
SCHEDULE 14A INFORMATION

Proxy Statement Pursuant to Section 14(a) of the Securities Exchange Act of 1934

Filed by the Registrant

Filed by a Party other than the Registrant

Check the appropriate box:

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

X4 Pharmaceuticals, 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 the appropriate box):

- No fee required.
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X4 PHARMACEUTICALS, INC.
61 North Beacon Street, 4th Floor
Boston, Massachusetts 02134

NOTICE OF ANNUAL MEETING OF STOCKHOLDERS

To Be Held On June 10, 2024

Dear Stockholder of X4 Pharmaceuticals, Inc.:

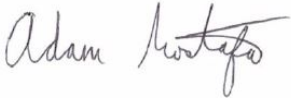
You are cordially invited to attend the 2024 Annual Meeting of Stockholders of X4 Pharmaceuticals, Inc., a Delaware corporation (the "Company"). The Annual Meeting will be held on Monday, June 10, 2024 at 12:00 p.m. Eastern Time at the offices of Goodwin Procter LLP, 100 Northern Avenue, 17th Floor, Boston, Massachusetts 02210. The Annual Meeting will be held for the following purposes:

1. To elect the three (3) nominees named in the accompanying proxy statement (the "Proxy Statement"), David McGirr, M.B.A; Paula Ragan, Ph.D.; and Michael S. Wyzga, to the Board of Directors to hold office until the 2027 Annual Meeting of Stockholders and until their successors are duly elected and qualified until their earlier death, resignation or removal.
2. To ratify the selection by the Audit Committee of the Board of Directors of PricewaterhouseCoopers LLP as the independent registered public accounting firm of the Company for its fiscal year ending December 31, 2024.
3. To hold a non-binding advisory "say-on-pay" vote on our named executive officer compensation.
4. To conduct any other business properly brought before the Annual Meeting.

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

The record date for the Annual Meeting is April 15, 2024. Only stockholders of record at the close of business on that date may vote at the Annual Meeting or any adjournment or postponement thereof. A list of stockholders entitled to vote at the Annual Meeting will be available at our principal executive offices for examination during normal business hours by any stockholder for any purpose germane to the Annual Meeting for a period of ten days ending the day prior to the Annual Meeting.

By Order of the Board of Directors,



Adam Mostafa
Chief Financial Officer, Treasurer and Corporate
Secretary

Boston, Massachusetts
April 29, 2024

You are cordially invited to attend the Annual Meeting. Whether or not you expect to attend the Annual Meeting, please vote by telephone or through the Internet, or, if you receive a paper proxy card by mail, by completing and returning the proxy card mailed to you, as promptly as possible in order to ensure your representation at the Annual Meeting. Voting instructions are provided in the Notice of Internet Availability of Proxy Materials, or, if you receive a paper proxy card by mail, the instructions are printed on your proxy card and included in the accompanying Proxy Statement. Even if you have voted by proxy, you may still vote in person if you attend the Annual Meeting. Please note, however, that if your shares are held of record by a brokerage firm, bank or other agent and you wish to vote at the Annual Meeting, you must obtain a proxy issued in your name from that agent in order to vote your shares that are held in such agent's name and account.

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X4 PHARMACEUTICALS, INC.
61 North Beacon Street, 4th Floor
Boston, Massachusetts 02134

PROXY STATEMENT
FOR THE 2024 ANNUAL MEETING OF STOCKHOLDERS

June 10, 2024

QUESTIONS AND ANSWERS ABOUT THESE PROXY MATERIALS AND VOTING

When are this Proxy Statement and the accompanying materials scheduled to be sent to stockholders?

We have elected to provide access to our proxy materials to our stockholders via the Internet. Accordingly, on or about April 29, 2024, we will begin mailing the Notice of Availability. Our proxy materials, including the Notice of the 2024 Annual Meeting of Stockholders, this Proxy Statement and the accompanying proxy card or, for shares held in street name (i.e., held for your account by a broker, bank or other nominee), a voting instruction form, and the 2023 Annual Report to Stockholders (the “2023 Annual Report”), will be mailed or made available to stockholders on the Internet on or about the same date.

Why did I receive a notice regarding the availability of proxy materials on the Internet?

Pursuant to rules adopted by the Securities and Exchange Commission (the “SEC”), we have elected to provide access to our proxy materials over the Internet. Accordingly, we have sent you a Notice of Internet Availability of Proxy Materials (the “Notice”) because the Board of Directors (the “Board”) of X4 Pharmaceuticals, Inc. (sometimes referred to as the “Company” or “X4”) is soliciting your proxy to vote at the 2024 Annual Meeting of Stockholders (the “Annual Meeting”), including at any adjournments or postponements of the Annual Meeting. All stockholders will have the ability to access the proxy materials on the website referred to in the Notice or request to receive a printed set of the proxy materials. Instructions on how to access the proxy materials over the internet or to request a printed copy may be found in the Notice.

Will I receive any other proxy materials by mail?

We may elect, in our discretion, to send you a proxy card, along with a second Notice, on or after ten calendar days have passed since our first mailing of the Notice.

How do I attend the Annual Meeting?

The Annual Meeting will be held in person on Monday, June 10, 2024 at 12:00 p.m. Eastern Time at the offices of Goodwin Procter LLP, 100 Northern Avenue, 17th Floor, Boston, Massachusetts 02210. Directions to the Annual Meeting may be found at <https://materials.proxyvote.com>. Information on how to vote in person at the Annual Meeting is discussed below.

Who can vote at the Annual Meeting?

Only stockholders of record at the close of business on April 15, 2024 will be entitled to vote at the Annual Meeting. On this record date, there were 167,937,781 shares of common stock outstanding and entitled to vote. A list of stockholders entitled to vote at the Annual Meeting will be available at our principal executive offices for examination during normal business hours by any stockholder for any purpose germane to the Annual Meeting for a period of ten days ending the day prior to the Annual Meeting.

Stockholder of Record: Shares Registered in Your Name

If on April 15, 2024, your shares were registered directly in your name with our transfer agent, Computershare Trust Company, N.A., then you are a stockholder of record. As a stockholder of record, you may vote in person at the Annual Meeting or vote by proxy prior to the Annual Meeting. Whether or not you plan to attend the Annual Meeting, we urge you to vote by proxy electronically through the Internet, over the telephone or by completing and returning a printed proxy card that you may request or that we may elect to deliver at a later time to ensure your vote is counted.

Beneficial Owner: Shares Registered in the Name of a Broker or Bank

If on April 15, 2024, your shares were held not in your name but rather in an account at a brokerage firm, bank or other similar organization, then you are the beneficial owner of shares held in “street name” and the Notice is being forwarded to you by that organization. The organization holding your account is considered to be the stockholder of record for purposes of voting at the Annual Meeting. As a beneficial owner, you have the right to direct your broker, bank or other agent regarding how to vote the shares in your account. You are also invited to attend the Annual Meeting. However, since you are not the stockholder of record, you may not vote your shares in person at the Annual Meeting unless you request and obtain a valid proxy from your broker, bank or other agent.

What am I voting on?

There are three matters scheduled for a vote:

- Election of three (3) directors to hold office until the 2027 Annual Meeting of Stockholders (Proposal 1);
- Ratification of selection by the Audit Committee of the Board of Directors of PricewaterhouseCoopers LLP as our independent registered public accounting firm for our fiscal year ending December 31, 2024 (Proposal 2); and
- Non-binding advisory “say-on-pay” vote on our named executive officer compensation (Proposal 3);

What if another matter is properly brought before the Annual Meeting?

The Board knows of no other matters that will be presented for consideration at the Annual Meeting. If any other matters are properly brought before the meeting, it is the intention of the persons named in the accompanying proxy to vote on those matters in accordance with their best judgment.

How do I vote?

With respect to Proposal 1, you may either vote “FOR ALL” the nominees to the Board, “WITHHOLD ALL” for the nominees, or you may vote “FOR ALL EXCEPT” any nominee you specify. With respect to Proposals 2 and 3, you may vote “FOR” or “AGAINST” or abstain from voting.

The procedures for voting are as follows:

Stockholder of Record: Shares Registered in Your Name

If you are a stockholder of record, you may vote in person at the Annual Meeting, vote by proxy through the Internet, vote by proxy over the telephone, or vote by proxy using a proxy card that you may request or that we may elect to deliver at a later time. Whether or not you plan to attend the Annual Meeting, we urge you to vote by proxy to ensure your vote is counted. You may still attend the Annual Meeting and vote in person even if you have already voted by proxy.

- To vote in person, come to the Annual Meeting and we will give you a ballot when you arrive.
- To vote through the Internet before the Annual Meeting, go to www.proxyvote.com to complete an electronic proxy card. You will be asked to provide the 16-digit control number from the Notice. Your Internet vote must be received by 11:59 p.m., Eastern Time, on June 9, 2024 to be counted.
- To vote over the telephone from a location in the United States, dial toll-free 1-800-690-6903 using a touch-tone phone and follow the recorded instructions. You will be asked to provide the control number from the Notice. Your telephone vote must be received by 11:59 p.m., Eastern Time, on June 9, 2024 to be counted.
- To vote by using a printed proxy card that may be delivered to you, simply complete, sign and date the proxy card and return it promptly in the envelope provided. If you return your signed proxy card to us before the Annual Meeting, we will vote your shares as you direct.

Beneficial Owner: Shares Registered in the Name of Broker or Bank

If you are a beneficial owner of shares registered in the name of your broker, bank or other agent, you should have received a Notice containing voting instructions from that organization rather than from us. Simply follow the voting instructions in the Notice to ensure that your vote is counted. To vote in person at the Annual Meeting, you must obtain a valid proxy from your broker, bank or other agent. Follow the instructions from your broker, bank or other agent included with these proxy materials, or contact that organization to request a proxy form.

We provide Internet proxy voting to allow you to vote your shares online, with procedures designed to ensure the authenticity and correctness of your proxy vote instructions. However, please be aware that you must bear any costs associated with your Internet access, such as usage charges from internet access providers and telephone companies.

How many votes do I have?

On each matter to be voted upon, you have one vote for each share of common stock you own as of April 15, 2024.

If I am a stockholder of record and I do not vote, or if I return a proxy card or otherwise vote without giving specific voting instructions, what happens?

If you are a stockholder of record and do not vote by completing a proxy card, by telephone, through the Internet or in person at the Annual Meeting, your shares will not be voted.

If you return a signed and dated proxy card or otherwise vote without marking voting selections, your shares will be voted, as applicable, “FOR” the election of each nominee for director, “FOR” the ratification of the selection of our independent registered public accounting firm, and “FOR” the non-binding advisory vote on “say-on-pay”. If any other matter is properly presented at the Annual Meeting, your proxyholder (one of the individuals named on your proxy card) will vote your shares using his or her best judgment.

If I am a beneficial owner of shares held in street name and I do not provide my broker or bank with voting instructions, what happens?

If you are a beneficial owner of shares held in street name and you do not instruct your broker, bank or other agent how to vote your shares, your broker, bank or other agent may still be able to vote your shares in its discretion. In this regard, under the rules of the New York Stock Exchange (“NYSE”), brokers, banks and other securities intermediaries that are subject to NYSE rules may use their discretion to vote your “uninstructed” shares with respect to matters considered to be “routine” under NYSE rules, but not with respect to “non-routine” matters. In this regard, each of Proposals 1 and 3 are considered to be “non-routine” under NYSE rules meaning that your broker may not vote your shares on this proposal in the absence of your voting instructions. However, Proposal 2 is considered to be a “routine” matter under NYSE rules, meaning that if you do not return voting instructions to your broker by its deadline, your shares may be voted by your broker in its discretion on Proposal 2. Accordingly, if you own shares through a nominee, such as a broker, bank or other agent, please be sure to instruct your nominee how to vote to ensure that your vote is counted on all of the proposals.

If you are a beneficial owner of shares held in street name, in order to ensure your shares are voted in the way you would prefer, you must provide voting instructions to your broker, bank or other agent by the deadline provided in the materials you receive from your broker, bank or other agent.

Who is paying for this proxy solicitation?

We will pay for the entire cost of soliciting proxies. In addition to these proxy materials, our directors and employees may also solicit proxies in person, by telephone, or by other means of communication. Directors and employees will not be paid any additional compensation for soliciting proxies. We may also reimburse brokerage firms, banks and other agents for the cost of forwarding proxy materials to beneficial owners.

What does it mean if I receive more than one Notice?

If you receive more than one Notice, your shares may be registered in more than one name or in different accounts. Please follow the voting instructions on each of the Notices to ensure that all of your shares are voted.

Can I change my vote after submitting my proxy?

Stockholder of Record: Shares Registered in Your Name

Yes. You can revoke your proxy at any time before the final vote at the Annual Meeting. If you are the record holder of your shares, you may revoke your proxy in any one of the following ways:

- You may submit another properly completed proxy card with a later date (which automatically revokes the earlier proxy).
- You may grant a subsequent proxy by telephone or through the Internet.
- You may send a timely written notice that you are revoking your proxy to our Corporate Secretary at 61 North Beacon Street, 4th Floor, Boston, Massachusetts 02134.
- You may attend the Annual Meeting and vote in person. Simply attending the Annual Meeting will not, by itself, revoke your proxy.

Your most current proxy card or telephone or Internet proxy is the one that is counted.

Beneficial Owner: Shares Registered in the Name of Broker or Bank

If your shares are held by your broker, bank or other agent, you should follow the instructions provided by your broker, bank or other agent.

When are stockholder proposals and director nominations due for next year's annual meeting?

To be considered for inclusion in next year's proxy materials, your proposal must be submitted in writing by December 30, 2024, to our Corporate Secretary, c/o X4 Pharmaceuticals, Inc., 61 North Beacon Street, 4th Floor, Boston, Massachusetts 02134.

Our bylaws also establish an advance notice procedure if you wish to present a proposal (including a director nomination) before an annual meeting of stockholders but you are not requesting that your proposal or nomination be included in next year's proxy materials. To be timely for our 2025 Annual Meeting of Stockholders, our Corporate Secretary must receive the written notice at our principal executive offices not later than the close of business on March 12, 2025 nor earlier than the close of business on February 10, 2025. However, if we hold our 2025 Annual Meeting of Stockholders more than 30 days before or 60 days after June 10, 2025 (the one-year anniversary date of the 2024 Annual Meeting of Stockholders), then timely notice of a stockholder proposal that is not intended to be included in our Proxy Statement must be received not earlier than the close of business on the 120th day prior to the 2025 Annual Meeting of Stockholders and not later than the close of business on the later of (a) the 90th day prior to the 2025 Annual Meeting of Stockholders and (b) the 10th day following the day on which the one of the following first occurs: (i) mailing of notice of the date of the 2024 Annual Meeting of Stockholders and (ii) the first public announcement of the date of the 2025 Annual Meeting of Stockholders. You are also advised to review our bylaws, which contain additional requirements about advance notice of stockholder proposals and director nominations. In addition, to comply with the SEC's new universal proxy rules, stockholders who intend to solicit proxies in support of director nominees other than the Company's nominees must provide notice by the same deadline noted herein and also comply with the additional requirements of Rule 14a-19(b).

How are votes counted?

Each holder of common stock is entitled to one vote for each share held by such stockholder as of the record date on each matter to come before the Annual Meeting, including the election of a director. Votes cast during the Annual Meeting or by proxy by mail, via the Internet or by telephone will be tabulated by the inspector of election appointed for the Annual Meeting, who will also determine whether a quorum is present.

Under our bylaws, any proposal, other than an election of directors, is decided by a majority of the votes properly cast for and against such proposal, except where a larger vote is required by law or by our certificate of incorporation or bylaws. Abstentions and broker "non-votes" are not included in the tabulation of the voting results on any such proposal and, therefore, do not have an impact on such proposals. A broker "non-vote" occurs when a nominee holding shares for a beneficial owner does not vote on a particular proposal because the nominee does not have discretionary voting power with respect to that item, and has not received instructions from the beneficial owner.

Votes will be counted by the inspector of election appointed for the Annual Meeting, who will separately count, for the proposal to elect directors (Proposal 1), votes "For," "Withhold" and broker non-vote, with respect to Proposals 2 and 3, votes "For," "Against" and abstentions. Abstentions and broker non-votes for Proposals 2 and 3 will have no effect and will not be counted towards the vote total. Votes withheld and broker non-votes on Proposal 1 will have no effect and will not be counted towards the vote total for this proposal.

What are "broker non-votes"?

As discussed above, when a beneficial owner of shares held in "street name" does not give voting instructions to his or her broker, bank or other securities intermediary holding his or her shares as to how to vote on matters deemed to be "non-routine" under NYSE rules, the broker, bank or other such agent cannot vote the shares. These unvoted shares are counted as "broker non-votes." Each of Proposals 1 and 3 is considered to be "non-routine" under NYSE rules and we therefore expect broker non-votes to exist in connection with that proposal.

*As a reminder, if you are a beneficial owner of shares held in street name, in order to ensure your shares are voted in the way you would prefer, you **must** provide voting instructions to your broker, bank or other agent by the deadline provided in the materials you receive from your broker, bank or other agent.*

How many votes are needed to approve each proposal?

