,000,000 to 170,000,000 shares; (vi) the adjournment of the Annual Meeting, if necessary; and (vii) as the proxy holders deem advisable, in their discretion, on other matters that may properly come before the Annual Meeting.

Voting by Proxy over the Internet, by Telephone, or by Proxy Card

If you are a stockholder whose shares are registered in your own name, you may vote by proxy, over the Internet, by telephone or by completing and returning a printed proxy card if one is mailed to you. Instructions for voting by proxy over the Internet, by telephone or by proxy card are set forth on the Notice. The Internet and telephone voting facilities will close at 9:00 a.m. Pacific Time on May 17, 2023. The Notice will also provide instructions on how you can elect to receive future proxy materials electronically or in printed form by mail. If you choose to receive future proxy materials electronically, you will

receive an email next year with instructions containing a link to the proxy materials and a link to the proxy voting site. Your election to receive proxy materials electronically or in printed form by mail will remain in effect until you terminate such election.

If your shares are held in street name, the Notice will be sent to you by your broker, bank or other nominee rather than from the Company. To vote prior to the Annual Meeting, simply follow the voting instructions in the Notice to ensure that your vote is counted. To vote at the Annual Meeting, you must obtain a valid proxy from your broker, bank or other nominee. Follow the instructions from your broker, bank or other nominee included with these proxy materials, or contact that organization to request a proxy form.

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 10240 Sorrento Valley Road, Suite #300, San Diego, California 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 _____, 2023 (120 days prior to the one-year anniversary of the date that this Proxy Statement is released to stockholders) in order to be considered for inclusion in next year's proxy materials. If the 2024 annual meeting of stockholders is scheduled to be held on a date that is more than 30 days before or after May 17, 2024, 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 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 January 18, 2024 and no later than February 17, 2024. Our Bylaws also specify requirements as to the form and content of a stockholder's notice. However, if our 2024 annual meeting of stockholders is not held between April 17, 2024 and July 16, 2024, 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 2024 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.

In addition, stockholders who intend to solicit proxies in support of director nominees other than the Company's nominees must also comply with the additional requirements of Rule 14a-19(b).

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 II directors will expire at the Annual Meeting, and each of our Class II directors will stand for re-election at the Annual Meeting. Our Board of Directors is currently comprised of seven members. If the Class II 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 II director nominees designated below to serve until the 2026 annual meeting of stockholders and until their successors shall have been duly elected and qualified. Each nominee is currently a director. Our 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 1, 2023 are set forth below.

Name	Age	Position
Sanjay S. Shukla, M.D., M.S.	51	President, Chief Executive Officer and Director
John K. Clarke ⁽¹⁾⁽²⁾⁽³⁾	69	Chairman of the Board
Timothy P. Coughlin ⁽¹⁾⁽²⁾	56	Director
Jane A. Gross, Ph.D. ⁽²⁾	66	Director
Svetlana Lucas, Ph.D. ⁽¹⁾⁽³⁾	51	Director
Paul Schimmel, Ph.D.	82	Director
Sara L. Zaknoen, M.D. ⁽³⁾	64	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 II:

The two individuals listed below are nominated for election as Class II directors to serve a three-year term expiring at the 2026 annual meeting of stockholders and until their respective successors are elected and qualified. Mr. Coughlin and Dr. Gross were previously elected by the stockholders.

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 ORILISSA (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 Travers 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.

Continuing Directors:

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.

Class I: Currently Serving Until the 2025 Annual Meeting

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 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.

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 LLC (“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, non-employee 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 four times in 2022 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 1, 2023)		
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, cybersecurity and data privacy, 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 2022, the Board of Directors held a total of four 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 and Media/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 2022, the Audit Committee held four meetings.

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 2022, the Compensation Committee held four 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 2022, the Nominating and Corporate Governance Committee held two 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 2022 annual meeting of stockholders virtually.

Required Vote

Directors are elected by a plurality of the votes of the holders of shares present by attendance or represented by proxy and entitled to vote on the election of directors. Accordingly, the two nominees named in this Proxy Statement receiving the highest number of “FOR” votes properly cast shall be elected as Class II directors to serve until the 2026 annual meeting of stockholders or until their successors have been duly elected and qualified. Withhold votes 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 the stockholders vote “FOR” the election of the Class II 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, 2023. 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, 2022 and 2021:

Fees billed by Ernst & Young LLP	Fiscal Year Ended December 31,	
	2022	2021
Audit Fees ⁽¹⁾	\$ 418,027	\$ 547,095
Audit-Related Fees	—	—
Tax Fees	—	—
All Other Fees	—	—
Total	\$ 418,027	\$ 547,095

(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. Fees billed for the fiscal year ended December 31, 2022 do not include final billing for work performed by Ernst & Young LLP during February and March of 2023.

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, 2022 and 2021 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, 2023.

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 our 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, pursuant to the compensation disclosure rules of the Securities and Exchange Commission, including the compensation tables and any related material, 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 6, 2023, 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 4,000,000 to 7,711,868. 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 the Nasdaq Capital Market on March 1, 2023, the maximum aggregate market value of the additional shares of common stock that would become available for issuance under the 2015 Stock Plan is \$ _____.

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 3,711,868 and after the proposed amendment will be 7,711,868;
- 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;
- 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 on the Nasdaq Capital Market on March 1, 2023 and the maximum number of shares that would have been available for awards as of such date under the 2015 Stock Plan, as amended by this Proposal 4, the maximum aggregate market value of the common stock that could potentially be issued under the 2015 Stock Plan is \$ _____. 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 , 2023, approximately % 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 , 2023. 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 , 2023, our overhang was %. The 4,000,000 share reserve increase under the 2015 Stock Plan being proposed in this Proposal 4 would result in our overhang as of March , 2023 increasing to approximately %.

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 , 2023, each of our non-employee directors and approximately 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 the Nasdaq Capital Market 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. For additional information regarding our current compensation program for non-employee directors, please see "Director Compensation" below.

Name and Position	Number of Shares Subject to Grant (#)
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 , 2023, 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 Grant (#)
Sanjay S. Shukla, M.D., M.S., <i>President and Chief Executive Officer</i>	
Jill M. Broadfoot, <i>Chief Financial Officer</i>	
Nancy E. Denyes, <i>General Counsel</i>	
All current executive officers, as a group	
All current directors who are not executive officers, as a group	
Each nominee for election as a director:	
Timothy P. Coughlin	
Jane A. Gross, Ph.D.	
Each associate of any executive officers, current directors or director nominees	
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	

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.