The following table summarizes the minimum vote needed to approve each proposal and the effect of abstentions and broker non-votes.

Proposal Number	Proposal Description	Vote Required for Approval	Effect of Abstentions	Effect of Broker Non-Votes
1	Election of directors	The three nominees receiving the most “ FOR ” votes from the holders of shares, either present at the meeting or represented by proxy, and entitled to vote on the election of directors will be elected; withheld votes will have no effect.	Not applicable	No effect
2	Ratification of the selection of PricewaterhouseCoopers LLP as our independent registered public accounting firm for the year ending December 31, 2024	“ FOR ” votes from the holders of shares representing a majority of the voting power of the shares of common stock of the Company, either present at the meeting or represented by proxy, and entitled to vote on the matter.	No effect	Not applicable ⁽¹⁾
3	Non-binding advisory “say-on-pay” vote on named executive officer compensation	“ FOR ” votes from the holders of shares representing a majority of the voting power of the shares of common stock of the Company, either present at the meeting or represented by proxy, and entitled to vote on the matter.	No effect	No effect

⁽¹⁾ Proposal 2 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.

What is the quorum requirement?

A quorum of stockholders is necessary to hold a valid meeting. A quorum will be present if stockholders holding at least a majority in voting power of the outstanding shares entitled to vote are present at the Annual Meeting in person or represented by proxy. On the record date, there were 167,937,781 shares outstanding and entitled to vote. Thus, the holders of 83,968,892 shares must be present in person or represented by proxy at the Annual Meeting to have a quorum.

Your shares will be counted towards the quorum only if you submit a valid proxy (or one is submitted on your behalf by your broker, bank or other nominee) or if you vote in person at the Annual Meeting. Abstentions and broker non-votes will be counted towards the quorum requirement. If there is no quorum, the holders of a majority of shares present at the Annual Meeting in person or represented by proxy may adjourn the Annual Meeting to another date.

How can I find out the results of the voting at the Annual Meeting?

Preliminary voting results will be announced at the Annual Meeting. In addition, final voting results will be published in a current report on Form 8-K that we expect to file within four business days after the Annual Meeting. If final voting results are not available to us in time to file a Form 8-K within four business days after the Annual Meeting, we intend to file a Form 8-K to publish preliminary results and, within four business days after the final results are known to us, file an additional Form 8-K to publish the final results.

PROPOSAL 1

ELECTION OF DIRECTORS

Our Board is divided into three classes. Each class consists, as nearly as possible, of one-third of the total number of directors, and each class has a three-year term. Vacancies on the Board may be filled only by persons elected by a majority of the remaining directors. A director elected by the Board to fill a vacancy in a class, including vacancies created by an increase in the number of directors, shall serve for the remainder of the full term of that class and until the director's successor is duly elected and qualified.

The Board presently has eight members. There are three directors in the class whose term of office expires at our Annual Meeting: David McGirr, M.B.A., Paula Ragan, Ph.D., and Michael S. Wzyga. If elected at the Annual Meeting, each of these nominees would serve until the 2027 annual meeting and until his or her successor has been duly elected and qualified, or, if sooner, until the director's death, resignation or removal. It is our policy that all directors and nominees for director make every effort to attend the Annual Meeting. All of the then-serving directors attended the 2023 Annual Meeting of stockholders.

Vote Required

Directors are elected by a plurality of the votes of the holders of shares present in person or by remote communication, as applicable, or represented by proxy and entitled to vote on the election of directors. Accordingly, the three nominees receiving the highest number of affirmative votes will be elected. Shares represented by executed proxies will be voted, if authority to do so is not withheld, for the election of the three nominees named below. If any nominee becomes unavailable for election as a result of an unexpected occurrence, shares that would have been voted for that nominee will instead be voted for the election of a substitute nominee proposed by us. Each person nominated for election has agreed to serve if elected. We have no reason to believe that any nominee will be unable to serve.

Director Nominees and Continuing Directors

The following is a brief biography and the ages of each nominee and each director whose term will continue after the Annual Meeting, and a discussion of the specific experience, qualifications, attributes or skills of each nominee that led the Nominating and Corporate Governance Committee to recommend that person as a nominee for director, as of the date of this Proxy Statement.

There are no family relationships between or among any of our directors or nominees. There is no arrangement or understanding between any of our directors or nominees and any other person or persons pursuant to which he or she is to be selected as a director or nominee.

There are no legal proceedings to which any of our directors is a party adverse to us or any of our subsidiaries or in which any such person has a material interest adverse to us or any of our subsidiaries.

Nominees for Election as a Class I Directors Continuing in Office Until the 2027 Annual Meeting of Stockholders

David McGirr, M.B.A., age 69, became a member of the board of directors of Arsanis, Inc. in September 2017 and continues to serve as a member of our Board upon the completion of our merger, between Arsanis, Inc. and the Company, in March 2019. From March 2013 until June 2014, Mr. McGirr was Senior Advisor to the chief executive officer of Cubist Pharmaceuticals, Inc., a biopharmaceutical company where he also served as Senior Vice President and Chief Financial Officer from November 2002 to March 2013. Prior to joining Cubist in 2002, Mr. McGirr was the President and Chief Operating Officer of Hippo Inc., a venture-financed internet technology company. From 1996 to 1999, he was the President of GAB Robins North America, Inc., a risk management company, serving also as Chief Executive Officer from 1997 to 1999. Mr. McGirr was a private equity investor from 1995 to 1996. From 1978 to 1995, Mr. McGirr served in various positions within the S.G. Warburg Group, ultimately as Chief Financial Officer, Chief Administrative Officer and Managing Director of S.G. Warburg & Co., Inc., a position held from 1992 to 1995. Mr. McGirr is currently a member of the board of directors of Insmmed Incorporated, a publicly traded biopharmaceutical company, where he has served since October 2013, and Rhythm Pharmaceuticals, Inc., a publicly traded biopharmaceutical company, where he has served since November 2015. Mr. McGirr previously served on the board of directors of Roka Bioscience, Inc., a molecular diagnostics company, from

December 2013 to January 2018 and Menlo Therapeutics Inc., a publicly traded biopharmaceutical company, from November 2017 until its merger with Foamix Pharmaceuticals, Ltd., another publicly traded biopharmaceutical company, in March 2019. Mr. McGirr received a B.Sc. in Civil Engineering from the University of Glasgow and received an M.B.A. from The Wharton School at the University of Pennsylvania. We believe that Mr. McGirr's extensive experience with public and private pharmaceutical companies provides him with the qualifications and skills to serve on our Board.

Paula Ragan, Ph.D., age 54, has served as our President, Chief Executive Officer, Secretary and a member of our Board since July 2014. Prior to joining us, from August 2012 to September 2014, Dr. Ragan consulted as Chief Business Officer at Lysosomal Therapeutics Inc., a private biopharmaceutical company, where she led the company's business development activities. Prior to then, from January 2007 to August 2012, Dr. Ragan held leadership roles in corporate development and operations at Genzyme Corporation, a Sanofi company, where she led strategic partnering efforts for Genzyme's Rare Disease business and headed the supply chain planning for Genzyme's flagship commercial products. Other professional roles include business roles at Hydra Biosciences, Oscient Corporation and Celera Corporation. Dr. Ragan received her B.S. from Tufts University and her Ph.D. from Massachusetts Institute of Technology and completed post-doctoral studies at Harvard Medical School. We believe that Dr. Ragan's perspective and experience as our President and Chief Executive Officer, which provides the Board with historic knowledge, operational expertise and continuity, provides her with the qualifications and skills to serve on our Board.

Michael S. Wyzga, age 69, became a member of the board of directors of X4 Pharmaceuticals, Inc., a private company, in July 2018 and continues to serve as a member of our Board and our Chairman following the completion of the Merger in March 2019. Mr. Wyzga is currently the President of MSW Consulting Inc., a strategic consulting group focused in the life sciences area. From December 2011 until November 2013, Mr. Wyzga served as President and Chief Executive Officer and a member of the board of directors of Radius Health, Inc., a publicly traded biopharmaceutical company. Prior to that, Mr. Wyzga served in various senior management positions at Genzyme Corporation, a publicly traded global biotechnology company. Mr. Wyzga joined Genzyme in February 1998 and most recently served as Executive Vice President, Finance from May 2003 until November 2011 and as Chief Financial Officer from July 1999 until November 2011. Mr. Wyzga is also a member of the boards of directors of Exact Sciences Corporation, a publicly traded medical technology company, where he has served since February 2015; LogicBio Therapeutics, Inc., a publicly traded genetic medicines company, where he has served since September 2018; GenSight Biologics S.A., a Euronext traded biopharmaceutical company, where he has served since February 2016 and currently holds the position as Chairman of the Board of Directors; and Invivyd, Inc. a publicly traded biopharmaceutical company since June 2022 and currently holds the position of chair of the audit committee and member of the compensation committee. He previously served at Mereo BioPharma Group plc (formerly Oncomed Pharmaceuticals, Inc.), where he served from October 2013 through the business combination in April 2019 and Akebia Therapeutics, Inc., a publicly traded biopharmaceutical company, from February 2014 to December 2018. He received an M.B.A. from Providence College and a B.S. from Suffolk University. We believe that Mr. Wyzga's senior management experience at biopharmaceutical and biotechnology companies, his current and past experience on boards of directors of public companies, and his financial expertise qualify him to serve as a member of our Board.

**THE BOARD OF DIRECTORS RECOMMENDS
A VOTE IN FAVOR OF EACH NAMED NOMINEE.**

Class II Directors Continuing in Office Until the 2025 Annual Meeting of Stockholders

William E. Aliski, MPA, age 76, has served as a member of our Board since September 2019. Since 2011, Mr. Aliski has served as an independent consultant to life sciences companies focused on orphan diseases. Prior to 2011, he served as Chief Commercial Officer for FoldRX Pharmaceuticals, an early stage company purchased by Pfizer in 2011, served as General Manager for Biomarin Europe, a biopharmaceutical company focused on rare diseases with genetic causes, and held executive level positions at Transkaryotic Therapies (TKT)/Shire and Genzyme Corp., both biopharmaceutical companies. Previously, Mr. Aliski served as a member of the boards of directors of Ultragenyx Pharmaceutical, Inc. from January 2011 until June 2022 and Applied Genetic Therapies Corporation from November 2018 until 2023. Mr. Aliski holds a M.P.A. from Harvard University and a Master of Social Planning from Boston College. We believe that Mr. Aliski's experience, in both consulting and operational roles, with life sciences companies focused on orphan diseases, as well as his public company board experience, qualify him to serve on our Board.

Alison Lawton, age 62, has served as a member of our Board since October 5, 2020. Ms. Lawton is an executive leader with more than 35 years of experience in biopharma and most recently served as the President and Chief Executive Officer of Kaleido Biosciences from August 2018 to June 2020, and prior to then as its President and Chief Operating Officer from December 2017 to August 2018. Prior to joining Kaleido Biosciences, Ms. Lawton served as Chief Operating Officer at Aura Biosciences, Inc., an oncology therapeutics company, from January 2015 until December 2017, and, prior to joining Aura, served as a consultant to Aura from March 2014 to December 2014. Before that, Ms. Lawton served as Chief Operating Officer at OvaScience, Inc., a life sciences company, from January 2013 to January 2014. In addition, from 2014 to 2017, Ms. Lawton served as a biotech consultant for various companies, including as a part-time Chief Operating Officer consultant to the Company from 2014 to 2016. Prior to that, Ms. Lawton spent more than 20 years in various positions of increasing responsibility at Genzyme Corporation, a global biopharmaceutical company, and subsequently at Sanofi S.A., also a global biopharmaceutical company, following the acquisition of Genzyme by Sanofi in 2011. Ms. Lawton currently serves as a member of the board of directors of ProQR Therapeutics N.V., a publicly traded biotechnology company, Dianthus Therapeutics (formerly Magenta Therapeutics), a publicly traded biotechnology company and three other nonpublic companies. Ms. Lawton previously served as a member of the board of directors of Verastem Inc., from 2012 to 2020, CoLucid Pharmaceuticals, Inc. from 2016 until its acquisition by Eli Lilly in 2017, Cubist Pharmaceuticals until its acquisition by Merck & Co and Spyre Therapeutics (formerly Aeglea Biotherapeutics) from November 2023 to January 2024. She holds a B.Sc. in pharmacology from Kings College, University of London. We believe that Ms. Lawton's experience as a senior executive in the pharmaceutical and biotechnology industries qualify her to serve on our Board.

R. Keith Woods, age 56, has served as a member of our Board since September 2023. From 2018 to 2022, Mr. Woods served as Chief Operating Officer of argenx, a company focused on rare diseases, where he helped lead argenx through its transition from a research and development organization to a global commercial organization. Following his retirement from argenx, Mr. Woods continues to serve as an advisor to the argenx Board of Directors. Beginning in December 2023, Mr. Woods still currently serves as a member of the Board of Directors of Neurogene, a publicly traded biotechnology company, Rocket Pharmaceuticals, a publicly traded biotechnology company, and TScan Therapeutics, a publicly traded biopharmaceutical company. Mr. Woods previously served in a variety of roles at Alexion Pharmaceuticals, including Vice President and Managing Director of Alexion UK, overseeing all aspects of Alexion's UK business, and Vice President, U.S. operations, ending his tenure there as Senior Vice President of North America Business Operations. Prior to that, he spent more than two decades in roles of increasing responsibility at Roche, Amgen, and Eisai. Mr. Woods a Bachelor of Science degree from Florida State University. We believe that Mr. Woods's experience with research and development and commercialization efforts as well as his focus on rare diseases qualifies him to serve on our Board.

Class III Directors Continuing In Office Until the 2026 Annual Meeting of Stockholders

Gary J. Bridger, Ph.D., age 61, became a member of the board of directors of X4 Pharmaceuticals, Inc., a private company, in October 2018 and continues to serve as a member of our Board upon the completion of our merger, between Arsanis, Inc. and the Company, in March 2019. From February 2015 to December 2017, Dr. Bridger served as a consultant to Xenon Pharmaceuticals Inc., a biopharmaceutical company, where he previously served as the Executive Vice President of Research and Development from January 2013 to February 2015. From October 2013 to October 2015, Dr. Bridger served as a Managing Director at Five Corners Capital Inc. From June 2010 to June 2012, Dr. Bridger served as a venture partner at Venture West Capital Management, a venture capital firm. From November 2006 to December 2007, Dr. Bridger served as Senior Vice President of Research and Development of Genzyme Corporation, a biotechnology company, which was acquired by Sanofi, S.A. In June 1996, Dr. Bridger co-founded AnorMED Inc., a biopharmaceutical company, and was its Vice President of Research and Development and Chief Scientific Officer from 2000 until its acquisition by Genzyme in November 2006. Dr. Bridger has served on the board of directors of Liminal BioSciences Inc., a biotechnology company, from May 2019 until September 2023, and previously served on the board of directors of Alder BioPharmaceuticals, Inc., a biopharmaceutical company, from 2013 to 2016 and Aquinox Pharmaceuticals Inc., a pharmaceuticals company, from 2015 until 2019. Dr. Bridger serves on the board of directors of Expansion Therapeutics and on the scientific advisory board of AlecTos Therapeutics Inc., a biopharmaceutical company. Dr. Bridger holds a Ph.D. in Organic Chemistry from the University of Manchester Institute of Science and Technology. We believe that Dr. Bridger's experience as an executive officer or director of several public and private life sciences companies provides him with the qualifications and skills to serve on our Board.

Francoise de Craecker, age 62, has served as a member of our Board since October 14, 2021. Ms. de Craecker has served as an Independent Director of Gensight Biologics, a biopharma company focused on developing and commercializing innovative gene therapies for retinal neurodegenerative diseases and central nervous system disorders, since May 2021. Previously, from January 2018 to August 2019, Ms. de Craecker was the General Manager of the Europe, Middle East & Africa region at AveXis (now Novartis Gene Therapies), a biotechnology company that develops and commercializes gene therapies for rare and life-threatening neurological genetic disorders. From August 2014 to December 2017, Ms. de Craecker served as Senior Vice President and General Manager of the Europe, Middle East & Africa region at Raptor Pharmaceuticals, a biopharmaceutical company since acquired by Horizon Pharmaceuticals and after by Chiesi Farmaceutici. Earlier in her

career, Ms. de Craecker held multiple positions of increasing responsibility and in diverse geographies at Shire Human Genetics Rare Disease Business Unit (previously Transkaryotic Therapies), from October 2000 to March 2014, including Vice President and General Manager of Europe, Vice President and General Manager of Northern Europe, Senior Director European Mid-Sized Countries and Global Fabry Disease Franchise Lead. Ms. de Craecker received her Masters in Nutrition Science from Faculty of Medicine of the University of Leuven (Belgium). We believe that Ms. De Craecker’s experience with and knowledge of life sciences companies in the development and commercialization space provide her with the qualifications and skills to serve on our Board.

Murray W. Stewart, M.D., age 63, has served as a member of our Board since March 2019 and as our interim Chief Medical Officer from November 2022 to September 2023. From July 2021 to May 2023, Dr. Stewart served on the Board of Directors of VectivBio Holding AG (Nasdaq: VECT) and was a member of the compensation committee. Additionally, from January 2023 to March 2023, Dr. Stewart served as a member of the Board of Directors of Amarin Corporation plc (NASDAQ: AMRN). Dr. Stewart has served as Chief Medical Officer of Rhythm Pharmaceuticals, Inc., a biopharmaceutical company focused on developing and commercializing therapies for the treatment of rare genetic disorders of obesity, since October 2018. He previously served as Head of Research and Development for Novilion Therapeutics Inc., a biopharmaceutical company focused on developing new standards of care for individuals living with rare disease, from November 2017 to October 2018. Prior to that, Dr. Stewart held various positions of increasing responsibility at GlaxoSmithKline, including serving as Chief Medical Officer from April 2014 to November 2017, with global responsibility for patient well-being across the vaccine, pharmaceutical, and consumer business units. He also held multiple research and development leadership roles, including Chief Medical Officer for the pharmaceutical business, Clinical Head of the Biopharma Unit, and Therapy Area Head for metabolic and cardiovascular diseases. Prior to his tenure to joining GlaxoSmithKline, he worked as a consultant physician and honorary senior lecturer at the Diabetes Center in Newcastle upon Tyne in the United Kingdom. Dr. Stewart holds an M.D. from Southampton Medical School and is a Fellow of the Royal College of Physicians. We believe that Dr. Stewart’s extensive biopharmaceutical leadership experience, including experience in research, clinical development and regulatory strategy, provide him with the qualifications and skills to serve on our Board.

BOARD DIVERSITY

The composition of our Board of Directors currently includes three individuals who are diverse under Nasdaq Stock Market LLC (“Nasdaq”) listing rule regarding board diversity, representing gender diversity of 33%, as presented in the below Board Diversity Matrix. Under the Nasdaq listing rule, directors who self-identify as (i) female, (ii) an underrepresented minority or (iii) LGBTQ+ are defined as being diverse. The following table provides certain self-identified personal characteristics of our directors, in accordance with Rule 5605(f) of the Nasdaq listing standards:

Board Diversity Matrix (As of April 15, 2024)				
Total Number of Directors	9			
	Female	Male	Non-Binary	Did Not Disclose Gender
Part I: Gender Identity				
Directors	3	6	—	—
Part II: Demographic Background				
African American or Black	—	—	—	—
Alaskan Native or Native American	—	—	—	—
Asian	—	—	—	—
Hispanic or Latinx	—	—	—	—
Native Hawaiian or Pacific Islander	—	—	—	—
White	3	6	—	—
Two or More Races or Ethnicities	—	—	—	—
LGBTQ+	—			
Did Not Disclose Demographic Background	—			

INFORMATION REGARDING THE BOARD OF DIRECTORS AND CORPORATE GOVERNANCE

INDEPENDENCE OF THE BOARD OF DIRECTORS

As required under the Nasdaq listing standards, a majority of the members of a listed company's board of directors must qualify as "independent," as affirmatively determined by the Board of Directors. The Board consults with its counsel to ensure that the Board's determinations are consistent with relevant securities and other laws and regulations regarding the definition of "independent," including those set forth in pertinent listing standards of Nasdaq, as in effect from time to time.

Consistent with these considerations, after review of all relevant identified transactions or relationships between each director, or any of his or her family members, and the Company, its senior management and its independent auditors, the Board has affirmatively determined that the following six directors are independent directors within the meaning of the applicable Nasdaq listing standards: Mr. Aliski, Ms. de Craecker, Ms. Lawton, Mr. McGirr, Mr. Wyzga and R. Keith Woods. In making this determination, the Board found that none of these directors or nominees for director had a material or other disqualifying relationship with the Company. Dr. Ragan is employed by us and is therefore not independent under Nasdaq listing standards. Dr. Bridger has previously provided us with consulting services in the past pursuant to a consulting agreement that was terminated in January 2023 and Dr. Stewart is currently providing consulting services to us pursuant to a consulting agreement. Therefore, neither Dr. Bridger nor Dr. Stewart are independent under the Nasdaq listing standards. See "Transactions with Related Persons and Indemnification – Certain Related-Person Transactions."

BOARD LEADERSHIP STRUCTURE

The Board has an independent Chairman, Mr. Wyzga, who has authority, among other things, to call and preside over Board meetings, including meetings of the independent directors, to set meeting agendas and to determine materials to be distributed to the Board. Accordingly, the Chairman has substantial ability to shape the work of the Board. We believe that separation of the positions of Chairman and Chief Executive Officer reinforces the independence of the Board in its oversight of our business and affairs. Our Board also recognizes the full-time, effort and energy that our Chief Executive Officer devotes to her position in the current business environment. In addition, we believe that having an independent Chairman creates an environment that is more conducive to objective evaluation, increasing management accountability and improving the ability of the Board to assess management's capacity to act in the best interests of our Company and our stockholders. As a result, we believe that having an independent Chairman can enhance the effectiveness of the Board as a whole.

ROLE OF THE BOARD IN RISK OVERSIGHT

One of the Board's key functions is informed oversight of our risk management process. The Board does not have a standing risk management committee, but rather administers this oversight function directly through the Board as a whole, as well as through various Board standing committees that address risks inherent in their respective areas of oversight. For example, in determining whether and under what circumstances we will engage in financing transactions or enter into licensing, collaboration or similar arrangements, the Board is involved in our management of risks related to our financial condition or of the risks inherent in drug development and commercialization. As part of its oversight, our Board receives reports by each committee chair regarding the committee's considerations and actions. In particular, the Audit Committee is responsible for discussing the adequacy of our risk management activities with management and our independent registered public accounting firm. The Audit Committee's primary emphasis is managing our financial risk exposures, including our internal control over financial reporting. The Audit Committee also monitors compliance with legal and regulatory requirements and considers and approves or disapproves any related person transactions. In addition, the Compensation Committee is responsible for considering whether our compensation programs and practices are reasonably likely to have a material adverse effect on us. The Nominating and Corporate Governance Committee assists the Board by overseeing and evaluating programs and risks associated with Board organization, membership and structure, and corporate governance.

At each of its meetings, the Board receives business updates from various members of management. These updates may identify matters that have emerged within that member of management's scope of responsibility that involve operational, financial, legal or regulatory risks and, in these cases, the Board provides guidance to management. Our Board believes that full and open communication between management and the Board is essential for effective risk management and oversight.

In carrying out their risk oversight functions, the Board and its committees routinely request and review management updates, reports from the independent auditors and legal and regulatory advice from outside experts, as appropriate, to assist in discerning and managing important risks that may be faced by us. The Board is committed to continuing to ensure and evolve its risk oversight practices as appropriate given the stage of our evolution as a late-stage clinical biopharmaceutical company and the fast-paced changes of the life sciences industry.

MEETINGS OF THE BOARD OF DIRECTORS

The Board met 8 times during the last fiscal year. Each of our incumbent Board members attended 75% or more of the aggregate number of meetings of the Board and of the committees on which he or she served, held during the portion of the last fiscal year for which he or she was a director or committee member.

INFORMATION REGARDING COMMITTEES OF THE BOARD OF DIRECTORS

The Board has three standing committees: an Audit Committee, a Compensation Committee and a Nominating and Corporate Governance Committee. Each of these committees has authority to engage legal counsel or other experts or consultants, as it deems appropriate to carry out its responsibilities. The composition and function of each of these committees are described below.

Audit Committee

The Audit Committee is currently composed of three members: Mr. McGirr (chair), Ms. Lawton and Mr. Wyzga. The Audit Committee met four times during 2023. The Board has adopted a written Audit Committee charter that is available to stockholders on our website at <http://investors.x4pharma.com/>.

The Audit Committee established by the Board in accordance with Section 3(a)(58)(A) of the Securities Exchange Act of 1934, as amended (the “Exchange Act”), to oversee our corporate accounting and financial reporting processes and audits of our financial statements. For this purpose, the Audit Committee performs several functions. The Audit Committee:

- appoints, evaluates, retains, and when necessary, terminates the engagement of the independent auditors;
- oversees the independent auditor and approves the compensation of the independence auditor;
- reviews and approves the retention of the independent auditors to perform any proposed permissible non-audit services;
- oversees the work of the independent auditor, including resolution of disagreements between our management and the independent auditor regarding financial reporting;
- reviews our annual audited financial statements and quarterly financial statements with management and the independent auditor, including our disclosures under “Management’s Discussion and Analysis of Financial Condition and Results of Operations;”
- discusses the type and presentation of information to be disclosed in our earnings releases;
- coordinates the Board’s oversight of our internal control over financial reporting, disclosure procedures, cybersecurity and technology planning, and code of business conduct and ethics;
- discusses our policies with respect to risk assessment and risk management, including guidelines and policies to govern the process by which our exposure to risk is handled;
- establishes procedures, as required under applicable law, for the receipt, retention and treatment of complaints received by us regarding accounting, internal accounting controls or auditing matters and the confidential and anonymous submission by employees of concerns regarding questionable accounting or auditing matters;
- reviews our policies and procedures for reviewing and approving related person transactions;
- oversees the work of the internal auditors and internal audit functions, including evaluating whether the Company requires an internal audit function in order to improve in the oversight of the integrity of the Company’s financial statements, the Company’s compliance with legal and regulatory requirements, and the Company’s overall audit function; and

- oversees and controls the Company’s cybersecurity policies and guidelines to prevent, detect, and respond to cyber incidents or data breaches involving the Company’s products, services, data, information systems, and business operations and reviews the effectiveness of the Company’s cybersecurity programs and its practices for identifying, assessing, and mitigating cybersecurity risks across the Company’s products, services, and business operations.

The Board reviews the Nasdaq listing standards definition of independence for Audit Committee members on an annual basis and has determined that all members of the Company’s Audit Committee are independent (as independence is currently defined in Rule 5605(c)(2)(A)(i) and (ii) of the Nasdaq listing standards).

The Board has also determined that each of Mr. McGirr and Mr. Wyzga qualifies as an “audit committee financial expert,” as defined in applicable Security and Exchange Commission (“SEC”) rules.

Report of the Audit Committee of the Board of Directors

The material in this report is not “soliciting material,” is not deemed “filed” with the SEC and is not to be incorporated by reference in any filing of the Company under the Securities Act of 1933, as amended (the “Securities Act”) or the Exchange Act, whether made before or after the date hereof and irrespective of any general incorporation language in any such filing.

The Audit Committee is appointed by our Board to assist our Board in fulfilling its oversight responsibilities with respect to (1) the integrity of the Company’s financial statements and financial reporting process and systems of internal controls regarding finance, accounting, and compliance with legal and regulatory requirements, (2) the qualifications, independence, and performance of the Company’s independent registered public accounting firm, (3) the performance of the Company’s internal audit function, if any, and (4) other matters as set forth in the charter of the audit committee approved by our board of directors.

Management is responsible for the preparation of the Company’s financial statements and the financial reporting process, including its system of internal control over financial reporting and its disclosure controls and procedures. The independent registered public accounting firm is responsible for performing an audit of the Company’s financial statements in accordance with the standards of the Public Company Accounting Oversight Board (“PCAOB”), and issuing a report thereon. The Audit Committee’s responsibility is to monitor and oversee these processes.

The Audit Committee has reviewed and discussed the audited financial statements for the fiscal year ended December 31, 2023 with management of the Company. The Audit Committee has discussed with the independent registered public accounting firm the matters required to be discussed by the applicable requirements of the PCAOB and the SEC. The Audit Committee has also received the written disclosures and the letter from the independent registered public accounting firm required by applicable requirements of the PCAOB regarding the independent accountants’ communications with the Audit Committee concerning independence, and has discussed with the independent registered public accounting firm the accounting firm’s independence. Based on the foregoing, the Audit Committee has recommended to the Board that the audited financial statements be included in the Company’s Annual Report on Form 10-K for the fiscal year ended December 31, 2023.

Respectfully submitted,

David McGirr, M.B.A (Chairman)
Alison Lawton
Michael S. Wyzga

Compensation Committee

The Compensation Committee is currently composed of three directors: Mr. Aliski (chair), Ms. de Craecker and Mr. Wyzga. All members of our Compensation Committee are independent (as independence is currently defined in Rule 5605(d)(2) of the Nasdaq Listing Rules.) The Compensation Committee met seven times during 2023. The Board has adopted a written Compensation Committee charter that is available to stockholders on our website at <http://investors.x4pharma.com>.

The Compensation Committee acts on behalf of the Board to review, approve or recommend for approval by the Board and oversee our compensation strategy, policies, plans and programs, including:

- review and approval, or review and recommendation to the Board for approval, the compensation and other terms of employment or service, including salary, bonus and incentive compensation levels, deferred compensation, executive perquisites, equity compensation, severance arrangements and change-in-control benefits, of our Chief Executive Officer and the other executive officers;
- oversight of the evaluation of our senior executives, including determining the nature and frequency of the evaluation and the persons subject to the evaluation, supervising the conduct of the evaluation, and preparing assessments of the senior executives' performance;
- review and approval or review and recommendation to the Board of our incentive-compensation and equity-based plans and approval of any tax-qualified, non-discriminatory employee benefit plans for which stockholder approval is not sought and pursuant to which options or stock may be acquired by our officers, directors, employees or consultants;
- administration of our equity compensation plans;
- review and recommendation to the Board with respect to director compensation; and
- adopt and administer a compensation recovery policy including, without limitation, a policy designed to comply with any rules or regulations adopted by the SEC and Nasdaq pursuant to Section 10D of the Exchange Act.

Compensation Committee Processes and Procedures

Our Compensation Committee is primarily responsible for determining the compensation for our executive officers. In setting base salaries and bonuses and granting equity incentive awards for our executive officers, including our NEOs, our Compensation Committee considers compensation for comparable positions in the market, the historical compensation levels of our executives, individual and corporate performance as compared to our expectations and objectives, our desire to motivate our employees to achieve short- and long-term results that are in the best interests of our stockholders, and a long-term commitment to our company. As part of this process, Dr. Ragan, as our president and chief executive officer, prepares performance evaluations for the other executive officers and recommends annual salary increases, annual equity awards and cash bonuses to the Compensation Committee, which is ultimately approved by the Compensation Committee. The Compensation Committee also conducts a performance evaluation of Dr. Ragan and reviews and approves, or recommends for approval by the Board, the compensation of Dr. Ragan, including salary, bonus and incentive compensation levels; deferred compensation; executive perquisites; equity compensation; severance arrangements; change-in-control benefits and/or other forms of executive officer compensation. Dr. Ragan may not be present during voting or deliberations on her compensation or evaluation. As necessary, the Compensation Committee consults with the Board as to the achievement of corporate objectives that drive contingent compensation awards.

Our Compensation Committee has the authority to delegate authority to one or more subcommittees as it deems appropriate from time to time under the circumstances. Additionally, our Compensation Committee may delegate to one or more executive officers of the Company the power to grant options or other stock awards pursuant to our equity-based plan to employees of the Company or any subsidiary of the Company who are not directors or executive officers of the Company. Our Compensation Committee has delegated Dr. Ragan such authority, subject to certain parameters.

Our Compensation Committee has the authority to engage the services of a consulting firm or other outside advisors to assist it in designing our executive compensation programs and in making compensation decisions. We have utilized a compensation consultant, Arnosti Consulting, with expertise in the biotechnology market, to help assess executive and employee compensation and to help inform our compensation strategy. Arnosti Consulting reports directly to our Compensation Committee. Our Compensation Committee annually assesses its independence consistent with Nasdaq listing standards and concluded that the engagement of Arnosti Consulting did not raise any conflict of interest.

Nominating and Corporate Governance Committee

The Nominating and Corporate Governance Committee is currently composed of three directors: Mr. Aliski (chair), Mr. McGirr, and Mr. Wyzga. All members of the Nominating and Corporate Governance Committee are independent (as independence is currently defined in Rule 5605(a)(2) of the Nasdaq Listing Rules). The Nominating and Corporate Governance Committee met three times during 2023. The Board has adopted a written Nominating and Corporate Governance Committee charter that is available to our stockholders on our website at <http://investors.x4pharma.com/>.

The Nominating and Corporate Governance Committee of the Board is responsible for identifying, reviewing and evaluating candidates to serve as directors of the Company (consistent with criteria approved by the Board), reviewing and evaluating incumbent directors, recommending to the Board candidates for election to the Board, making recommendations to the Board regarding the membership of the committees of the Board (including with respect to making changes or rotation of members, the creation of additional Board committees, or changes in Committee charters), overseeing an annual self-assessment of the Board, overseeing succession planning for senior executives of the Company, and developing and recommending to the Board a set of corporate governance principles for the Company.