Equity Compensation Plan Information

The following table provides information as of December 31, 2022 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 Employee Stock Purchase Plan (“2015 ESPP”), and our 2014 Stock Plan, and through inducement grants issued outside of our 2015 Stock Plan, such as the aTyr Pharma, Inc. 2022 Inducement Plan (the “2022 Inducement 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 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⁾	2,721,723	\$ 7.66	1,834,668
Equity compensation plans not approved by security holders: Inducement option grants ⁽⁵⁾	355,885	\$ 5.93	98,400
Total	3,077,608		1,933,068

(1) Includes 2,956,170 shares subject to outstanding stock options and 121,438 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 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. Additionally, in March 2022, the Compensation Committee adopted the 2022 Inducement Plan with a share reserve of 300,000 shares, and we have granted nonstatutory stock option awards to purchase an aggregate of 201,600 shares of common stock to new hires who joined the Company during 2022 as material inducements to their acceptance of employment with us in accordance with Nasdaq Listing Rule 5635(c)(4), all of which remain outstanding and were granted pursuant to a form of nonstatutory stock option grant notice and option agreement previously approved by the Board of Directors.

Required Vote

The approval of the amendment to the 2015 Stock Plan 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 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 COMPANY'S RESTATED CERTIFICATE OF INCORPORATION TO INCREASE THE 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 (as amended to date, the "Charter") to increase the Company's number of authorized shares of common stock from 85,000,000 to 170,000,000 (the "Certificate of Amendment"). The form of the proposed Certificate of Amendment is attached to this Proxy Statement as Annex B and is incorporated by reference into this proposal.

As of March , 2023, there were: (i) shares of common stock outstanding; (ii) shares of common stock reserved for issuance upon exercise of warrants; (iii) shares of common stock reserved for issuance upon exercise of outstanding stock options or vesting and settlement of outstanding RSUs; (iv) shares available for issuance in connection with additional grants under our 2015 Stock Plan (not including the increase set forth in Proposal 4); (v) shares reserved for issuance under our 2022 Inducement Plan; and (vi) shares of common stock reserved for issuance under our 2015 ESPP. Thus, as of March , 2023, we had unissued and unreserved authorized shares of common stock (not including the share reserve increase set forth in Proposal 4).

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 170,000,000 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 Nasdaq rules 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, and (ii) pursuant to a sales agreement with Jefferies LLC ("Jefferies") entered into in April 2022 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 \$65.0 million. To date, we have issued \$5.6 million of shares of our common stock to Jefferies pursuant to the sales agreement with Jefferies. 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, 2022, we have financed our operations primarily through the sale of equity securities and convertible debt and through venture debt, term loans and license and collaboration agreement revenues. 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, efzofitimod (the non-proprietary name of ATYR1923), in 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 on the matter 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 85,000,000 to 170,000,000 shares.

PROPOSAL 6

AUTHORIZATION TO ADJOURN THE ANNUAL MEETING, IF NECESSARY, TO SOLICIT ADDITIONAL PROXIES

General

If the Annual Meeting is convened and a quorum is present, but there are not sufficient votes to approve Proposals 4 or 5, 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 or 5. 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 or 5, 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 6 requires the affirmative vote of the majority of the votes properly 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 1, 2023:

Name	Age	Position
Sanjay S. Shukla, M.D., M.S.	51	President, Chief Executive Officer and Director
Jill M. Broadfoot	61	Chief Financial Officer
Nancy E. Denyes	55	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 Biocenticals Inc., where she was responsible for establishing operations for the U.S.-based pharmaceutical and biocentical 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 AcelRx Pharmaceuticals, Inc. and Angiocrine Biosciences, Inc., both biotechnology companies. She previously served on the board of directors of Otonomy, Inc., a biotechnology company. 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 2022 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 first-in-class medicines from our proprietary tRNA synthetase platform. 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”).

Efzofitimod

Our primary focus is efzofitimod, a clinical-stage product candidate which targets NRP2 to resolve chronic inflammation that can lead to fibrosis. Efzofitimod has a novel mechanism of action for potentially treating lung inflammation and fibrosis. We believe by targeting NRP2 on myeloid cells during active inflammation, efzofitimod works upstream of currently available immunomodulators to restore immune homeostasis, thereby resolving chronic inflammation and preventing the progression of fibrosis. We are developing efzofitimod as a potential disease-modifying therapy for patients with interstitial lung disease (“ILD”). ILDs are predominantly immune-mediated disorders that are characterized by chronic inflammation, which can lead to progressive fibrosis of the lung. There are limited treatment options for ILD and there remains a high unmet medical need. Sarcoidosis and systemic sclerosis (SSc, also known as scleroderma)-associated ILD (“SSc-ILD”) are two major forms of ILD. During 2022, the U.S. Food and Drug Administration (“FDA”) granted efzofitimod orphan drug designations for the treatment of sarcoidosis and for the treatment of SSc, and Fast Track designations for the treatment of pulmonary sarcoidosis and for the treatment of SSc-ILD. In January 2023, the European Commission granted efzofitimod an orphan drug designation for the treatment of sarcoidosis based on the opinion of the European Medicines Agency (“EMA”) Committee for Orphan Medicinal Products (“COMP”).

In September 2021, we announced positive results and clinical proof-of-concept from a double-blind, placebo-controlled Phase 1b/2a clinical trial in 37 patients with pulmonary sarcoidosis. The study was designed to evaluate the safety, tolerability, immunogenicity and preliminary efficacy of three doses of efzofitimod, 1.0, 3.0 and 5.0 mg/kg, in the context of a forced steroid taper. Efzofitimod was safe and well-tolerated at all doses administered with no serious drug-related adverse events or signal of immunogenicity. Additionally, the study demonstrated consistent dose response for efzofitimod on key efficacy endpoints and improvements compared to placebo, including measures of steroid reduction, lung function, pulmonary sarcoidosis symptom measures and inflammatory biomarkers. These data were subsequently presented at the American Thoracic Society (“ATS”) International Conference and published in the peer-reviewed journal *CHEST* during 2022.

In February 2022, we met with the FDA in an end-of-Phase 2 meeting to discuss our plans for subsequent clinical development and path to registration for efzofitimod for pulmonary sarcoidosis. Subsequently, we initiated a global pivotal Phase 3 randomized, double-blind, placebo-controlled clinical trial to evaluate the efficacy and safety of efzofitimod in patients with pulmonary sarcoidosis (“EFZO-FIT™ study”). The EFZO-FIT™ study is a 52-week study consisting of three parallel cohorts randomized equally to either 3.0 mg/kg or 5.0 mg/kg of efzofitimod or placebo dosed intravenously once a month for a total of 12 doses. The study is currently enrolling and intends to enroll 264 subjects with pulmonary sarcoidosis at multiple centers in the United States, Europe and Japan. The trial design incorporates a forced steroid taper. The primary endpoint of the study is steroid reduction. Secondary endpoints include measures of lung function and sarcoidosis symptoms. In September 2022, we dosed the first patient in this study.