The Nominating and Corporate Governance Committee believes that candidates for director should have certain minimum qualifications, including a reputation for integrity, honesty and adherence to high ethical standards; demonstrated business acumen, experience and the ability to exercise sound judgments in matters that relate to the current and long-term objectives of the Company and a willingness and ability to contribute positively to the decision-making process of the Company; a commitment to understand the Company and its industry and to regularly attend and participate in meetings of the Board and its committees; the interest and ability to understand the sometimes conflicting interests of the various constituencies of the Company, which include stockholders, employees, customers, governmental units, creditors and the general public, and to act in the interests of all stockholders; and the ability to serve for at least three years before reaching the age of 75. The Nominating and Corporate Governance Committee also believes that candidates for director should not have, nor appear to have, a conflict of interest that would impair the candidate's ability to represent the interests of all the Company's stockholders and to fulfill the responsibilities of a director. However, the Nominating and Corporate Governance Committee retains the right to modify these qualifications from time to time. Candidates for director nominees are reviewed in the context of the current composition of the Board, the operating requirements of the Company and the long-term interests of stockholders, and the Nominating and Corporate Governance Committee has direct input from the Chairman of the Board and the Chief Executive Officer.

Our Nominating and Corporate Governance Committee has not adopted a formal diversity policy in connection with the consideration of director nominations or the selection of nominees but believes that our Board, taken as a whole, should embody a diverse set of skills, experiences and backgrounds. In this regard, the Nominating and Corporate Governance Committee will consider issues of diversity among its members in identifying and considering nominees for director, and strive where appropriate to achieve a diverse balance of backgrounds, perspectives, experience, age, gender, ethnicity and country of citizenship on our Board and its committees. The Nominating and Corporate Governance Committee does not make any particular weighting of diversity or any other characteristic in evaluating nominees and directors.

The Nominating and Corporate Governance Committee appreciates the value of thoughtful Board refreshment, and regularly identifies and considers qualities, skills and other director attributes that would enhance the composition of the Board. In the case of incumbent directors whose terms of office are set to expire, the Committee reviews these directors' overall service to the Company during their terms, including the number of meetings attended, level of participation, quality of performance and any other relationships and transactions that might impair the directors' independence. The Nominating and Corporate Governance Committee also takes into account the results of the Board's self-evaluation, conducted annually on a group and individual basis. In the case of new director candidates, the Nominating and Corporate Governance Committee also determines whether the nominee is independent for Nasdaq purposes, which determination is based upon applicable Nasdaq listing standards, applicable SEC rules and regulations and the advice of counsel, if necessary. The Nominating and Corporate Governance Committee then uses its network of contacts to compile a list of potential candidates, but may also engage, if it deems appropriate, a professional search firm. The Nominating and Corporate Governance Committee conducts any appropriate and necessary inquiries into the backgrounds and qualifications of possible candidates after considering the function and needs of the Board. The Nominating and Corporate Governance Committee meets to discuss and consider the candidates' qualifications and then selects a nominee for recommendation to the Board by majority vote.

The Nominating and Corporate Governance Committee will consider director candidates recommended by stockholders. The Nominating and Corporate Governance Committee does not intend to alter the manner in which it evaluates candidates, including the minimum criteria set forth above, based on whether or not the candidate was recommended by a stockholder. Stockholders who wish to recommend individuals for consideration by the Nominating and Corporate Governance Committee to become nominees for election to the Board may do so by delivering a written recommendation to the

Nominating and Corporate Governance Committee at the following address: c/o X4 Pharmaceuticals, Inc., 61 North Beacon Street, 4th Floor, Boston, Massachusetts 02134 at least 120 days prior to the anniversary date of the mailing of our Proxy Statement for the last Annual Meeting of Stockholders. Submissions must include the full name of the proposed nominee, a description of the proposed nominee's business experience for at least the previous five years, complete biographical information, a description of the proposed nominee's qualifications as a director and a representation that the nominating stockholder is a beneficial or record holder of our common stock and has been a holder for at least one year. Any such submission must be accompanied by the written consent of the proposed nominee to be named as a nominee and to serve as a director if elected.

STOCKHOLDER COMMUNICATIONS WITH THE BOARD OF DIRECTORS

These communications will be reviewed by one or more employees of the Company designated by the Board, who will determine whether the communication should be presented to the Board. Stockholders who wish to communicate with our Board, or any individual director, may do so by sending written communications addressed to our Corporate Secretary at 61 North Beacon Street, 4th Floor, Boston, Massachusetts 02134.

Communications will be distributed to the Board, or to any individual director or directors as appropriate, depending on the facts and circumstances outlined in the communications. Items that are unrelated to the duties and responsibilities of our Board of Directors may be excluded, such as:

- junk mail and mass mailings;
- resumes and other forms of job inquiries;
- surveys; and
- solicitations or advertisements.

In addition, any material that is unduly hostile, threatening, or illegal in nature may be excluded, in which case it will be made available to any outside director upon request.

CODE OF ETHICS

We have adopted a Code of Business Conduct and Ethics that applies to all of our officers, directors and employees. The Code of Business Conduct and Ethics is available on our website at <http://investors.x4pharma.com>. If the Company makes any substantive amendments to the Code of Business Conduct and Ethics or grants any waiver from a provision of the Code of Business Conduct and Ethics to any executive officer or director, the Company will promptly disclose the nature of the amendment or waiver on its website.

HEDGING POLICY

Our Board has adopted an insider trading policy, which prohibits our employees, directors and certain consultants from engaging in hedging or monetization transactions with respect to our securities, including through the use of financial instruments such as prepaid variable forwards, equity swaps, collars, and exchange funds. In addition, our insider trading policy prohibits trading in derivative securities related to our securities, which include publicly traded call and put options, engaging in short selling of our common stock, purchasing our common stock on margin or holding it in a margin account and pledging our shares as collateral for a loan.

INCENTIVE COMPENSATION RECOUPMENT POLICY

Our board of directors adopted an Incentive Compensation Recoupment Policy effective as of October 2, 2023 (the "Incentive Compensation Recoupment Policy"), in compliance with the Nasdaq listing rules, which requires recovery from executive officers of incentive-based compensation that is earned, granted or vested based on the achievement of a financial reporting measure in the event of a required accounting restatement of previously issued financial statements. The recoverable compensation includes any compensation received after the effective date of the Incentive Compensation Recoupment Policy and in the three-year fiscal period preceding the date we were required to prepare the accounting restatement that is in excess of the amount that would have been earned, paid or vested had it been calculated based on the restated financial statements. Recovery is required regardless of fault or a covered officer's role in the financial reporting process. The Incentive Compensation Recoupment Policy has been filed as Exhibit 97.1 to our Annual Report on Form 10-K for the year ended December 31, 2023. At no time during or after the year ended December 31, 2023, was the Company required to prepare an accounting restatement that required recovery of erroneously awarded compensation pursuant to the Incentive Compensation Recoupment Policy, nor was there, on December 31, 2023, an outstanding balance of erroneously awarded compensation to be recovered from the application of the policy to a prior restatement.

PROPOSAL 2

RATIFICATION OF SELECTION OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

The Audit Committee of the Board has selected PricewaterhouseCoopers LLP as our independent registered public accounting firm for the fiscal year ending December 31, 2024 and has further directed that management submit the selection of its independent registered public accounting firm for ratification by the stockholders at the Annual Meeting. PricewaterhouseCoopers LLP has audited our financial statements since 2016 and also served as our auditor when we were a private company since 2016. Representatives of PricewaterhouseCoopers LLP are expected to be present at the Annual Meeting. They will have an opportunity to make a statement if they so desire and will be available to respond to appropriate questions.

Neither our Bylaws nor other governing documents or law require stockholder ratification of the selection of PricewaterhouseCoopers LLP as our independent registered public accounting firm. However, the Audit Committee of the Board is submitting the selection of PricewaterhouseCoopers LLP to the stockholders for ratification as a matter of good corporate practice. If the stockholders fail to ratify the selection, the Audit Committee of the Board will reconsider whether or not to retain that firm. Even if the selection is ratified, the Audit Committee of the Board in its discretion may direct the appointment of different independent auditors at any time during the year if they determine that such a change would be in our best interests and our stockholders.

PRINCIPAL ACCOUNTANT FEES AND SERVICES

The following table represents aggregate fees billed to us for the fiscal years ended December 31, 2023 and December 31, 2022 by PricewaterhouseCoopers LLP, our principal accountant.

	For the year ended	
	2023	2022
Audit Fees ⁽¹⁾	\$ 943,000	\$ 960,000
Audit-related Fees	—	—
Tax Fees	—	—
All Other Fees ⁽²⁾	4,250	4,038
Total Fees	\$ 947,250	\$ 964,038

(1) Consists of fees billed for professional services provided to us in connection with the annual audit of our consolidated financial statements, the review of our quarterly condensed consolidated financial statements, as well as audit services that are normally provided by an independent registered public accounting firm in connection with statutory and regulatory filings or engagements for those fiscal years, such as statutory audits. Included in 2023 and 2022 Audit Fees are fees of \$158,000 and \$255,000, respectively, in connection with the filing of registration statements and issuance of comfort letters.

(2) Consists of subscription fees paid for access to online accounting research software applications and data.

All fees described above were pre-approved by the Audit Committee. There were no services that were approved by the Audit Committee pursuant to Rule 2-01(c)(7)(i)(C) (relating to the approval of a *de minimis* amount of non-audit services after the fact but before completion of the audit).

The Audit Committee has adopted a policy and procedures for the pre-approval of audit and non-audit services rendered by our independent registered public accounting firm, PricewaterhouseCoopers LLP. Prior to engagement of an independent registered public accounting firm for the next year's audit, management will submit an aggregate of services expected to be rendered during that year for each of four categories of services (audit services, audit-related services, tax services and other fees) to the Audit Committee for approval. Prior to engagement, the Audit Committee pre-approves these services by category of service. The fees are budgeted, and the Audit Committee requires our independent registered public accounting firm and management to report actual fees versus the budget periodically throughout the year by category of service. During the year, circumstances may arise when it may become necessary to engage our independent registered public accounting firm for additional services not contemplated in the original pre-approval. In those instances, the Audit Committee requires

specific pre-approval before engaging our independent registered public accounting firm. The pre-approval of services may be delegated to one or more of the Audit Committee's members, but the decision must be reported to the full Audit Committee at its next scheduled meeting.

The Audit Committee has determined that the rendering of services other than audit services by PricewaterhouseCoopers LLP is compatible with maintaining the principal accountant's independence.

Vote Required

The affirmative vote of the holders of shares representing a majority of the shares present in person or by proxy and entitled to vote on this matter at the Annual Meeting will be required to ratify the selection of PricewaterhouseCoopers LLP.

**THE BOARD OF DIRECTORS RECOMMENDS
A VOTE IN FAVOR OF PROPOSAL 2.**

PROPOSAL 3

NON-BINDING ADVISORY VOTE ON NAMED EXECUTIVE OFFICER COMPENSATION

In accordance with the requirements of Section 14A of the Exchange Act (which was added by the Dodd-Frank Wall Street Reform and Consumer Protection Act), we are providing our stockholders with an opportunity to make a non-binding advisory vote on the compensation of our named executive officers, as disclosed in this Proxy Statement.

This non-binding advisory vote is commonly known as a “say-on-pay” vote and provides our stockholders with the opportunity to express their views on our executive compensation for our named executive officers for fiscal year 2023.

We urge stockholders to read the “Executive Compensation” section of this Proxy Statement, which discusses our executive compensation policies and procedures and contains tabular information and narrative discussion about our executive compensation policies and procedures and the compensation of our named executive officers.

Advisory Vote and Board Recommendation

We request stockholder approval, on a non-binding and advisory basis, of the compensation of our named executive officers as disclosed in this Proxy Statement pursuant to the SEC’s compensation disclosure rules (which disclosure includes the compensation tables and narrative disclosures that accompany the compensation tables within the Executive Compensation section of this Proxy Statement). This vote is not intended to address any specific element of compensation, but rather the overall compensation of our named executives and the compensation philosophy, policies, and practices described in this Proxy Statement. Accordingly, we ask our stockholders to vote “FOR” on the following resolution at the Annual Meeting:

“RESOLVED, that the Company’s stockholders approve, on a non-binding and advisory basis, the compensation of the named executive officers, as disclosed in the Company’s Proxy Statement for the 2024 Annual Meeting of Stockholders pursuant to the compensation disclosure rules of the Securities and Exchange Commission, including the compensation tables and narrative discussions that accompany the compensation tables within the Executive Compensation section of this Proxy Statement.”

The say-on-pay vote is advisory, and therefore not binding on the corporation or our Board of Directors. Although non-binding, our Board of Directors and the Compensation Committee value the opinions of our stockholders, and will carefully review and consider the voting results when making future decisions regarding our executive compensation program.

Vote Required

The affirmative vote of the holders of shares representing a majority of the shares present in person or by proxy and entitled to vote on this matter at the Annual Meeting will be required to ratify the advisory “say-on-pay” vote on executive compensation.

**THE BOARD OF DIRECTORS RECOMMENDS
A VOTE “FOR” ON PROPOSAL 3.**

EXECUTIVE OFFICERS

The following table sets forth information with respect to our executive officers and their ages as of the date of this Proxy Statement. There are no family relationships between any of our executive officers, and there is no arrangement or understanding between any executive officer and any other person pursuant to which the executive officer was selected.

Name	Age	Position
Paula Ragan, Ph.D.	54	President, Chief Executive Officer and Director
Adam S. Mostafa	44	Chief Financial Officer, Treasurer and Corporate Secretary
Christophe Arbet-Engels, Ph.D., M.D.	62	Chief Medical Officer
Mark Baldy	60	Chief Commercial Officer
Mary DiBiase, Ph.D.	63	Chief Operating Officer
Arthur Taveras, Ph.D.	60	Chief Scientific Officer

Paula Ragan, Ph.D. Biographical information for Dr. Ragan is presented above under the caption “Nominees for Election as a Class I Directors Continuing in Office Until the 2027 Annual Meeting of Stockholders”.

Adam S. Mostafa. Mr. Mostafa has served as our Chief Financial Officer and Treasurer since the completion of our merger, between Arsanis, Inc. and the Company, in March 2019. Prior to that, Mr. Mostafa served as X4’s Chief Financial Officer since September 2018. Prior to joining X4, Mr. Mostafa served as chief financial officer of Abpro Corporation, a biotechnology company focused on antibody therapeutics, from June 2016 to August 2018. Prior to that, Mr. Mostafa was a managing director in the healthcare investment banking group at Cantor Fitzgerald from January 2015 to May 2016, and from June 2011 to January 2015, Mr. Mostafa was a senior banker in the healthcare investment banking group at Needham & Company. Prior to that, Mr. Mostafa was a vice president in the investment banking group at CRT Capital Group from March 2007 to May 2011, and from September 2003 to March 2007, Mr. Mostafa was a portfolio management associate in the global stock selection group at AQR Capital. Mr. Mostafa began his career as an analyst in the healthcare investment banking group at Salomon Smith Barney. Mr. Mostafa earned an A.B. in Economics from Brown University.

Christophe Arbet-Engels, Ph.D., M.D. Dr. Arbet-Engels joined X4 in August 2023 as Chief Medical Officer. He brings to X4 more than 25 years of experience in strategic global drug discovery, development, and commercialization across a broad range of therapeutic areas including gastroenterology, cardiovascular-metabolism, neurology, oncology, and rare and orphan diseases. Dr. Arbet-Engels previously served as Chief Medical Officer at several life science companies, including Neurogastrx, Millendo Therapeutics, and Poxel Pharmaceuticals, where he provided research and development leadership, advancing multiple candidates from pre-clinical through to late-stage clinical trials and assisting with both financial and strategic partnering transactions. Prior to these roles, he held a variety of senior medical and clinical positions at Biogen, Boehringer-Ingelheim Pharmaceuticals, Hoffmann-La Roche, Merck Research Laboratories, Aventis Pharmaceuticals, and Ligand Pharmaceuticals, where he led clinical development and registration, launch, and lifecycle management efforts for several new medicines, including the blockbuster therapies LANTUS® and JARDIANCE®. Dr. Arbet-Engels has also served in educational roles at The Salk Institute for Biological Studies, University of Paris VI, and the Assistance Publique, Hospitals of Paris, and currently serves as a Member of the Board of Tutors in Biochemical Sciences at Harvard University. He received his MD and PhD in internal medicine/endocrinology-metabolism from the University of Paris, France, and completed his MBA at Rutgers University.

Mark Baldry. Mr. Baldry has served as our Chief Commercial Officer since November 2022. Previously, from November 2020 to October 2022, Mr. Baldry served as Chief Commercial Officer at Freeline Therapeutics Holdings Limited, a clinical-stage biotechnology company developing AAV gene therapies. From August 2019 to February 2020, Mr. Baldry served as Chief Commercial Officer of Wave Life Sciences USA, Inc., a clinical-stage genetic medicines company. From June 2015 to July 2019, Mr. Baldry held multiple positions of increasing responsibility at Amicus Therapeutics, Inc., a global biotechnology company focused on medicines for people living with rare metabolic diseases, including VP Global Marketing and SVP Global Marketing and Commercial Operations. Mr. Baldry received his B.Sc. in Genetics from York University (U.K.) and an M.B.A. from Concordia University (Canada).

Mary DiBiase, Ph.D. Dr. DiBiase has served as our Chief Operating Officer since September 2021. Prior to her promotion, Dr. DiBiase served as our Senior Vice President and previously Vice President of Technical Operations and Quality from June 2017 to September 2021. From February 2013 to July 2016, Dr. DiBiase was VP Technical Operations and Program Management, previously VP Program Management at Epirus Biopharmaceuticals, a small biosimilar company working to expand access to biosimilar products across the globe. From June 2011 to May 2012, Dr. DiBiase served as VP Product Operations, Specialty Care Business Unit for Pfizer Global Supply. From 1995 to 2011, she held multiple positions of increasing responsibility at Biogen, including Sr Director CMC Management, Program Executive for Avonex[®] and Associate Director Pharmaceutical Science and Technology. Dr. DiBiase received her Ph.D. from University of Rhode Island and her B.Pharm. from the University of London.

Arthur Taveras, Ph.D. Dr. Taveras has served as our Chief Scientific Officer since November 2020. Previously, from August 2018 to July 2020, Dr. Taveras served as Chief Scientific Officer of Comet Therapeutics, Inc., a private biotechnology company. From May 2015 to the present, Dr. Taveras has served in various capacities as Chief Scientific Officer, Head of Drug Discovery and/or Owner of Transform Therapeutics, a private company he founded that is focused on developing novel therapeutics for cancer, neurodegenerative diseases and immunologic disorders. Dr. Taveras also served as President & Chief Scientific Officer of Shanghai ChemPartner Co., Ltd., a research organization serving the pharmaceutical and biotechnology industry, from October 2013 to December 2014. Earlier in his career, he held leadership positions at Biogen, Atlantos Pharmaceuticals (later acquired by Amgen), and Schering-Plough Research Institute (later acquired by Merck). Dr. Taveras received his Ph.D., M.S and B.S. degrees from Rensselaer Polytechnical Institute.

PRINCIPAL STOCKHOLDERS

The following table sets forth information, to the extent known by us or ascertainable from public filings, with respect to the beneficial ownership of our common stock as of March 31, 2024 by:

- each of our directors;
- each of our named executive officers;
- all of our directors and executive officers as a group; and
- each person, or group of affiliated persons, who is known by us to beneficially own greater-than-5% of our common stock.

The column entitled “Percentage Beneficially Owned” is based on 167,937,781 shares of our common stock outstanding as of March 31, 2024.

Beneficial ownership is determined in accordance with the rules and regulations of the SEC and includes voting or investment power with respect to our common stock. Shares of our common stock subject to options that are currently exercisable or exercisable within 60 days of March 31, 2024 are considered outstanding and beneficially owned by the person holding the options for the purpose of calculating the percentage ownership of that person but not for the purpose of calculating the percentage ownership of any other person. Except as otherwise noted, the persons and entities in this table have sole voting and investing power with respect to all of the shares of our common stock beneficially owned by them, subject to community property laws, where applicable. Except as otherwise indicated in the table below, addresses of named beneficial owners are in care of X4 Pharmaceuticals, Inc., 61 North Beacon Street, 4th Floor, Boston, Massachusetts 02134.

Beneficial Owner	Beneficial Ownership	
	Number of Shares	Percent of Total
5% Stockholders		
Entities affiliated with Bain Capital Life Sciences Investors, LLC ⁽¹⁾	16,987,546	9.99 %
Entities affiliated with Growth Equity Opportunities 18 VGE, LLC ⁽²⁾	16,994,493	9.99 %
Entities affiliated with Acorn ⁽³⁾	17,845,650	9.99 %
Entities affiliated with OrbiMed ⁽⁴⁾	11,494,437	6.67 %
Named Executive Officers, Directors and Director Nominees		
Paula Ragan, Ph.D. ⁽⁵⁾	1,095,280	*
Adam S. Mostafa ⁽⁶⁾	78,480	*
William E. Aliski ⁽⁷⁾	67,948	*
Gary J. Bridger, Ph.D. ⁽⁸⁾	119,518	*
Francoise de Craecker ⁽⁹⁾	62,556	*
Alison Lawton ⁽¹⁰⁾	64,521	*
David McGirr, M.B.A. ⁽¹¹⁾	70,353	*
Murray W. Stewart, M.D. ⁽¹²⁾	176,119	*
Michael S. Wyzga ⁽¹³⁾	163,272	*
Christophe Arbet-Engels, Ph.D. M.D.	—	*
R. Keith Woods	—	*
All directors and current executive officers as a group (14 people) ⁽¹⁴⁾	2,739,034	1.62 %

* Less than one percent.

(1) Based on a Schedule 13G/A filed by Bain Capital Life Sciences Fund, L.P. (“BCLS Fund I”), Bain Capital Life Sciences Fund II, L.P. (“BCLS Fund II”), BCIP Life Sciences Associates, LP (“BCIP LS”), BCLS I Investco, LP (“BCLS I Investco”) and BCLS II Investco, LP (“BCLS II Investco”) and collectively, the “Bain Capital Life Sciences Holders”) on February 13, 2024. As of the close of business on December 31, 2023, (i) BCLS Fund I held 566,966 shares of our common stock and pre-funded warrants to purchase 566,966 shares of our common stock; (ii) BCLS Fund II held 1,332,276 shares of our common stock and pre-funded warrants to purchase 601,714 shares of our common stock; (iii) BCIP LS held 220,298 shares of our common stock and pre-funded warrants to purchase 131,320 shares of our common stock; (iv) BCLS II Investco held 9,270,081 shares of our common stock, warrants to purchase 6,448,689 shares of our common stock, Class C warrants to purchase 2,064,561 shares of common stock and pre-funded warrants to purchase 7,303,890 shares of common stock; and (v) BCLS I Investco held 3,490,188 shares of our common stock, warrants to purchase 2,688,998 shares of common stock, Class C warrants to purchase 860,888 shares of common stock and pre-funded warrants to purchase 1,888,599 shares of common stock. The Bain Capital Life Sciences Holders are (i) prohibited from exercising warrants to purchase common stock or pre-funded warrants to purchase common stock if, as a result of such exercise, the Bain Capital Life Sciences Holders would beneficially own more than 9.99% of the total number of shares of common stock then issued and outstanding immediately after giving effect to the exercise and (ii) prohibited from exercising Class C warrants to purchase common stock if, as a result of such exercise, the Bain Capital Life Sciences Holders would beneficially own more than 4.99% of the total number of shares of common stock then issued and outstanding immediately after giving effect to the exercise (collectively, the “BCLS Bain Beneficial

Ownership Blockers”). As a result of the BCLS Bain Beneficial Ownership Blockers, the amount reported above as beneficially owned consists of: (a) an aggregate of 14,879,809 shares of common stock held directly by the Bain Capital Life Sciences Holders and (b) an aggregate of 2,107,737 shares of common stock issuable upon exercise of pre-funded warrants, warrants and/or Class C warrants held directly by the Bain Capital Life Sciences Holders. Bain Capital Life Sciences Investors, LLC, (“BCLSI”), is (i) the general partner of Bain Capital Life Sciences Partners, LP, which is the general partner of BCLS Fund I and (ii) the manager of Bain Capital Life Sciences Investors II, LLC, which is the general partner of BCLS Fund II. Boylston Coinvestors, LLC, is the general partner of BCIP LS. BCLSI governs the investment strategy and decision-making process with respect to investments held by BCIP LS. BCLS II Investco (GP), LLC, whose manager is BCLS Fund II, is the general partner of BCLS II Investco and BCLS I Investco GP, LLC, whose manager is BCLS Fund I, is the general partner of BCLS I Investco. As a result, BCLSI may be deemed to share voting and dispositive power with respect to the securities held by the Bain Capital Life Sciences Holders. The address of each of the Bain Capital Life Sciences Holders is c/o Bain Capital Life Sciences, 200 Clarendon Street, Boston, MA 02116.

- (2) Based on a Schedule 13D/A filed by Growth Equity Opportunities 18 VGE, LLC (“GEO”) on May 26, 2023. As of May 15, 2023, GEO in connection with a private placement purchased (i) 3,250,000 shares of common stock and (ii) pre-funded warrants to purchase 4,973,684 shares of common stock. The pre-funded warrants carry a limitation on exercise preventing GEO from exercise if such exercise results in GEO beneficially owning in excess of 9.99% of the number of shares of our common stock, which percentage can be increased or decreased at the option of GEO upon 61 days prior notice however not to exceed 19.99%. Additionally, as previously disclosed, in connection with our underwritten offering in December 2022, GEO purchased (i) 5,213,636 shares of our common stock, (ii) pre-funded warrants to purchase 6,150,000 shares of our common stock and (iii) Class C warrants to purchase 5,681,818 shares of common stock. The pre-funded warrants carry a limitation on exercise preventing GEO from exercise if such exercise results in GEO beneficially owning in excess of 9.99% of the number of shares of our common stock, which percentage can be increased or decreased at the option of GEO upon 61 days prior notice however not to exceed 19.99%, and the Class C warrants carry a limitation on exercise preventing GEO from exercise if such exercise results in GEO beneficially owning in excess of 4.99% of the number of shares of our common stock, which percentage can be increased or decreased at the option of GEO upon 61 days prior notice however not to exceed 9.99% (the “GEO Beneficial Ownership Blockers”). As previously disclosed, in connection with a private placement closed in July 2022, GEO purchased (i) 6,523,157 shares of our common stock, (ii) pre-funded warrants to purchase 7,182,032 shares of our common stock and (iii) warrants to purchase 13,705,189 shares of our common stock. As a result of the GEO Beneficial Ownership Blockers, the amount reported above as beneficially owned consists of 14,986,793 shares of common stock held by GEO and up to 2,007,700 shares of common stock issuable upon exercise of pre-funded warrants and/or warrants, including Class C warrants held by GEO. NEA 18 Venture Growth Equity, L.P. (“NEA 18 VGE”) is the sole member of GEO and NEA Partners 18 VGE, L.P. (“NEA Partners 18 VGE”) is the sole general partner of NEA 18 VGE. NEA 18 VGE GP, LLC (“NEA 18 VGE LLC”) and, together with NEA Partners 18 VGE, the “Control Entities”) is the sole general partner of NEA Partners 18 VGE. Ali Behbahani (“Behbahani”), Carmen Chang (“Chang”), Anthony A. Florence, Jr. (“Florence”), Mohamad H. Makhzoumi (“Makhzoumi”), Edward T. Mathers (“Mathers”), Scott D. Sandell (“Sandell”), Paul Walker (“Walker”) and Rick Yang (“Yang”) are the managers of NEA 18 VGE LLC. The address of the principal business office of GEO, NEA 18 VGE, each Control Entity and Sandell is New Enterprise Associates, 1954 Greenspring Drive, Suite 600, Timonium, MD 21093. The address of the principal business office of Behbahani, Chang, Makhzoumi, Walker and Yang is New Enterprise Associates, 2855 Sand Hill Road, Menlo Park, California 94025. The address of the principal business office of Florence and Mathers is New Enterprise Associates, 104 5th Avenue, 19th Floor, New York, NY 10001.
- (3) Based on a Schedule 13G filed by Acorn Bioventures, L.P. (“Acorn”); Acorn Capital Advisors GP, LLC (“Acorn GP”), which is the sole general partner of Acorn; Acorn Bioventures 2, L.P. (“Acorn 2”); Acorn Capital Advisors GP 2, LLC (“Acorn GP 2”), which is the sole general partner of Acorn 2; and Anders Hove (“Hove” or “Manager”, and collectively with Acorn, Acorn GP, Acorn 2, Acorn GP2, the “Acorn Reporting Persons”) on February 14, 2024. As of the close of business on December 31, 2023, the Acorn Reporting Persons held (i) 7,310,650 shares of common stock and (ii) 10,535,000 warrants to purchase 10,535,000 shares of our common stock. The Acorn Reporting Persons are (i) prohibited from exercising warrants to purchase common stock or pre-funded warrants to purchase common stock if, as a result of such exercise, the Acorn Reporting Persons would beneficially own more than 9.99% of the total number of shares of common stock then issued and outstanding immediately after giving effect to the exercise and (ii) prohibited from exercising Class C warrants to purchase common stock if, as a result of such exercise, the Acorn Reporting Persons would beneficially own more than 4.99% of the total number of shares of common stock then issued and outstanding immediately after giving effect to the exercise (collectively, the “Acorn Beneficial Ownership Blockers”). As a result of the Acorn Beneficial Ownership Blockers, any warrants held in excess of the Acorn Beneficial Ownership Blockers are not included in the above amounts. The address of the principal business office of each of the Acorn Reporting Persons is 420 Lexington Avenue, Suite 2626, New York, New York 10170.
- (4) Based on a Schedule 13G filed by OrbiMed Advisors LLC (“OrbiMed Advisors”) and OrbiMed Capital GP IV LLC (“GP IV”) on February 14, 2024. Consists of (i) 7,133,515 shares of common stock and (ii) 4,360,922 shares issuable upon the exercise of warrants to purchase common stock held by OrbiMed Private Investments IV, LP (“OPI IV”). GP IV is the general partner of OPI IV. OrbiMed Advisors is the managing member of GP IV. By virtue of such relationships, GP IV and OrbiMed Advisors may be deemed to have voting power and investment power over the securities held by OPI IV and as a result, may be deemed to have beneficial ownership over such securities. OrbiMed Advisors exercises voting and investment power through a management committee comprised of Carl L. Gordon, Sven H. Borho, and W. Carter Neild, each of whom disclaims beneficial ownership of the shares held by OPI IV. The address of each of the aforementioned entities is c/o OrbiMed Advisors LLC, 601 Lexington Avenue, 54th Floor, New York, New York 10022.
- (5) Consists of 765,068 shares of common stock and 330,012 shares of common stock underlying options that were exercisable as of April 15, 2024 or will become exercisable within 60 days after such date.
- (6) Consists of 78,480 shares of common stock underlying options that were exercisable as of April 15, 2024 or will become exercisable within 60 days after such date.

- (7) Consists of 3,334 shares of common stock, 16,281 shares of common stock underlying options that were exercisable as of April 15, 2024 or will become exercisable within 60 days after such date and 48,333 shares of common stock underlying restricted stock units that were vested as of April 15, 2024 or will become exercisable within 60 days after such date.
- (8) Consists of 3,334 shares of common stock, 67,851 shares of common stock underlying options that were exercisable as of April 15, 2024 or will become exercisable within 60 days after such date and 48,333 shares of common stock underlying restricted stock units that were vested as of April 15, 2024 or will become exercisable within 60 days after such date.
- (9) Consists of 3,334 shares of common stock, 10,889 shares of common stock underlying options that were exercisable as of April 15, 2024 or will become exercisable within 60 days after such date and 48,333 shares of common stock underlying restricted stock units that were vested as of April 15, 2024 or will become exercisable within 60 days after such date.
- (10) Consists of 3,334 shares of common stock, 12,854 shares of common stock underlying options that were exercisable as of April 15, 2024 or will become exercisable within 60 days after such date and 48,333 shares of common stock underlying restricted stock units that were vested as of April 15, 2024 or will become exercisable within 60 days after such date.
- (11) Consists of 3,334 shares of common stock, 18,686 shares of common stock underlying options that were exercisable as of April 15, 2024 or will become exercisable within 60 days after such date and 48,333 shares of common stock underlying restricted stock units that were vested as of April 15, 2024 or will become exercisable within 60 days after such date.
- (12) Consists of 146,505 shares of common stock, 26,281 shares of common stock underlying options that were exercisable as of April 15, 2024 or will become exercisable within 60 days after such date and 3,333 shares of common stock underlying restricted stock units that were vested as of April 15, 2024 or will become exercisable within 60 days after such date.
- (13) Consists of 28,334 shares of common stock, 86,605 shares of common stock underlying options that were exercisable as of April 15, 2024 or will become exercisable within 60 days after such date and 48,333 shares of common stock underlying restricted stock units that were vested as of April 15, 2024 or will become exercisable within 60 days after such date.
- (14) Consists of 1,507,320 shares of common stock, 937,022 shares of common stock underlying options that were exercisable as of April 15, 2024 or will become exercisable within 60 days after such date, and 293,331 shares of common stock underlying restricted stock units that were vested as of April 15, 2024 or will become exercisable within 60 days after such date.

EXECUTIVE COMPENSATION

Our Compensation Committee is primarily responsible for establishing and reviewing our general compensation strategy. See the section captioned “Compensation Committee Processes and Procedures.”

2023 SUMMARY COMPENSATION TABLE

The following table shows the total compensation awarded to, earned by or paid to, during the fiscal years ended December 31, 2023 and December 31, 2022, the following individuals, for all services rendered in all capacities: (1) each individual who served as our Chief Executive Officer during the fiscal year ended December 31, 2023, and (2) our two next most highly compensated executive officers who earned more than \$100,000 during the fiscal year ended December 31, 2023 and were serving as executive officers as of such date. We refer to these three individuals in this Proxy Statement as our named executive officers.

Our named executive officers for 2023 who appear in the Summary Compensation Table are:

- Paula Ragan, Ph.D., our President and Chief Executive Officer;
- Adam S. Mostafa, our Chief Financial Officer, Treasurer and Corporate Secretary; and
- Christophe Arbet-Engels, Ph.D. M.D., our Chief Medical Officer.