Based on the results of the Phase 1b/2a clinical trial, we believe efzofitimod has potential applications in the treatment of other ILDs, such as chronic hypersensitivity pneumonitis (“CHP”) and connective tissue disease related ILD including SSc-ILD and rheumatoid arthritis-associated ILD. As such, we designed a focused Phase 2 proof-of-concept study of efzofitimod in patients with SSc-ILD. In February 2023, we announced that we plan to initiate this Phase 2 study of efzofitimod in patients with SSc-ILD in 2023. This planned Phase 2 study is expected to be a randomized, double-blind placebo-controlled proof-of-concept study to evaluate the efficacy, safety and tolerability of efzofitimod in patients with SSc-ILD. This is expected to be a 28-week study with three parallel cohorts randomized 2:2:1 to either 270 mg or 450 mg of efzofitimod or placebo dosed intravenously monthly for a total of six doses. It is expected the study will enroll 25 patients at multiple centers in the United States. The primary objective of the study will be to evaluate the efficacy of multiple doses of intravenous (“IV”) efzofitimod on pulmonary, cutaneous and systemic manifestations in patients with SSc-ILD. Secondary objectives will include safety and tolerability.

Named Executive Officers

This section discusses our executive compensation decisions for the year ended December 31, 2022 for our Named Executive Officers. Our Named Executive Officers for 2022 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 2022, we executed on our plans to advance the clinical development of efzofitimid, 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 2022 include:

- **Advancement of efzofitimid clinical program.** During the third quarter of 2022, we initiated the EFZO-FIT™ study, which is a global pivotal Phase 3 randomized, double-blind, placebo-controlled clinical trial to evaluate the efficacy and safety of efzofitimid in patients with pulmonary sarcoidosis. The EFZO-FIT™ study is a 52-week study consisting of three parallel cohorts randomized equally to either 3.0 mg/kg or 5.0 mg/kg of efzofitimid or placebo dosed intravenously once a month for a total of 12 doses. The study is currently enrolling and intends to enroll 264 subjects with pulmonary sarcoidosis at multiple centers in the United States, Europe and Japan. The trial design incorporates a forced steroid taper. The primary endpoint of the study is steroid reduction. Secondary endpoints include measures of lung function and sarcoidosis symptoms. In September 2022, we dosed the first patient in this study. During 2022, the FDA granted efzofitimid orphan drug designations for the treatment of sarcoidosis and for the treatment of SSc, and Fast Track designations for the treatment of pulmonary sarcoidosis and for the treatment of SSc-ILD. In January 2023, the European Commission granted efzofitimid an orphan drug designation for the treatment of sarcoidosis based on the opinion of the EMA COMP.
- **Pipeline advancement.** Extracellular tRNA synthetase biology represents a novel set of potential physiological modulators and therapeutic targets. Using efzofitimid as a model, we have developed a process to advance novel tRNA synthetase domains from a concept to therapeutic candidate. This process leverages our early discovery work as well as current scientific understanding of tRNA synthetase evolution, protein structure, gene splicing and tissue-specific regulation to identify potentially active protein domains. Screening approaches are employed to identify target cells and extracellular receptors for these tRNA synthetase-derived proteins. These cellular systems can then be used in mechanism-of-action studies to elucidate the role these proteins play in cellular responses and their potential therapeutic utility. We are working to identify new tRNA synthetase based drug candidates through our internal discovery efforts and industry and academic collaborations, including our research collaboration we entered into in October 2022 with Dualsystems Biotech AG (“Dualsystems”), a company specializing in custom proteomics. Under the collaboration, which is exclusive with respect to tRNA related molecules, Dualsystems has agreed to utilize their proprietary receptor screening technology and research expertise to attempt to identify and validate additional target receptors for tRNA synthetases. We have also advanced our preclinical pipeline of NRP2 targeting antibody candidates through internal research efforts and academic collaborations. ATYR2810 is a product candidate from our NRP2 antibody program that we believe is ready to enter clinical trials. In the third quarter of 2022, we announced that we intend to focus our resources on our efzofitimid program. Therefore, we have made the strategic decision not to use internal resources to initiate a Phase 1 study of ATYR2810 at this time. We intend to pursue alternative avenues to advance this program.
- **Fostered partnerships.** In January 2020, we entered into a collaboration and license agreement (“Kyorin Agreement”) with Kyorin Pharmaceutical Co., Ltd. (“Kyorin”) for the development and commercialization of efzofitimid for the treatment of ILD in Japan. Under the Kyorin Agreement, Kyorin received an exclusive right to develop and commercialize efzofitimid in Japan for all forms of ILD, and is obligated to fund all research, development, regulatory, marketing and commercialization activities in Japan. In September 2020, Kyorin began dosing patients in a Phase 1 clinical trial of efzofitimid (known as KRP-R120 in Japan) and completed the last subject visit in December 2020. The Phase 1 clinical trial, which was conducted and funded by Kyorin, was a placebo-controlled clinical trial to evaluate the safety, pharmacokinetics (“PK”) and immunogenicity of efzofitimid in 32 healthy Japanese male volunteers. Efzofitimid was observed to be generally well-tolerated with no drug-related serious adverse events, and PK findings were consistent with previous studies of efzofitimid. Kyorin is also participating in our Phase 3 EFZO-FIT™ study as the local sponsor in Japan. In February 2023, Kyorin dosed the first patient in Japan in the EFZO-FIT™ study which triggered a \$10.0 million milestone payment to us. To date, the Kyorin Agreement has generated \$20.0

million in upfront and milestone payments to us and we are eligible to receive up to an additional \$155.0 million in the aggregate upon achievement of certain development, regulatory and sales milestones, as well as tiered royalties on any net sales in Japan.

- **Enhanced sustainability through meeting financial and operational objectives.** We ended 2022 with \$69.3 million in cash and investments. Additionally, in February 2023, we completed an underwritten follow-on public offering of 23,125,000 shares of our common stock, including the partial exercise of the underwriters' option to purchase additional shares, at a price to the public of \$2.25 per share. The total gross proceeds from the offering were approximately \$52.0 million, before deducting underwriting discounts, commissions and offering expenses payable by us. In April 2022, we entered into an Open Market Sale AgreementSM with Jefferies implementing an "at-the-market" offering program (the "ATM Offering Program"), pursuant to which we may offer and sell, from time to time and at our option, up to an aggregate of \$65.0 million of shares of our common stock through Jefferies, acting as sales agent. Jefferies is entitled to a fixed commission rate of up to 3.0% of the gross sales proceeds of shares sold under the ATM Offering Program. During 2022, we sold an aggregate of 1,421,627 shares of common stock at a weighted-average price of \$3.09 per share for net proceeds of approximately \$4.0 million under the ATM Offering Program. Additionally, in May 2022, we entered into a lease ("Lease") with San Diego Creekside, LLC ("Landlord"), as lessor, pursuant to which we agreed to lease from Landlord approximately 23,696 rentable square feet (subject to increase pursuant to the terms of the Lease) of office and laboratory space. This facility will serve as our new corporate headquarters and research and development facility. We have also entered into an equipment financing lease arrangement to lease various research and development and information technology equipment over a 48-month term as we move into our new facility in 2023. This structure will allow us to extend cash expenditure over the 48-month term for our equipment needs.