Name and Principal Position	Year	Salary (\$)	Bonus (\$)	Stock Awards (\$) ⁽¹⁾	Option Awards (\$) ⁽²⁾	Non-Equity Incentive Plan Compensation (\$) ⁽³⁾	All Other Compensation (\$)	Total (\$)
Paula Ragan, Ph.D. President and Chief Executive Officer	2023	620,053	—	1,035,784	—	375,132	13,792 ⁽⁴⁾	2,044,761
	2022	583,481	58,773	476,904	2,432,049	308,557	12,769	3,872,533
Adam S. Mostafa Chief Financial Officer, Treasurer and Secretary	2023	486,192	—	452,064	—	214,000	592 ⁽⁴⁾	1,152,848
	2022	458,973	46,085	226,800	954,900	193,555	569	1,880,882
Christophe Arbet-Engels, Ph.D M.D. Chief Medical Officer ⁽⁵⁾	2023	179,590 ⁽⁶⁾	200,000 ⁽⁷⁾	—	1,257,135	—	205 ⁽⁴⁾	1,636,930

- (1) The amounts reported in the “Stock Awards” column reflect the aggregate grant date fair value of restricted stock units awarded during the applicable fiscal year, computed in accordance with the provisions of Financial Accounting Standards Board Accounting Standards Codification Topic 718 (“ASC 718”), but excluding any estimated forfeitures related to service-based vesting conditions. See Note 12 to the X4 Pharmaceuticals Inc. Annual Report on Form 10-K for the year ended December 31, 2023 filed with the SEC on March 21, 2024, regarding assumptions underlying the valuation of equity awards. The amounts reported in this column reflect the total accounting expense for these restricted stock units and do not correspond to the actual economic value that may be received by our named executive officers upon the vesting and settlement of the restricted stock units or any sale of the underlying shares of common stock. For 2023, the amounts are for performance-based restricted stock units and the aggregate grant date fair value is reported based on probable achievement of performance outcomes. The aggregate grant date fair value of such awards assuming the maximum achievement of performance outcomes are the same as the aggregate grant date fair values of the awards assuming probable achievement of the performance outcomes.
- (2) The amounts reported in the “Options Awards” column reflect the aggregate grant date fair value of stock appreciation rights (“SARs”) and/or stock options awarded during the applicable fiscal year, computed in accordance with the provisions of ASC 718 but disregarding any estimate of forfeitures related to service-based vesting conditions for this purpose. See Note 12 to the X4 Pharmaceuticals Inc. Annual Report on Form 10-K for the year ended December 31, 2023 filed with the SEC on March 21, 2024, regarding assumptions underlying the valuation of equity awards. The amounts reported in this column reflect the accounting expense for these options and/or SARs and do not correspond to the actual economic value that may be received by our named executive officers upon the exercise of the options or SARs, as applicable, or any sale of the underlying shares of common stock.
- (3) The amounts reported in the “Non-Equity Incentive Plan Compensation” column represent amounts earned pursuant to our annual bonus program, which is based upon our named executive officer’s achievement of predetermined individual and/or company-wide performance goals. Amounts listed for fiscal year 2023, represents amounts earned for the 12-month period from January 1, 2023 to December 31, 2023 and paid in 2024. See “Narrative to Summary Compensation Table—Non-Equity Incentive Plan Compensation” below for more information.
- (4) The amounts reported in the “All Other Compensation” column for fiscal years 2023 reflect 401(k) matching contributions of \$13,200 for Dr. Ragan and the value of group term life insurance provided to each named executive officer.
- (5) Dr. Arbet-Engels commenced employment with us on August 16, 2023 and was not a named executive officer for 2022.

- (6) The amount reported represents the pro-rated salary that Dr. Arbet-Engels received for 2023 due to his commencement of employment on August 16, 2023 .
- (7) The amount reported represents (i) a guaranteed annual bonus for the 2023 calendar year equal to 20% of Dr. Arbet-Engels's annual base salary (i.e., \$100,000) (the "Arbet-Engels 2023 Bonus") and (ii) a signing bonus equal to \$100,000 (the "Signing Bonus"), in each case subject to the terms of Dr. Arbet-Engels's employment agreement. With respect to the Arbet-Engels 2023 Bonus, if Dr. Arbet-Engels is terminated for cause, (other than as a result of death or disability), or if he terminates his employment without good reason (each, as defined in his employment agreement), within the first 12 months following the commencement of his employment with us, Dr. Arbet-Engels will be required to repay a pro-rata amount of the after-tax value of the Arbet-Engels 2023 Bonus, based on the number of days Dr. Arbet-Engels is not actually employed during such 12-month period. With respect to the Signing Bonus, if Dr. Arbet-Engels is terminated for cause, (other than as a result of death or disability), or if he terminates his employment without good reason, before the two-year anniversary following the commencement of his employment with us, Dr. Arbet-Engels will be required to repay a pro-rata amount of the after-tax value of the Signing Bonus based on the following: (A) if such termination occurs on or before the one-year anniversary following Dr. Arbet-Engels's commencement of employment with us, Dr. Arbet-Engels will be required to repay 100% of the after-tax value of the Signing Bonus; and (ii) if such termination occurs after the one-year anniversary following Dr. Arbet-Engels's commencement of employment with us but before the two-year anniversary following his commencement of employment with us, Dr. Arbet-Engels will be required to repay 50% of the after-tax value of the Signing Bonus.

OUTSTANDING EQUITY AWARDS AT FISCAL 2023 YEAR END

The following table shows for the fiscal year ended December 31, 2023, certain information regarding outstanding equity awards at fiscal year-end for the named executive officers. The equity awards described below are subject to certain acceleration of vesting benefits pursuant to the named executive officers' employment agreements.

Name	Grant Date	Option and Stock Appreciation Rights (SARs) Awards				Stock Awards			
		Number of Securities Underlying Unexercised Options (#) Exercisable	Number of Securities Underlying Unexercised Options (#) Unexercisable	Option Exercise Price (\$)	Option Expiration Date	Number of Shares or Units of Stock That Have Not Vested (#)	Market Value of Shares or Units of Stock That Have Not Vested (\$ (9))	Equity incentive plan awards: number of unearned shares, units or other rights that have not vested (#)	Equity incentive plan awards: market or payout value of unearned shares, units or other rights that have not vested (\$ (9))
Paula Ragan, Ph.D.	1/19/2016 ⁽¹⁾	100,729	—	6.84	1/18/2026				
	1/24/2017 ⁽¹⁾	65,430	—	6.84	1/23/2027				
	1/31/2018 ⁽¹⁾	80,160	—	7.08	1/30/2028				
	6/17/2019 ⁽²⁾	83,893	—	14.75	6/16/2029				
	3/24/2021 ^{(2),(4)}					48,210	40,448		
	3/10/2022 ^{(2),(5)}					110,394	92,621		
	11/7/2022 ^{(2),(6)}	1,146,112	2,292,223	1.80	11/6/2032				
	2/17/2023 ^{(2),(7)}							443,401	372,013
	3/2/2023 ^{(2),(7)}							88,680	74,403
Adam S. Mostafa	10/4/2018 ⁽¹⁾	62,633	—	10.44	10/3/2028				
	6/17/2019 ⁽²⁾	15,847	—	14.75	6/16/2029				
	3/24/2021 ^{(2),(4)}					27,721	23,258		
	3/10/2022 ^{(2),(5)}					52,500	44,048		
	11/7/2022 ^{(2),(6)}	450,000	900,000	1.80	11/6/2032				
	2/17/2023 ^{(2),(7)}							230,645	193,511
Christophe Arbet-Engels, Ph.D. M.D.	8/31/2023 ⁽³⁾	—	1,250,000 ⁽⁸⁾	1.28	8/30/2033				

- (1) This award was granted pursuant to the Company's 2015 Employee, Director and Consultant Equity Incentive Plan, as amended from time to time. ("2015 Plan").
- (2) This award was granted pursuant to the Company's Amended and Restated 2017 Equity Incentive Plan, as amended from time to time (the "2017 Plan").
- (3) This award was granted pursuant to the Company's 2019 Inducement Equity Incentive Plan, as amended from time to time (the "Inducement Plan")
- (4) Represents restricted stock units, with each restricted stock unit representing the contingent right to receive one share of common stock on the applicable vesting date. No amount was paid upon grant of the restricted stock units. The restricted stock units vest in three substantially equal annual installments on February 11, 2022, February 11, 2023 and February 11, 2024, subject to the applicable named executive officer's continued service through each such date.
- (5) Represents restricted stock units, with each restricted stock unit representing the contingent right to receive one share of common stock on the applicable vesting date. No amount was paid upon grant of the restricted stock units. The restricted stock units vest in two substantially equal annual installments on March 10, 2023 and March 10, 2024, subject to the applicable named executive officer's continued service through each such date.
- (6) Represents SARs that are settled in cash upon exercise. The SARs vest and become exercisable in three equal annual installments on the first, second, and third anniversaries of grant date, in each case, subject to the applicable named executive officer's continued service through each such date.
- (7) Represents performance-based restricted stock units for which the performance criteria has not been met. These performance-based restricted stock units vest based on the Company's achievement of certain operational milestones, subject to the named executive officer's continued service through the date that the applicable performance milestone is achieved.
- (8) 25% of the shares subject to the option vest on August 31, 2024, with the remainder vesting in equal installments of 2.0833% of the shares subject to the option on the last day of each month thereafter for a period of 36 months, subject to the applicable named executive officer's continued service through each such date .
- (9) The market value of outstanding restricted stock units is based on the market price of the Company's common stock of \$0.839 as of December 29, 2023 (the last trading day of fiscal year 2023) multiplied by the number of units that have not vested as of December 31, 2023.

NARRATIVE TO SUMMARY COMPENSATION TABLE

The material terms of the elements of our executive compensation program are described below.

Base Salary

Each named executive officer's base salary is a fixed component of annual compensation for performing specific duties and functions, and has been established by our Board taking into account each individual's role, responsibilities, skills, and experience. Effective January 1, 2023, our Board, upon the recommendation of the Compensation Committee increased Dr. Ragan's base salary to \$620,053, and increased Mr. Mostafa's base salary to \$486,192. The Compensation Committee set Dr. Arbet-Engels's salary to \$500,000 upon his commencement of employment on August 16, 2023.

Bonus Compensation

Our annual bonus program is intended to reward our named executive officers for meeting objective or subjective individual and/or company-wide performance goals for a fiscal year. For 2023, our named executive officers received incentive compensation based upon the Board's determination (following the recommendation of the Compensation Committee) of their respective achievement of and performance with respect to corporate objectives, which are described below, as well as their respective individual performance. Dr. Ragan's and Mr. Mostafa's bonus targets were 55%, and 40%, respectively, of their annual base salaries. Pursuant to Dr. Arbet-Engels's employment agreement, he received the Arbet-Engels 2023 Bonus and the Signing Bonus, in each case subject to repayment in certain conditions, as further described above in the Summary Compensation Table.

In February 2024, the Compensation Committee completed an evaluation of the Company's overall performance for 2023 and the named executive officers' respective contributions in achieving this performance. The Compensation Committee's review was based on company performance against corporate objectives, as well as individual performance against individual goals established by the Compensation Committee. Following such review, our Board (following the recommendation of the Compensation Committee) determined that the corporate performance objectives were achieved at the 110% level. Our Board also determined that Dr. Ragan had earned 110% of her target bonus for 2023, equal to a bonus of \$375,132, and Mr. Mostafa had earned approximately 110% of his target bonus for 2023, equal to a bonus of \$214,000.

Long-Term Equity Incentives

Our equity grant program is intended to align the interests of our named executive officers with those of our stockholders and to motivate them to make important contributions to our performance. During the fiscal year ended December 31, 2023, we granted a stock option award to Dr. Arbet-Engels as an inducement to his commencement of employment with the Company and restricted stock units as annual refresh grants to Dr. Ragan and Mr. Mostafa, as described in more detail in the “Outstanding Equity Awards at Fiscal 2023 Year-End” table above.

Employment and Change in Control Arrangements

Paula Ragan, Ph.D.

On March 13, 2019, we entered into an amended and restated executive employment agreement with Dr. Ragan, which was subsequently amended on February 10, 2020 and April 15, 2020, pursuant to which Dr. Ragan agreed to continue serving as our Chief Executive Officer. Pursuant to the employment agreement, Dr. Ragan’s compensation consists of base salary at an annual rate approved by our Board or an appropriate committee thereof, an annual performance bonus as determined by our Board (provided that the target for such bonus shall be no less than 25% of Dr. Ragan’s annual base salary), employee benefits, vacation, reimbursement of ordinary and reasonable out-of-pocket expenses and coverage under our Directors’ and Officers’, or D&O, insurance policies, subject to the terms and conditions of such policies. Dr. Ragan’s 2022 base salary was \$587,728, and in March 2023, Dr. Ragan’s 2023 annual base salary was retroactively increased to \$620,053 (effective January 1, 2023). Subsequently, in February 2024, Dr. Ragan’s 2024 annual base salary was retroactively increased to \$654,156 (effective January 1, 2024).

Pursuant to her employment agreement, if Dr. Ragan’s employment is terminated for any reason, Dr. Ragan will be entitled to receive her accrued but unpaid salary, accrued but unused vacation days, and the amount of any properly incurred expenses prior to termination not yet reimbursed and other benefits. In addition to the foregoing, if Dr. Ragan’s employment is terminated by us without cause or if Dr. Ragan resigns for good reason, each term as defined in her employment agreement, Dr. Ragan will be entitled to the following: (a) her base salary for a period of 12 months following such termination, (b) a pro-rated portion of her target annual bonus for the calendar year in which the termination occurs, payable in a lump sum, (c) so long as Dr. Ragan is eligible for coverage under our health insurance plan, elects coverage, was covered prior to termination, and elects to exercise her rights under COBRA to continue participation in such plan, we will pay an amount equal to the monthly employer contribution we pay for current employees under such plan until the earlier of 12 months from the date of Dr. Ragan’s termination, or the date Dr. Ragan is eligible to receive health benefits through another employer, and (d) Dr. Ragan will become vested in the additional number of outstanding time-based equity awards granted to Dr. Ragan by us that would have otherwise vested had Dr. Ragan remained employed for an additional 12 months after her termination date. In lieu of the foregoing, if Dr. Ragan’s employment is terminated without cause or if Dr. Ragan resigns for good reason, in either case within the one-year period following a change of control, as that term is defined in the employment agreement, Dr. Ragan will be entitled to the following, in addition to her accrued but unpaid benefits: (a) her base salary for a period of 18 months following such termination, (b) 100% of her annual bonus for the calendar year in which the termination occurs, payable in a lump sum, (c) so long as Dr. Ragan is eligible for coverage under our health insurance plan, elects coverage, was covered prior to termination, and elects to exercise her rights under COBRA to continue participation in such plan, we will pay an amount equal to the monthly employer contribution we pay for current employees under such plan until the earlier of 12 months from the date of Dr. Ragan’s termination, or the date Dr. Ragan is eligible to receive health benefits through another employer, and (d) automatic vesting in all outstanding time-based equity awards granted to Dr. Ragan by us. As a condition to receiving the foregoing severance benefits, Dr. Ragan must execute and not revoke a separation agreement in a form acceptable to us and which will include a complete release of claims and terms related to non-disparagement, non-competition, confidentiality and cooperation.

Dr. Ragan’s employment agreement also contains her agreement to continue to abide by the terms of her non-competition, non-solicitation, non-disclosure and intellectual property agreement.

In addition, Dr. Ragan’s employment agreement provides that in the event the severance and other benefits provided for or otherwise payable to Dr. Ragan constitute “parachute payments” within the meaning of Section 280G of the Internal Revenue Code of 1986, as amended (the “Code”) and are subject to the excise tax imposed by Section 4999 of the Code, we will pay either (i) Dr. Ragan’s severance benefits under the employment agreement in full or (ii) only a part of Dr. Ragan’s severance benefits under the employment agreement such that Dr. Ragan receives the largest payment possible without the imposition of the excise tax, in each case, depending upon which alternative would result in Dr. Ragan receiving the greater net after-tax payment.

Adam S. Mostafa

On March 13, 2019, we entered into an amended and restated executive employment agreement with Mr. Mostafa, which was amended and restated again in March 2022, pursuant to which Mr. Mostafa agreed to continue serving as our Chief Financial Officer. Pursuant to the employment agreement, Mr. Mostafa's compensation consists of base salary at an annual rate approved by our Board or an appropriate committee thereof, an annual performance bonus as determined by our Board, employee benefits, vacation, reimbursement of ordinary and reasonable out-of-pocket expenses and coverage under our D&O insurance policies, subject to the terms and conditions of such policies. Mr. Mostafa's base salary in 2022 was \$460,846 and in March 2023, Mr. Mostafa's 2023 annual base salary was retroactively increased to \$486,192 (effective January 1, 2023). Subsequently, in February 2024, Mr. Mostafa's 2024 annual base salary was retroactively increased to \$510,000 (effective January 1, 2024).