2022 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 2022.
- Based on 2022 performance, the Compensation Committee and the Board of Directors determined that performance-based bonuses should be paid at 80% of target to our Named Executive Officers.
- We granted equity awards in the form of stock options and RSUs to our Named Executive Officers to incentivize and reward for stockholder value creation as part of our annual performance evaluation in February.
- In May 2022, 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.

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, 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 2021 and 2022, 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 2022, 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 2022 was approximately \$41,000. The Compensation Committee's direct engagement of Radford in 2022 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 2022, the Compensation Committee reviewed market data for each executive officer's position, compiled by Radford, from the following peer group of companies for 2022:

9 Meters Biopharma, Inc.	Infinity Pharmaceuticals, Inc.
Alaunos Therapeutics, Inc.	KalVista Pharmaceuticals, Inc.
Corvus Pharmaceuticals, Inc.	MEI Pharma, Inc.
CymaBay Therapeutics, Inc.	Pieris Pharmaceuticals, Inc.
Equilium, Inc.	Pliant Therapeutics, Inc.
Evelo Biosciences, Inc.	Savara Inc.
Fortress Biotech, Inc.	Scholar Rock Holding Corporation
Humanigen, Inc.	Viking Therapeutics, Inc.
Immunic, Inc.	

The peer group for 2022 was recommended by Radford and targeted U.S.-based, publicly traded, pre-commercial companies operating in the biopharmaceutical industry, with development programs primarily in Phase II or III clinical trials with emphasis on pulmonology, respiratory, immunoncology and infection disease where possible, market capitalizations generally between 0.5 and 3.0 times our market capitalization, headcount generally under 150 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, 2022 and 2021.

Name and Principal Position	Year	Salary (\$)	Stocks Awards (\$) ⁽¹⁾	Option (\$) ⁽¹⁾	Nonequity Incentive Plan Compensation (\$) ⁽²⁾	All Other Compensation (\$) ⁽³⁾⁽⁴⁾	Total (\$)
Sanjay S. Shukla, M.D., M.S. <i>President and CEO</i>	2022	561,243	229,080	1,386,876	224,500	9,736	2,411,435
	2021	510,221	—	1,076,297	293,377	12,813	1,892,708
Jill M. Broadfoot <i>Chief Financial Officer</i>	2022	414,395	82,800	274,076	132,610	9,612	913,493
	2021	376,723	—	355,683	173,282	11,755	917,443
Nancy E. Denyes <i>General Counsel</i>	2022	396,635	59,340	266,053	126,925	8,575	857,528
	2021	360,577	—	353,702	165,876	11,133	891,288

- (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 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.
- (4) The amounts reported in 2022 in this column include: (i) 401(k) Plan employer match of \$9,130 and life insurance premium of \$606 to Dr. Shukla; (ii) 401(k) Plan employer match of \$9,006 and life insurance premium of \$606 to Ms. Broadfoot; and (iii) 401(k) Plan employer match of \$7,969 and life insurance premium of \$606 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 2022 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' 2022 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 2022, the Compensation Committee reviewed the base salaries for our executive officers, peer group data, the scope of each executive officer's responsibilities for 2022, each executive officer's prior

experience and internal pay equity in order to determine 2022 base salaries for Ms. Broadfoot and Ms. Denyes and to recommend the 2022 base salary for Dr. Shukla. Each of the Named Executive Officers' 2022 annual base salary rates (effective January 1, 2022), as approved by the Compensation Committee or the Board of Directors, as applicable, are listed in the table below. Each Named Executive Officer received a 10% increase in base salary to account for closer alignment with the 2022 peer group data provided by Radford and general market increases as recommended by Radford according to market data.

Named Executive Officer	2022 Base Salary
Sanjay S. Shukla, M.D., M.S.	\$561,243
Jill M. Broadfoot	\$414,395
Nancy E. Denyes	\$396,635

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 2022. 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 2022. For 2022, the target bonus percentages for Dr. Shukla, Ms. Broadfoot and Ms. Denyes were 50%, 40% and 40%, respectively.

The Performance Goals for 2022 on which our Named Executive Officer performance-based bonuses were based, included the following:

- Initiate a Phase 3 clinical trial of efzofitmod in pulmonary sarcoidosis;
- Achieve regulatory milestones supporting the clinical development of efzofitmod;
- Complete IND-enabling work and initiate a Phase 1 clinical trial for ATYR2810;
- Nominate a new IND-candidate from our research pipeline;
- Ensure adequate financial resources to add another year of cash runway through a combination of program prioritization, equity vehicles and partnerships; and
- Expand headcount while continuing to nurture existing culture and reinforcing shared values.

The Performance Goals were weighted. In evaluating our performance for 2022, the Compensation Committee reviewed the objectives and the 2022 performance highlights described earlier in this section. Given our success in advancing the efzofitmod program, coupled with challenging overall economic conditions that required prioritization of our efzofitmod program over our other programs and impacted our ability to strengthen and sustain our financing, the Compensation Committee determined that we had achieved an 80% level of performance toward achieving these Performance Goals.

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 80% of their target bonuses for 2022 as reflected in the table below:

Named Executive Officer	Bonus
Sanjay S. Shukla, M.D., M.S.	\$224,500
Jill M. Broadfoot	\$132,610
Nancy E. Denyes	\$126,925

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 2022, the Compensation Committee or the Board of Directors, as applicable, approved the following annual stock option grants and RSU grants for our Named Executive Officers. The stock options vest monthly over a four-year period and have an exercise price of \$5.52 per share, the closing price of our common stock on the grant date. The restricted stock units vest annually over a four-year period:

Named Executive Officer	Stock Option Grant (# shares)
Sanjay S. Shukla, M.D., M.S.	83,000
Jill M. Broadfoot	30,000
Nancy E. Denyes	21,500

Named Executive Officer	Restricted Stock Unit Grant (# shares)
Sanjay S. Shukla, M.D., M.S.	41,500
Jill M. Broadfoot	15,000
Nancy E. Denyes	10,750

In addition, in May 2022, 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, as well as an analysis of total percentage company ownership versus our peers. 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 2022 stock option grants for executives vest monthly over a four-year period and have an exercise price of \$2.81 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.	516,280
Jill M. Broadfoot	75,347
Nancy E. Denyes	88,097

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 2022, Dr. Shukla’s annual base salary was \$561,243. 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 2022, Ms. Broadfoot’s annual base salary was \$414,395. 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 2022, Ms. Denyes’ annual base salary was \$396,635.

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, 2022:

Option Awards							Stock Awards		
Name	Vesting Commencement Date	Number of Securities Underlying Unexercised Options (#) Exercisable	Number of Securities Underlying Unexercised Options (#) Unexercisable	Equity Incentive Plan Awards: Number of Securities Underlying Unexercised Unearned Options (#)	Option Exercise Price (\$)	Option Expiration Date	Equity Incentive Plan Awards: Number of Unearned Shares or Units that have not Vested (#)	Equity Incentive Plan Awards: Market Value of Unearned Shares or Units that have not Vested (\$) (5)	
Sanjay S. Shukla, M.D., M.S.	3/30/2016	11,642 ⁽¹⁾	—	—	68.04	3/30/2026	—	—	
	9/13/2016	1,964 ⁽²⁾	—	—	42.84	9/13/2026	—	—	
	2/7/2017	4,642 ⁽²⁾	—	—	46.20	2/7/2027	—	—	
	11/1/2017	32,142 ⁽²⁾	—	—	56.00	11/1/2027	—	—	
	2/6/2018	21,428 ⁽²⁾	—	—	46.20	2/6/2028	—	—	
	2/6/2019	13,690 ⁽²⁾	595 ⁽²⁾	—	7.24	2/6/2029	—	—	
	2/5/2020	27,857 ⁽²⁾	11,470 ⁽²⁾	—	4.51	2/5/2030	—	—	
	5/26/2020	23,619 ⁽²⁾	12,952 ⁽²⁾	—	4.06	5/26/2030	—	—	
	2/4/2021	51,548 ⁽²⁾	60,921 ⁽²⁾	—	4.52	2/4/2031	—	—	
	5/21/2021	81,938 ⁽²⁾	125,062 ⁽²⁾	—	4.45	5/21/2031	—	—	
	2/3/2022	17,292 ⁽²⁾	65,708 ⁽²⁾	—	5.52	2/3/2032	—	—	
	2/3/2022	—	—	—	—	—	41,500 ⁽⁴⁾	90,885	
5/24/2022	75,291 ⁽²⁾	440,989 ⁽²⁾	—	2.81	5/24/2032	—	—		
Jill M. Broadfoot	7/30/2018	14,285 ⁽¹⁾	—	—	11.41	7/30/2028	—	—	
	2/6/2019	3,422 ⁽²⁾	149 ⁽²⁾	—	7.24	2/6/2029	—	—	
	2/5/2020	16,546 ⁽²⁾	6,813 ⁽²⁾	—	4.51	2/5/2030	—	—	
	5/26/2020	9,688 ⁽²⁾	5,312 ⁽²⁾	—	4.06	5/26/2030	—	—	
	2/4/2021	22,917 ⁽²⁾	27,083 ⁽²⁾	—	4.52	2/4/2031	—	—	
	5/21/2021	21,375 ⁽²⁾	32,625 ⁽²⁾	—	4.45	5/21/2031	—	—	
	2/3/2022	6,250 ⁽²⁾	23,750 ⁽²⁾	—	5.52	2/3/2032	—	—	
2/3/2022	—	—	—	—	—	15,000 ⁽⁴⁾	32,850		
5/24/2022	10,988 ⁽²⁾	64,359 ⁽²⁾	—	2.81	5/24/2032	—	—		
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	3,571	(2)	—	—	46.20	2/6/2028	—	—
						5/16/202		
5/16/2018	3,571	(3)	—	—	11.90	8	—	—
2/6/2019	8,556	(2)	372	(2)	7.24	2/6/2029	—	—
2/5/2020	9,759	(2)	4,019	(2)	4.51	2/5/2030	—	—
						5/26/203		
5/26/2020	9,688	(2)	5,312	(2)	4.06	0	—	—
2/4/2021	20,625	(2)	24,375	(2)	4.52	2/4/2031	—	—
						5/21/203		
5/21/2021	23,354	(2)	35,646	(2)	4.45	1	—	—
2/3/2022	4,479	(2)	17,021	(2)	5.52	2/3/2032	—	—
2/3/2022	—		—		—	—	10,750	(4)
						5/24/203		23,543
						2	—	—
5/24/2022	12,847	(2)	75,250	(2)	2.81	2	—	—

- (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) 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 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, as applicable or the respective stock option agreements evidencing such stock option).
- (4) Vested in four equal annual installments from Vesting Commencement Date set forth in the table above.
- (5) Value is based on our closing stock price on December 31, 2022 of \$2.19, as reported on the Nasdaq Capital Market.

PAY VERSUS PERFORMANCE

We are providing the following information about the relationship between executive compensation actually paid and certain financial performance of our company as required by Section 953(a) of the Dodd-Frank Wall Street Reform and Consumer Protection Act and Item 402(v) of Regulation S-K.

Year	Summary Compensation Table Total for Principal Executive Officer ("PEO") ⁽¹⁾		Average Summary Compensation Table Total for Non-PEO Named Executive Officers ("NEOs") ⁽³⁾		Value of Initial Fixed \$100 Investment Based On Total Shareholder Return ("TSR") ⁽⁵⁾		Net Income (Loss) (thousands)					
	(a)	(b)	(c)	(d)	(e)	(f)						
2022	\$	2,411,435	\$	480,848	\$	885,511	\$	29,260	\$	56.44		
2021	\$	1,892,708	\$	1,647,683	\$	904,366	\$	1,119,241	\$	192.43	\$	(33,777)

- (1) The dollar amounts reported in column (b) are the amounts of total compensation reported for Dr. Shukla (our Chief Executive Officer) for each corresponding year in the "Total" column of the Summary Compensation Table. Refer to "Executive Compensation—Summary Compensation Table".
- (2) The dollar amounts reported in column (c) represent the amount of "compensation actually paid" to Dr. Shukla, as computed in accordance with Item 402(v) of Regulation S-K. The dollar amounts do not reflect the actual amount of compensation earned by or paid to Dr. Shukla during the applicable year. In accordance with the requirements of Item 402(v) of Regulation S-K, the following adjustments were made to Dr. Shukla's total compensation for each year to determine the compensation actually paid:

Year	Reported Summary Compensation Table Total for PEO (\$)		Reported Value of Equity Awards ^(a) (\$)		Equity Award Adjustments (b) (\$)		Compensation Actually Paid to PEO (\$)	
2022	\$	2,411,435	\$	(1,615,956)	\$	(314,631)	\$	480,848
2021	\$	1,892,708	\$	(1,076,297)	\$	831,272	\$	1,647,683