Pursuant to his employment agreement, if Mr. Mostafa's employment is terminated for any reason, Mr. Mostafa is entitled to receive his accrued but unpaid salary, accrued but unused vacation days, the amount of any properly incurred expenses prior to termination not yet reimbursed and other benefits. In addition to the foregoing, if Mr. Mostafa's employment is terminated by us without cause or if Mr. Mostafa resigns for good reason, each term as defined in the agreement, Mr. Mostafa will be entitled to the following: (a) his base salary for a period of 12 months following such termination, (b) a pro-rated portion of Mr. Mostafa's target annual bonus for the calendar year in which the termination occurs based on the period worked by Mr. Mostafa during such calendar year prior to termination, (c) so long as Mr. Mostafa is eligible for coverage under our health insurance plan, elects coverage, was covered prior to termination, and elects to exercise his rights under COBRA to continue participation in such plan, we will pay an amount equal to the monthly employer contribution we pay for current employees under such plan until the earlier of six months from the date of Mr. Mostafa's termination or the date Mr. Mostafa is eligible to receive health benefits through another employer, and (d) Mr. Mostafa will become vested in the additional number of outstanding equity awards granted to Mr. Mostafa by us that would have otherwise vested had Mr. Mostafa remained employed for an additional six months after his termination date. In lieu of the foregoing, if Mr. Mostafa's employment is terminated without cause or if Mr. Mostafa resigns for good reason, in either case within the one-year period following a change of control, as that term is defined in the agreement, Mr. Mostafa will be entitled to the following, in addition to his accrued but unpaid benefits: (a) his base salary for a period of 12 months following such termination, (b) 100% of his target annual bonus for the calendar year in which the termination occurs, (c) so long as Mr. Mostafa is eligible for coverage under our health insurance plan, elects coverage, was covered prior to termination, and elects to exercise his rights under COBRA to continue participation in such plan, we will pay an amount equal to the monthly employer contribution we pay for current employees under such plan until the earlier of six months from the date of Mr. Mostafa's termination or the date Mr. Mostafa is eligible to receive health benefits through another employer, and (d) automatic vesting in all outstanding equity awards granted to Mr. Mostafa by us. As a condition to receiving the foregoing severance benefits, Mr. Mostafa must execute and not revoke a separation agreement in a form acceptable to us and which will include a complete release of claims and terms related to non-disparagement, non-competition, confidentiality and cooperation.

Mr. Mostafa agreed to continue to abide by the terms of his non-competition, non-solicitation, non-disclosure and intellectual property agreement.

Christophe Arbet-Engels Ph.D. M.D.

On July 26, 2023, we entered into an executive employment agreement with Dr. Arbet-Engels, pursuant to which Dr. Arbet-Engels agreed to serve as our Chief Medical Officer commencing August 16, 2023. Pursuant to the employment agreement, Dr. Arbet-Engels's compensation consists of base salary of \$500,000, subsequently adjusted at an annual rate approved by the Company, an annual performance bonus as determined by the Company with a target of up to 40% of Dr. Arbet-Engels's annual base salary, employee benefits, vacation, reimbursement of ordinary and reasonable out-of-pocket expenses, subject to the terms and conditions of such policies, and a signing bonus of \$100,000. The Company also granted Dr. Arbet-Engels a stock option award exercisable for 1,250,000 shares of common stock at an exercise price of \$1.28 per share, which was the fair market value of the Company's common stock on the date of grant. In February 2024, Dr. Arbet-Engels's 2024 annual base salary was increased to \$510,000.

Pursuant to his employment agreement, if Dr. Arbet-Engels's employment is terminated for any reason, Dr. Arbet-Engels will be entitled to receive his accrued but unpaid salary and the amount of any properly incurred expenses prior to termination not yet reimbursed and other benefits. In addition to the foregoing, if Dr. Arbet-Engels's employment is terminated by us without cause or if Dr. Arbet-Engels resigns for good reason, Dr. Arbet-Engels will be entitled to the following: (a) a continuation of base salary for 12 months, (b) a pro-rated portion of his target annual bonus for the calendar year in which the termination occurs, (c) payment of any annual bonus for the prior calendar year to the extent it has not been paid as of the date of such termination (d) so long as Dr. Arbet-Engels is eligible for coverage under our health insurance plan, elects coverage, was

covered prior to termination, and elects to exercise his rights under COBRA to continue participation in such plan, we will pay an amount equal to the monthly contribution we pay for current employees under such plan until the earlier of 6 months from the date of Dr. Arbet-Engels's termination, or the date Dr. Arbet-Engels is eligible to receive health benefits through another employer, and (e) Dr. Arbet-Engels will become vested in the additional number of outstanding equity awards granted to Dr. Arbet-Engels by us that would have otherwise vested had Dr. Arbet-Engels remained employed for an additional 6 months after his termination date. In lieu of the foregoing, if Dr. Arbet-Engels's employment is terminated without cause or if Dr. Arbet-Engels resigns for good reason, in either case within the one-year period following a change of control, as that term is defined in the employment agreement, Dr. Arbet-Engels will be entitled to the following, in addition to his accrued but unpaid benefits: (a) a continuation of base salary for 12 months, (b) 100% of his target annual bonus for the calendar year in which the termination occurs, (c) payment of any annual bonus for the prior calendar year to the extent it has not been paid as of the date of such termination, (d) so long as Dr. Arbet-Engels is eligible for coverage under our health insurance plan, elects coverage, was covered prior to termination, and elects to exercise his rights under COBRA to continue participation in such plan, we will pay an amount equal to the monthly employer contribution we pay for current employees under such plan until the earlier of 6 months from the date of Dr. Arbet-Engels's termination, or the date Dr. Arbet-Engels is eligible to receive health benefits through another employer, and (e) automatic vesting in all outstanding equity awards granted to Dr. Arbet-Engels by us. As a condition to receiving the foregoing severance benefits, Dr. Arbet-Engels must execute and not revoke a separation agreement in a form acceptable to us and which will include a complete release of claims and terms related to non-disparagement and no cooperation.

Dr. Arbet-Engels's employment agreement also contains his agreement to continue to abide by the terms of his confidentiality, non-competition, non-solicitation and intellectual property agreement.

401(k) Plan

We maintain a defined contribution retirement plan that provides eligible U.S. employees with an opportunity to save for retirement on a tax-advantaged basis. Eligible employees may defer eligible compensation on a pre-tax basis, up to the statutorily prescribed annual limits on contributions under the Code. 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. We provide a discretionary matching contribution equal to 100% of employee contributions up to a maximum of 4% of eligible compensation, as defined under the 401(k) plan. The 401(k) plan is intended to be qualified under Section 401(a) of the Code with the 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 the 401(k) plan and earnings on those contributions are not taxable to the employees until distributed from the 401(k) plan.

Health and Welfare Benefits

All of our full-time employees, including our named executive officers, and certain of our part-time employees are eligible to participate in our health and welfare benefit plans, including our medical, dental, life and long-term disability insurance plans. Our health and welfare benefit plans do not discriminate in scope, terms or operation in favor of our executive officers.

PAY vs. PERFORMANCE

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, we are providing the following information about the relationship between executive "compensation actually paid" (CAP) to our principal executive officer (PEO) and our non-PEO named executive officers (NEOs) in the applicable years, and certain financial performance of the Company.

Year ⁽¹⁾	Summary Compensation Table Total for PEO (2)	Compensation Actually Paid to PEO (3)	Average Summary Compensation Table Total for Non-PEO NEOs (4)	Average Compensation Actually Paid to Non-PEO NEOs (3)	Value of Initial Fixed \$100 Investment Based on Total Shareholder Return (5)	Net Loss (\$000) (6)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
2023	\$ 2,044,761	\$ 1,285,650	\$ 1,394,889	\$ 838,053	\$ 13.05	\$ (101,167)
2022	\$ 3,872,533	\$ 3,300,353	\$ 1,862,085	\$ 1,611,499	\$ 15.44	\$ (93,867)
2021	\$ 2,141,328	\$ 667,290	\$ 1,189,100	\$ 572,159	\$ 35.61	\$ (88,696)

- (1) Our PEO in each reporting year is Dr. Ragan. Our non-PEO NEOs in the 2023 reporting year were Mr. Mostafa and Dr. Arbet-Engels. Our non-PEO NEOs in the 2022 reporting year were Mr. Mostafa and Dr. DiBiase. Our non-PEO NEOs in the 2021 reporting year were Mr. Mostafa and Mr. Derek Meisner, who in 2021 was our Chief Legal Officer.
- (2) The dollar amounts reported in column (b) are the amounts of total compensation reported for Dr. Ragan for each corresponding year in the “Total” column of the Summary Compensation Table for such applicable year.
- (3) The dollar amounts reported in columns (c) and (e) represent the CAP to our PEO and average CAP paid to our non-PEO NEOs, respectively, 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 our PEO or the average amounts paid to our non-PEO NEOs during the applicable year. In accordance with the requirements of Item 402(v) of Regulation S-K, the following adjustments were made to our PEO’s and our non-PEO NEOs’ compensation for each year to determine the CAP and average CAP, respectively:

Current Fiscal Year	PEO			NEOs		
	2023	2022	2021	2023	2022	2021
SCT Total	\$ 2,044,761	\$ 3,872,533	\$ 2,141,328	\$ 1,394,889	\$ 1,862,085	\$ 1,189,100
Grant Date Fair Value of Awards Granted in Fiscal Year (a)	(1,035,784)	(2,908,953)	(1,258,272)	(854,600)	(1,181,700)	(569,376)
Fair Value at Fiscal Year-End of Outstanding and Unvested Option Awards and Stock Awards Granted in Fiscal Year (b)	446,416	2,651,292	331,200	494,256	1,059,165	149,870
Change in Fair Value of Outstanding and Unvested Option Awards and Stock Awards Granted in Prior Fiscal Years (b)	(378,191)	(187,499)	(578,588)	(243,327)	(80,725)	(201,431)
Fair Value at Vesting of Option Awards and Stock Awards Granted in Fiscal Year That Vested During Fiscal Year (b)	426,197	—	—	92,373	—	—
Change in Fair Value as of Vesting Date of Option Awards and Stock Awards Granted in Prior Fiscal Years For Which Applicable Vesting Conditions Were Satisfied During Fiscal Year (b)	(217,749)	(127,020)	31,622	(45,538)	(47,326)	3,996
Fair Value as of Prior Fiscal Year-End of Option Awards and Stock Awards Granted in Prior Fiscal Years That Failed to Meet Applicable Vesting Conditions During Fiscal Year (b)	—	—	—	—	—	—
Compensation Actually Paid (CAP)	<u>\$ 1,285,650</u>	<u>\$ 3,300,353</u>	<u>\$ 667,290</u>	<u>\$ 838,053</u>	<u>\$ 1,611,499</u>	<u>\$ 572,159</u>

- (a) The grant date fair value of equity awards represents the total of the amounts reported in the “Stock Awards” and/or “Option Awards” columns in the Summary Compensation Table for the applicable year.
- (b) The fair value of stock options reported for CAP purposes is estimated using a Black-Scholes option pricing model for purposes of this PVP calculation in accordance with the SEC rules. This model uses both historical data and current market data to estimate the fair value of options and requires several assumptions. The assumptions used in estimating fair value for awards granted and vesting during fiscal years 2023, 2022, and 2021 are as follows:

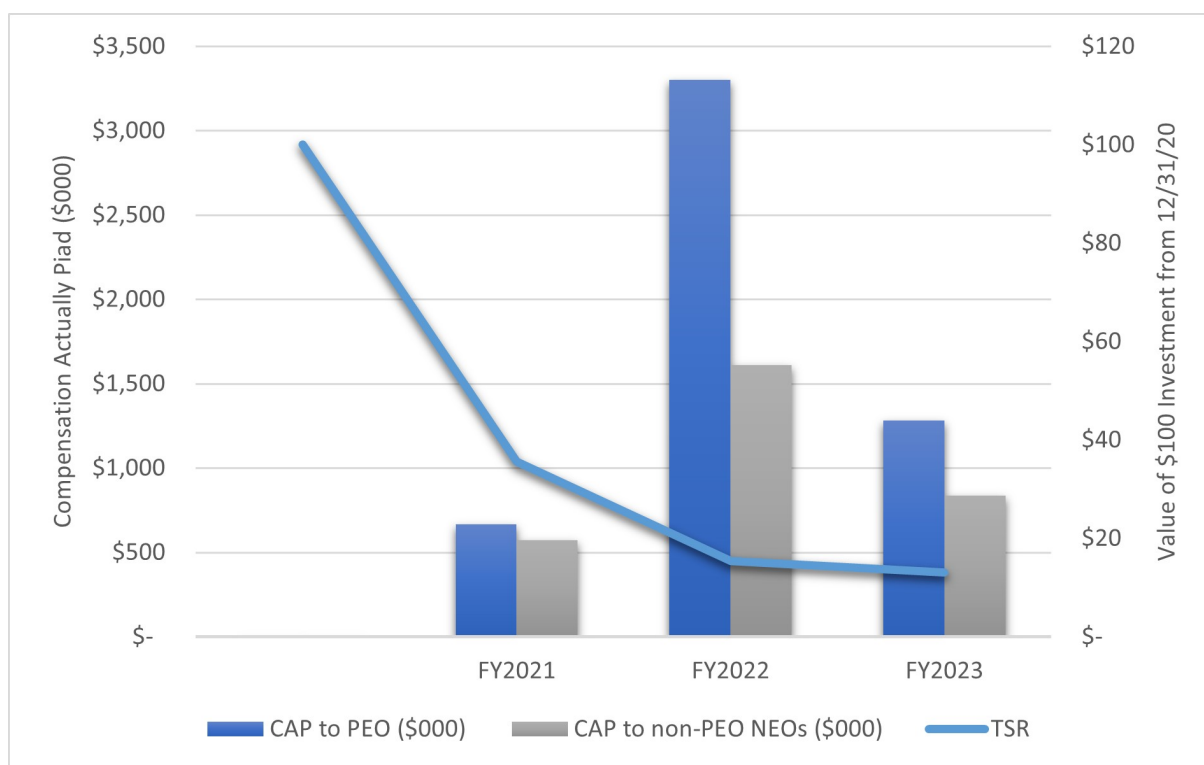
	2023	2022	2021
Risk-free interest rate	3.5% - 4.5%	1.7% - 4.3%	0.5% - 1.5%
Expected term (in years)	3.00 - 6.33	3.0 - 4.8	3.2 - 3.7
Expected volatility	90.8% - 99.4%	94.5% - 101.4%	94.5% - 97.0%
Expected dividend yield	—%	—%	—%

The fair value of restricted stock units reported for CAP purposes is based on the closing market price of the Company's common stock on the date of each vesting event and at the end of the period. The fair value of performance-based restricted stock units is based on the closing market price of the Company's common stock on the date of each vesting event and at the end of the period and assumes that vesting is probable, consistent with the amount calculated in accordance with the provisions of ASC 718 and reported in the Company's Annual Report on Form 10-K for the year ended December 31, 2023 filed with the SEC on March 21, 2024.

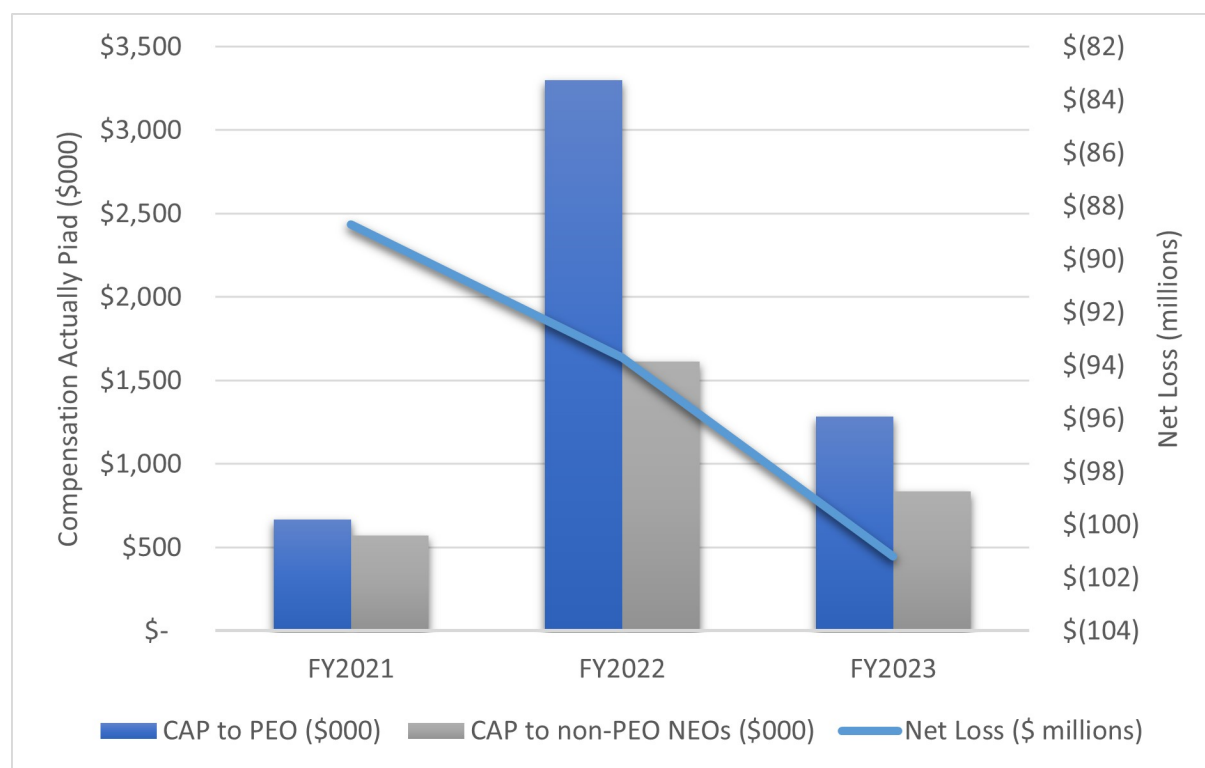
- (4) The dollar amounts reported represent the average of the amounts reported for our non-PEO NEOs for each corresponding year in the "Total" column of the Summary Compensation Table for such applicable year.
- (5) The Company's total shareholder return (TSR) reflected in this column for each applicable fiscal year is calculated based on a fixed investment of \$100 at the applicable measurement point on the same cumulative basis as is used in Item 201(e) of Regulation S-K.
- (6) The dollar amounts reported represent the amount of net income (or loss) reflected in the Company's audited financial statements for the applicable year.