- (a) The grant date fair value of equity awards represents the sum of the totals of the amounts reported in the “Stock Awards” and “Option Awards” columns in the Summary Compensation Table for the applicable year.
- (b) The equity award adjustments for each applicable year include the addition (or subtraction, as applicable) of the following: (i) the year-end fair value of any equity awards granted in the applicable year that are outstanding and unvested as of the end of the year; (ii) the amount of change as of the end of the applicable year (from the end of the prior fiscal year) in fair value of any awards granted in prior years that are outstanding and unvested as of the end of the applicable year; (iii) for awards that are granted and vest in same applicable year, the fair value as of the vesting date; (iv) for awards granted in prior years that vest in the applicable year, the amount equal to the change as of the vesting date (from the end of the prior fiscal year) in fair value; (v) for awards granted in prior years that are determined to fail to meet the applicable vesting conditions during the applicable year, a deduction for the amount equal to the fair value at the end of the prior fiscal year; and (vi) the dollar value of any dividends or other earnings paid on stock or option awards in the applicable year prior to the vesting date that are not otherwise reflected in the fair value of such award or included in any other component of total compensation for the applicable year. The amounts deducted or added in calculating the equity award adjustments are as follows:

Year	Year End Fair Value of Outstanding and Unvested Equity Awards Granted in the Year (\$)	Year over Year Change in Fair Value of Outstanding and Unvested Equity Awards Granted in Prior Years (\$)	Fair Value as of Vesting Date of Equity Awards Granted and Vested in the Year (\$)	Year over Year Change in Fair Value of Equity Awards Granted in Prior Years that Vested in the Year (\$)	Fair Value at the End of the Prior Year of Equity Awards that Failed to Meet Vesting Conditions in the Year (\$)	Value of Dividends or other Earnings Paid on Stock or Option Awards not Otherwise Reflected in Fair Value or Total Compensation (\$)	Total Equity Award Adjustments (\$)
2022	\$ 818,642	\$ (969,060)	\$ 180,050	\$ (344,263)	—	—	\$ (314,631)
2021	\$ 462,204	\$ 66,857	\$ 257,639	\$ 44,572	—	—	\$ 831,272

- (3) The dollar amounts reported in column (d) represent the average of the amounts reported for our company’s named executive officers as a group (excluding Dr. Shukla) in the “Total” column of the Summary Compensation Table in each applicable year.
- (4) The dollar amounts reported in column (e) represent the average amount of “compensation actually paid” to the named executive officers as a group (excluding Dr. Shukla), as computed in accordance with Item 402(v) of Regulation S-K. The dollar amounts do not reflect the actual average amount of compensation earned by or paid to the named executive officers as a group (excluding Dr. Shukla) during the applicable year. In accordance with the requirements of Item 402(v) of Regulation S-K, the following adjustments were made to average total compensation for the named executive officers as a group (excluding Dr. Shukla) for each year to determine the compensation actually paid, using the same methodology described above in Note (2):

Year	Average Reported Summary Compensation Table Total for Non-PEO NEOs (\$)	Average Reported Value of Equity Awards (\$)	Average Equity Award Adjustments ^(a) (\$)	Average Compensation Actually Paid to Non-PEO NEOs (\$)
2022	\$885,511	(\$341,135)	(\$515,116)	\$29,260
2021	\$904,366	(\$354,693)	\$569,568	\$1,119,241

(a) The amounts deducted or added in calculating the total average equity award adjustments are as follows:

Year	Average Year End Fair Value of Outstanding and Unvested Equity Awards Granted in the Year (\$)	Year over Year Average Change in Fair Value of Outstanding and Unvested Equity Awards Granted in Prior Years (\$)	Average Fair Value as of Vesting Date of Equity Awards Granted and Vested in the Year (\$)	Year over Year Average Change in Fair Value of Equity Awards Granted in Prior Years that Vested in the Year (\$)	Average Fair Value at the End of the Prior Year of Equity Awards that Failed to Meet Vesting Conditions in the Year (\$)	Average Value of Dividends or other Earnings Paid on Stock or Option Awards not Reflected in Fair Value or Total Compensation (\$)	Total Average Equity Award Adjustments (\$)
2022	\$ 310,699	\$ (651,157)	\$ 68,433	\$ (243,091)	\$ —	\$ —	\$ (515,116)
2021	\$ 300,609	\$ 63,050	\$ 169,174	\$ 36,735	\$ —	\$ —	\$ 569,568

(5) Cumulative TSR is calculated by dividing the sum of the cumulative amount of dividends for the measurement period, assuming dividend reinvestment, and the difference between our company's share price at the end and the beginning of the measurement period by our company's share price at the beginning of the measurement period. No dividends were paid on stock or option awards in 2021 or 2022).

(6) The dollar amounts reported represent the amount of net income (loss) reflected in our consolidated audited financial statements for the applicable year.

Analysis of the Information Presented in the Pay versus Performance Table

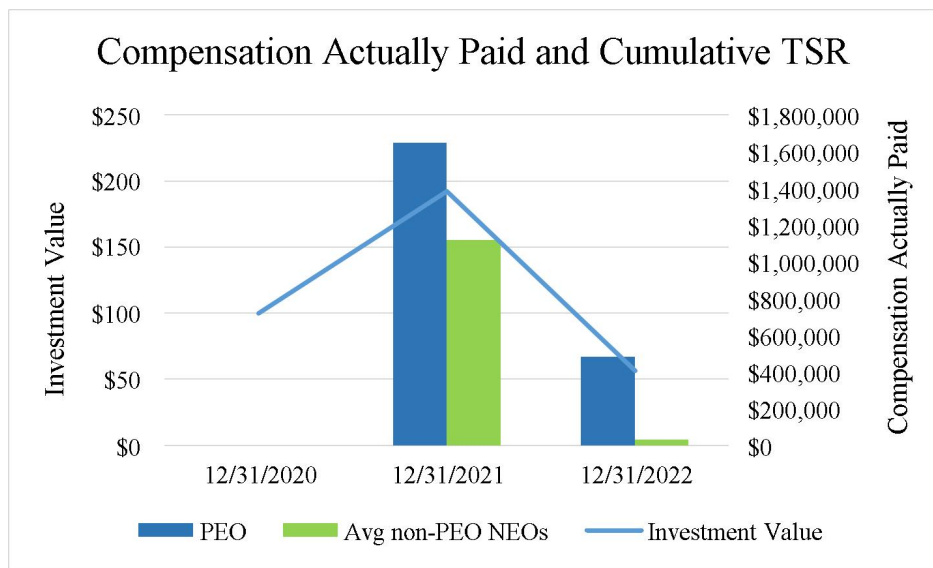
We generally seek to incentivize long-term performance, and therefore do not specifically align our performance measures with "compensation actually paid" (as computed in accordance with Item 402(v) of Regulation S-K) for a particular year. In accordance with Item 402(v) of Regulation S-K, we are providing the following descriptions of the relationships between information presented in the Pay Versus Performance table.

Compensation Actually Paid and Net Income (Loss)

Our company has not historically looked to net income (loss) as a performance measure for our executive compensation program. Our net loss was \$(44.6) million in 2021 and million in 2022.

Compensation Actually Paid and Cumulative TSR

As shown in the following graph, the compensation actually paid to Dr. Shukla and the average amount of compensation actually paid to our non-PEO NEOs as a group (excluding Dr. Shukla) during the periods presented do have some correlation because a significant portion of their compensation is in the form of long-term equity awards. The equity awards values are significantly impacted by changes in our stock price each period. These equity awards strongly align our executive officers' interests with those of our stockholders by providing a continuing financial incentive to maximize long-term value for our stockholders and by encouraging our executive officers to continue in our employment for the long-term.



All information provided above under the “Pay Versus Performance” heading will not be deemed to be incorporated by reference in any filing of our company under the Securities Act of 1933, as amended, whether made before or after the date hereof and irrespective of any general incorporation language in any such filing

Equity Compensation Plans

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

Additional long-term equity incentives are provided through our 2015 ESPP, which became effective in connection with the Company’s initial public offering in May 2015.

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.

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

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, provided that 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. 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.

The accumulated payroll deductions of any employee who is not a participant on the last day of an offering period will be refunded. An employee's rights under the 2015 ESPP terminate upon voluntary withdrawal from the plan or when the employee ceases employment for any reason.

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.

The 2015 ESPP is 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.

2022 Inducement Plan

The Compensation Committee adopted the 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.

We have granted nonstatutory stock option awards to purchase an aggregate of 201,600 shares of common stock to new hires who joined the Company during 2022 as material inducements to their acceptance of employment with us in accordance with Nasdaq Listing Rule 5635(c)(4), all of which remain outstanding and were granted pursuant to a form of nonstatutory stock option grant notice and option agreement previously approved by the Board of Directors.

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.

Board of Directors	Annual Retainer
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 (each, an "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 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—2022

The following table sets forth information with respect to the compensation earned by our non-employee directors during the fiscal year ended December 31, 2022. During 2022, 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".

Name	Fees Earned or Paid in Cash	Stock Awards ⁽¹⁾	Total
John K. Clarke (Chairman) ⁽²⁾	\$ 102,542	\$ 25,560	\$ 128,102
Timothy P. Coughlin ⁽³⁾	\$ 70,679	\$ 25,560	\$ 96,239
Jane A. Gross, Ph.D. ⁽⁴⁾	\$ 45,679	\$ 25,560	\$ 71,239
Svetlana Lucas, Ph.D. ⁽⁵⁾	\$ 51,771	\$ 25,560	\$ 77,331
Paul Schimmel, Ph.D. ⁽⁶⁾	\$ 39,771	\$ 25,560	\$ 65,331
Sara L. Zaknoen, M.D. ⁽⁷⁾	\$ 43,104	\$ 25,560	\$ 68,664

- (1) In accordance with SEC rules, this column reflects the aggregate grant date fair value of the restricted stock unit awards granted during 2022 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 restricted stock units, see Part II, Item 8 “Financial Statements and Supplementary Data” of our Annual Report in the Notes to Consolidated Financial Statements, Note 7, “Stockholders Equity”. These amounts do not reflect the actual economic value that may be realized by the directors upon the vesting of the restricted stock units or the sale of the common stock underlying such restricted stock units.
- (2) Mr. Clarke held stock options to purchase an aggregate of 10,261 shares of common stock and held 6,000 restricted stock units as of December 31, 2022.
- (3) Mr. Coughlin held stock options to purchase an aggregate of 9,425 shares of common stock and held 6,000 restricted stock units as of December 31, 2022.
- (4) Dr. Gross held stock options to purchase an aggregate of 5,141 shares of common stock and held 6,000 restricted stock units as of December 31, 2022.
- (5) Dr. Lucas held stock options to purchase an aggregate of 5,141 shares of common stock and held 6,000 restricted stock units as of December 31, 2022.
- (6) Dr. Schimmel held stock options to purchase an aggregate of 10,763 shares of common stock and held 6,000 restricted stock units as of December 31, 2022.
- (7) Dr. Zaknoen held stock options to purchase an aggregate of 1,206 shares of common stock and held 6,000 restricted stock units as of December 31, 2022.

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, 2021, 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 “Director Compensation” and “Executive Compensation.”

Participation in Offerings

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 Directors),

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 February 2023, we completed an underwritten follow-on public offering of 23,125,000 shares of our common stock, including the partial exercise of the underwriters' option to purchase additional shares, at a price to the public of \$2.25 per share. The total gross proceeds from the offering were approximately \$52.0 million, before deducting underwriting discounts, commissions and offering expenses payable by us. 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 1, 2023 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 53,162,052 shares of the Company’s common stock were issued and outstanding as of March 1, 2023.

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	10,189,966	—	10,189,966	19.17%
FMR LLC ⁽⁶⁾ 245 Summer Street, Boston, MA 02210	7,684,740	—	7,684,740	14.46%
Stonepine Capital Management, LLC ⁽⁷⁾ 919 NW Bond Street, Suite 204 Bend, OR 97703	4,569,433	—	4,569,433	8.60%
Laurence W. Lytton ⁽⁸⁾ 467 Central Park West New York, NY 10025	4,440,188	—	4,440,188	8.35%
Sanjay S. Shukla, M.D., M.S. ⁽⁹⁾	61,173	460,537	521,710	*
Jill M. Broadfoot ⁽¹⁰⁾	15,460	1219,763	145,223	*
Nancy E. Denyes ⁽¹¹⁾	7,079	131,888	138,967	*
John K. Clarke ⁽¹²⁾	13,797	16,261	30,058	*
Timothy P. Coughlin ⁽¹³⁾	—	15,425	15,425	*
Jane A. Gross, Ph.D. ⁽¹⁴⁾	—	11,141	11,141	*
Svetlana Lucas, Ph.D. ⁽¹⁵⁾	—	11,141	11,141	*
Paul Schimmel, Ph.D. ⁽¹⁶⁾	795,056	16,763	811,819	1.53%
Sara A. Zaknoen, M.D. ⁽¹⁷⁾	—	7,460	7,460	*
All directors and executive officers as a group (9 persons) ⁽¹⁸⁾	892,565	800,379	1,692,944	3.14%

* 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., 10240 Sorrento Valley Road, Suite #300, 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 1, 2023.
- (3) Shares of common stock subject to stock options, restricted stock units or warrants acquirable within 60 days of March 1, 2023, 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 1, 2023, plus an additional 4,958,366 shares of common stock acquired through the underwritten following-on public offering we completed in February 2023. 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, and report shared voting and dispositive power over all of the reported shares.

- (6) Based on Schedule 13G/A filed with the SEC on February 9, 2023, plus an additional 3,333,333 shares of common stock acquired through the underwritten following-on public offering we completed in February 2023. Shares of common stock owned can vary since the date of such filing. 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. FMR LLC reports sole voting and dispositive power over all of the reported shares, and Abigail P. Johnson reports sole dispositive power over all of the reported shares.
- (7) Based on Schedule 13G/A filed with the SEC on February 17, 2023. Shares of common stock owned can vary since the date of such filing. Stonepine Capital Management, LLC (the “General Partner”) is the general partner and investment adviser of investment funds, including Stonepine Capital, L.P. (the “Partnership”). Jon M. Plexico and Timothy P. Lynch are the control persons of the General Partner. Each of Mr. Plexico, Mr. Lynch, the General Partner and the Partnership disclaim beneficial ownership of the shares of common stock that they own except to the extent of that person’s pecuniary interest therein, and report shared voting and dispositive power over all of the reported shares.
- (8) Based on Schedule 13G filed with the SEC on February 22, 2023. Shares of common stock owned can vary since the date of such filing. Mr. Lytton reports sole voting and sole dispositive power over 4,435,168 of the reported shares and shared voting and shared dispositive power over 5,020 of the reported shares.
- (9) Includes (i) 61,173 shares of common stock held by Dr. Shukla; and (ii) 460,537 shares of common stock that Dr. Shukla has the right to acquire from us within 60 days of March 1, 2023 pursuant to the exercise of stock options.
- (10) Includes (i) 15,460 shares of common stock held by Ms. Broadfoot; and (ii) 129,763 shares of common stock that Ms. Broadfoot has the right to acquire from us within 60 days of March 1, 2023 pursuant to the exercise of stock options.
- (11) Includes (i) 7,079 shares of common stock held by Ms. Denyes; and (ii) 131,888 shares of common stock that Ms. Denyes has the right to acquire from us within 60 days of March 1, 2023 pursuant to the exercise of stock options.
- (12) Includes (i) 13,797 shares of common stock held by our director, Mr. Clarke; (ii) 10,261 shares of common stock that Mr. Clarke has the right to acquire from us within 60 days of March 1, 2023 pursuant to the exercise of stock options; and (iii) 6,000 shares of common stock that Mr. Clarke will acquire within 60 days of March 1, 2023 pursuant to the vesting of restricted stock units.
- (13) Represents (i) 9,425 shares of common stock that Mr. Coughlin has the right to acquire from us within 60 days of March 1, 2023 pursuant to the exercise of stock options; and (ii) 6,000 shares of common stock that Mr. Coughlin will acquire within 60 days of March 1, 2023 pursuant to the vesting of restricted stock units.
- (14) Represents (i) 5,141 shares of common stock that Dr. Gross has the right to acquire from us within 60 days of March 1, 2023 pursuant to the exercise of stock options; and (ii) 6,000 shares of common stock that Dr. Gross will acquire within 60 days of March 1, 2023 pursuant to the vesting of restricted stock units.
- (15) Represents (i) 5,141 shares of common stock that Dr. Lucas has the right to acquire from us within 60 days of March 1, 2023 pursuant to the exercise of stock options; and (ii) 6,000 shares of common stock that Dr. Lucas will acquire within 60 days of March 1, 2023 pursuant to the vesting of restricted stock units.
- (16) 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; (iv) 10,763 shares of common stock that Dr. Schimmel has the right to acquire from us within 60 days of March 1, 2023 pursuant to the exercise of stock options; and (v) 6,000 shares of common stock that Dr. Schimmel will acquire within 60 days of March 1, 2023 pursuant to the vesting of restricted stock units.
- (17) Represents (i) 1,460 shares of common stock that Dr. Zaknoen has the right to acquire from us within 60 days of March 1, 2023 pursuant to the exercise of stock options; and (ii) 6,000 shares of common stock that Dr. Zaknoen will acquire within 60 days of March 1, 2023 pursuant to the vesting of restricted stock units.
- (18) 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, 2022.

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, 2022 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, 2022.

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, 2023.

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 Notice of Internet Availability of Proxy Materials or other Annual Meeting materials addressed to those stockholders. 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).

A single Notice of Internet Availability of Proxy Materials will be delivered to multiple stockholders sharing an address unless contrary instructions have been received from the affected stockholders. Once you have received notice from your brokerage firm that they will be “householding” communications to your address, “householding” will continue until you are notified otherwise or until you revoke your consent. If, at any time, you no longer wish to participate in “householding” and would prefer to receive a separate Notice of Internet Availability of Proxy Materials, please notify your brokerage firm or 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) 937-5449. Stockholders who currently receive multiple copies of the Notices of Internet Availability of Proxy Materials at their addresses and would like to request “householding” of their communications should contact their brokerage firm.

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 , 2023

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 GRANTEEES 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 3,706,439¹ 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 Company's stockholders approved such amendment to the Plan at the Company's 2021 Annual Meeting of Stockholders held on April 28, 2021. 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. The Company's stockholders approved such amendment to the Plan at the Company's 2022 Annual Meeting of Stockholders held on April 26, 2022. The Plan was amended by the Board of Directors in March 2023 to increase the maximum number of shares of Stock reserved and available for issuance under the Plan by 4,000,000 shares, resulting in 7,711,868 shares as of March 6, 2023, 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: April 26, 2022

AMENDMENT APPROVED BY THE BOARD OF DIRECTORS: March 6, 2023

AMENDMENT APPROVED BY THE STOCKHOLDERS: _____, 2023

ANNEX B

**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 One Hundred Seventy-Seven Million Two Hundred Eighty-Five Thousand Four Hundred Fifty-Six (177,285,456), of which (i) One Hundred and Seventy Million (170,000,000) 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 , 2023.

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

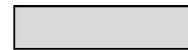


P.O. BOX 8016, CARY, NC 27512-9903

YOUR VOTE IS IMPORTANT! PLEASE VOTE BY:

 <p>INTERNET Go To: www.proxydocs.com/LIFE</p> <ul style="list-style-type: none"> • Cast your vote online • Have your Proxy Card ready • Follow the simple instructions to record your vote
 <p>PHONE Call 1-866-284-6674</p> <ul style="list-style-type: none"> • Use any touch-tone telephone • Have your Proxy Card ready • Follow the simple recorded instructions
 <p>MAIL</p> <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 , 2023

TIME: Wednesday, May 17, 2023 9:00 AM, Pacific Time
PLACE: Offices of aTyr Pharma, Inc.
10240 Sorrento Valley Road, Suite #300, San Diego, CA 92121

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 AND 6

PROPOSAL	YOUR VOTE			BOARD OF DIRECTORS RECOMMENDS
1. To elect two Class II directors, as nominated by the Company's Board of Directors, to hold office until the 2026 annual meeting of stockholders or until their successors are duly elected and qualified;	FOR	WITHHOLD		↓ FOR
1.01 Timothy P. Coughlin	<input type="checkbox"/>	<input type="checkbox"/>		FOR
1.02 Jane A. Gross, Ph.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, 2023;	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 Company's Restated Certificate of Incorporation to increase the number of authorized shares of common stock from 85,000,000 to 170,000,000 shares;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	FOR
6. 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 or 5; and	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	FOR
7. The transaction of such other business as may properly come before the Annual Meeting or any adjournment or postponement thereof.				

Check here if you would like to attend the meeting in person.

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