Pay Versus Performance Comparative Disclosure

The graphs below reflect the relationship between PEO CAP, average Non-PEO NEO CAP and the Company's cumulative indexed TSR, (assuming an initial fixed investment of \$100) for the fiscal years ended December 31, 2023, 2022 and 2021:



The graph below reflects the relationship between the PEO CAP, and average Non-PEO NEO CAP and the Company's Net Income (Loss) for the applicable reporting year.



All information provided above under the “Pay Versus Performance” heading will not be deemed to be incorporated by reference into any filing of the Company under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, whether made before or after the date hereof and irrespective of any general incorporation language in any such filing, except to the extent the Company specifically incorporates such information by reference.

DIRECTOR COMPENSATION FOR FISCAL YEAR 2023

Name ⁽¹⁾	Fees Earned or Paid in Cash (\$)	Stock Awards (\$) ⁽²⁾⁽³⁾	All Other Compensation (\$)	Total (\$)
William E. Aliski, MPA	\$ 53,000	\$ 112,050	\$ —	\$ 165,050
Gary J. Bridger, Ph.D.	\$ 35,000	\$ 112,050	\$ —	\$ 147,050
Francoise de Craecker	\$ 40,000	\$ 112,050	\$ —	\$ 152,050
Alison Lawton	\$ 42,500	\$ 112,050	\$ —	\$ 154,550
David McGirr, M.B.A.	\$ 54,000	\$ 112,050	\$ —	\$ 166,050
Murray W. Stewart, M.D. ⁽⁴⁾	\$ 13,125	\$ —	\$ 76,956 ⁽⁵⁾	\$ 90,081
Keith Woods	\$ 7,228	\$ 84,600	\$ —	\$ 91,828
Michael S. Wyzga	\$ 87,288	\$ 112,050	\$ —	\$ 199,338

- (1) Dr. Ragan, one of our directors who also serves as our Chief Executive Officer and President, did not receive any additional compensation for her service director. Dr. Ragan is a named executive officer and, accordingly, the compensation that we pay to Dr. Ragan is described under “2023 Summary Compensation Table” and “Narrative Disclosure to Summary Compensation Table.”
- (2) The amounts reported in the “Stock Awards” column reflect the aggregate grant date fair value of restricted stock units awarded during 2023 computed in accordance with the provisions of ASC 718, which disregards any estimated forfeitures related to service-based vesting conditions for this purpose. See Note 12 to our consolidated financial statements appearing in our Annual Report on Form 10-K for the fiscal year ended December 31, 2023 filed with the SEC on March 21, 2024, regarding assumptions underlying the valuation of equity awards. The amounts reported in this column reflect the accounting expense for these restricted stock units and do not correspond to the actual economic value that may be received by our directors upon the vesting and settlement of the restricted stock units or any sale of the underlying shares of common stock.
- (3) The aggregate number of shares subject to outstanding stock options held by each director listed in the table above as of December 31, 2023 was as follows: 16,281 shares for Mr. Aliski; 67,851 shares for Dr. Bridger; 12,250 for Ms. de Craecker; 12,854 for Ms. Lawton; 18,686 shares for Mr. McGirr; 26,281 shares for Dr. Stewart; and 86,605 shares for Mr. Wyzga. Mr. Woods did not hold any outstanding stock options as of December 31, 2023. In addition, the aggregate number of outstanding shares subject to restricted stock awards held by each director listed in the table above as of December 31, 2023 was as follows: 48,333 restricted stock units for Mr. Aliski; 48,333 restricted stock units for Dr. Bridger; 48,333 restricted stock units for Ms. de Craecker; 48,333 restricted stock units for Ms. Lawton; 48,333 restricted stock units for Mr. McGirr; 3,333 restricted stock units for Dr. Stewart; 90,000 restricted stock units for Mr. Woods and 48,333 restricted stock units for Mr. Wyzga.
- (4) Dr. Stewart continued to serve as an outside director during 2023 following his transition from our interim Chief Medical Officer in July 2023 upon the Company’s hiring of Dr. Arbet-Engels as Chief Medical Officer. Dr. Stewart was an executive officer for 2023, but not a named executive officer for 2023. As such, his compensation for services as an executive officer have not been included in this table.
- (5) On August 16, 2023, the Company entered into an independent contractor agreement with Dr. Stewart, pursuant to which Dr. Stewart is entitled to receive consulting fees of \$64,245 for the period August 16, 2023 through September 30, 2023, and \$4,237 per month thereafter until June 30, 2024. For more information see “Transaction with Related Persons” below.

NARRATIVE TO DIRECTOR COMPENSATION TABLE

Non-Employee Director Compensation Policy in Effect for Fiscal Year 2023

In March 2023, our Board, upon the recommendation of the Compensation Committee, approved an amendment to our non-employee director compensation policy. Prior to the amendment to our non-employee director compensation policy, the initial equity grant to non-employee directors joining the Board consisted of 13,333 restricted stock units vesting in equal annual installments on the first two anniversaries of the date of grant, subject to the non-employee director’s continued service as a director. This vesting accelerates as to 100% of the restricted stock units upon a change in control of the Company. Further, on the date of our annual meeting of stockholders, each non-employee director that had served on our Board for at least six months was eligible to receive 6,667 restricted stock units vesting in equal annual installments on the first two anniversaries of the date of grant, subject to the non-employee director’s continued service as a director, with 100% acceleration of vesting upon a change in control of the Company.

Pursuant to the amended policy, for 2023, the initial equity grant to non-employee directors joining the Board consisted of 90,000 restricted stock units vesting in equal annual installments on the first three anniversaries of the date of grant, subject to the non-employee director’s continued service as a director. This vesting accelerates as to 100% of the restricted stock upon a change in control of the Company.

Further, on the date of our annual meeting of stockholders, each non-employee director that had served on our Board for at least six months was eligible to receive 45,000 restricted stock units vesting in full on the first anniversary of the date of grant (or the date of the next annual meeting, if such meeting is earlier than the anniversary of the grant), subject to the non-employee director’s continued service as a director, with 100% acceleration of vesting upon a change in control of the Company.

For fiscal year 2023, we paid our non-employee directors a cash retainer for service on the Board and for service on each committee on which the director was a member. The Chairman of the Board and the Chair of each committee received higher retainers for such service. These fees are payable in arrears in four equal quarterly installments on the last day of each quarter, provided that the amount of such payment would be prorated for any portion of such quarter that the director was not serving on the Board, on such committee or in such position. The fees paid to non-employee directors for service on the Board, for service as a Lead Independent Director and for service on each committee of the Board on which the director was a member were as follows:

	Annual Retainer Amount for Member (excluding Chair)	Annual Retainer Amount for Chair
Board of Directors	\$ 35,000	\$ 75,000
Audit Committee	\$ 7,500	\$ 15,000
Compensation Committee	\$ 5,000	\$ 10,000
Nominating and Corporate Governance Committee	\$ 4,000	\$ 8,000

We also reimburse our non-employee directors for reasonable travel and other expenses incurred in connection with attending meetings of the Board and any committee of the Board of Directors on which they served.

SECURITIES AUTHORIZED FOR ISSUANCE UNDER EQUITY COMPENSATION PLANS

EQUITY COMPENSATION PLAN INFORMATION

The following table provides certain information with respect to all of our equity compensation plans in effect as of December 31, 2023:

Plan Category	Number of securities to be issued upon exercise of outstanding options, warrants and rights (a)	Weighted-average exercise price of outstanding options, warrants and rights (b) ⁽¹⁾	Number of securities remaining available for issuance under equity compensation plans (excluding securities reflected in column (a)) (c)
Equity compensation plans approved by security holders ⁽²⁾	506,562	\$ 7.65 ⁽²⁾	4,992,569 ⁽⁵⁾
Equity compensation plans not approved by security holders ⁽³⁾	5,501,979 ⁽⁴⁾	\$ 2.54 ⁽⁴⁾	1,523,256
Total	6,008,541	\$ 2.97	6,515,825

(1) The weighted average exercise price is calculated based solely on outstanding stock options

(2) Includes our Amended and Restated 2017 Equity Incentive Plan (“2017 Plan”) and our Amended and Restated 2017 Employee Stock Purchase Plan (“ESPP”). However, the number of securities in columns (a), (b) and (c) do not include purchase rights accruing under the ESPP offering period that commenced November 18, 2023 as the number of shares to be issued for such offering period are not determined until the end of the offering period on May 17, 2024. The maximum number of shares that can be purchased for each offering period is limited to \$12,500 divided by the market value of the shares of our common stock on the first day of the applicable offering period. For the offering period that commenced on November 18, 2023 and ends on May 17, 2024, such maximum number of shares is 15,697, or \$12,500.

(3) Consists of our 2015 Plan and our Inducement Plan. Descriptions of the 2015 Plan and Inducement Plan are contained in Note 12 of the notes to our consolidated financial statements contained in our Annual Report on Form 10-K for the year ended December 31, 2023, filed with the SEC on March 21, 2024.

(4) Includes (i) shares of our common stock to be issued upon outstanding stock options under our 2015 Plan, which plan and awards were assumed in connection with our business combination with X4 Therapeutics, Inc. and (ii) shares of our common stock to be issued upon outstanding stock options under our Inducement Plan.

(5) The 2017 Plan has an evergreen provision that allows for an annual increase in the number of shares available for issuance under the 2017 Plan to be added on the first day of each fiscal year, beginning with the fiscal year ended December 31, 2018 and continuing for each fiscal year until, and including, the fiscal year ending December 31, 2027. The evergreen provides for an automatic increase in the number of shares available for issuance equal to the least of (i) 4% of the outstanding number of shares of common stock on such date and (ii) an amount determined by our Board. Any awards granted under our 2010 Special Stock Incentive Plan, as amended (the “2010 Plan”), and the Company’s 2011 Stock Incentive Plan, as amended (the “2011 Plan”), that expire, terminate or are otherwise surrendered, canceled, forfeited or repurchased by the Company are added to shares available for issuance under the 2017 Plan. No further awards may be granted under the 2010 Plan or 2011 Plan.

TRANSACTIONS WITH RELATED PERSONS AND INDEMNIFICATION

RELATED-PERSON TRANSACTIONS POLICY AND PROCEDURES

Our Board of Directors has adopted a written related person transaction policy to set forth policies and procedures for the review of any transaction, arrangement or relationship in which our company is a participant, the amount involved exceeds \$120,000, and one of our executive officers, directors, director nominees or 5% stockholders, or their immediate family members, each of whom we refer to as a “related person,” has a direct or indirect material interest.

If a related person proposes to enter into such a transaction, arrangement or relationship, which we refer to as a “related party transaction,” the related person must report the proposed related person transaction to our Chief Financial officer. The policy calls for the proposed related person transaction to be reviewed and approved by our Audit Committee. Whenever practicable, the reporting, review and approval will occur prior to entry into the transaction. If advance review and approval is not practicable, Audit Committee will review and, in its discretion, may ratify the related person transaction. The policy also permits the Chair of the Audit Committee to review and, if deemed appropriate, approve proposed related person transactions that arise between Audit Committee meetings, subject to ratification by the Audit Committee at its next meeting. Any related person transactions that are ongoing in nature will be reviewed annually.

A related person transaction reviewed under this policy will be considered approved or ratified if it is authorized by the Audit Committee in accordance with the standards set forth in the policy after full disclosure of the related person’s interests in the transaction. As appropriate for the circumstances, the policy provides that the Audit Committee will review and consider:

- the related person’s interest in the related person transaction;
- the approximate dollar value of the amount involved in the related person transaction;
- the approximate dollar value of the amount of the related person’s interest in the transaction without regard to the amount of any profit or loss;
- whether the transaction was undertaken in the ordinary course of our business;
- whether the terms of the transaction are no less favorable to us than the terms that could have been reached with an unrelated third party;
- the purpose of, and the potential benefits to us of, the transaction; and
- any other information regarding the related person transaction or the related person in the context of the proposed transaction that would be material to investors in light of the circumstances of the particular transaction.

The Audit Committee may approve or ratify the related person transaction only if the Audit Committee determines that, under all of the circumstances, the transaction is in our best interests. The Audit Committee may impose any conditions on the related person transaction as it deems appropriate. The policy also provides that transactions involving compensation of executive officers will be reviewed and approved by our Compensation Committee in the manner specified in its charter.

For purposes of the policy, we refer to certain related-party transactions below in which (a) we were a participant, (b) the amount involved exceeded or will exceed \$120,000 or, during such time as we qualify as a “smaller reporting company,” the lesser of (1) \$120,000 or (2) 1% of the average of our total assets for the last two completed fiscal years, and (c) one or more related persons had a direct or indirect material interest. Transactions involving compensation for services provided to us by an employee, director, consultant or individual performing in a similar capacity by a related person are not covered by this policy.

CERTAIN RELATED-PERSON TRANSACTIONS

Since January 1, 2022, we have engaged in, or currently propose to engage in, the following related-party transactions. We believe that all of these transactions were on terms comparable to terms that could have been obtained from unrelated third parties.

Agreements with Directors

Gary J. Bridger, Ph.D.

On September 17, 2020, we entered into an independent contractor agreement, as amended, with Gary J. Bridger, Ph.D., pursuant to which Dr. Bridger was entitled to receive \$30,000 per month and a non-qualified stock option to purchase 30,000 shares of our common stock in consideration for his performance of certain consulting services to the Company during the period from September 17, 2020 to January 1, 2023. The consulting agreement terminated in January 2023.

Murray W. Stewart, M.D.

On August 16, 2023, we entered into an independent contract agreement, as amended with Murray W. Stewart, M.D., pursuant to which Dr. Stewart is entitled to receive consultant a fee \$64,245 from August 16, 2023 through September 30, 2023 and a fee of \$4,237 per month until June 30, 2024. The services Dr. Stewart is to provide are completion of WHIM NDA submission and subsequent related support, chronic neutropenia related clinical strategy, support transition of new CMO and provide general clinical/medical, regulatory and other pertinent support and guidance. The consulting agreement will terminate in June 2024.

Employment Arrangements

We have entered into employment agreements with our executive officers. Each of our executive officers has entered into a written employment agreement with us that provides for payment of base salary, target annual cash incentive compensation, eligibility for employee benefit programs and potential severance benefits. For more information regarding these agreements with our named executive officers, see “Executive Compensation.”

Equity Awards Granted to Executive Officers and Directors

We have granted options to our executive officers and directors. For more information regarding the equity awards granted to our named executive officers and directors, see “Executive Compensation” and “Director Compensation for Fiscal Year 2023.”

INDEMNIFICATION

We provide indemnification for our directors and executive officers so that they will be free from undue concern about personal liability in connection with their service to us. Under our Bylaws, we are required to indemnify our directors and executive officers to the extent not prohibited under Delaware or other applicable law. We have also entered into indemnity agreements with certain officers and directors. These agreements provide, among other things, that we will indemnify the officer or director, under the circumstances and to the extent provided for in the agreement, for expenses, damages, judgments, fines and settlements he or she may be required to pay in actions or proceedings which he or she is or may be made a party by reason of his or her position as a director, officer or other agent of the Company, and otherwise to the fullest extent permitted under Delaware law and our Bylaws.

HOUSEHOLDING OF PROXY MATERIALS

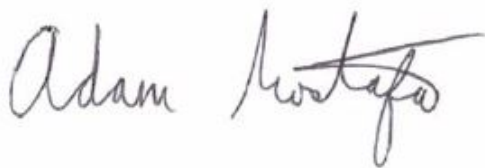
The SEC has adopted rules that permit companies and intermediaries (e.g., brokers) to satisfy the delivery requirements for Notices of Internet Availability of Proxy Materials or other Annual Meeting materials with respect to two or more stockholders sharing the same address by delivering a single Notice of Internet Availability of Proxy Materials or other Annual Meeting materials addressed to those stockholders. This process, which is commonly referred to as “householding,” potentially means extra convenience for stockholders and cost savings for companies.

This year, a number of brokers with account holders who are X4 stockholders will be “householding” the Company’s proxy materials. 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 broker 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 broker or X4. Direct your written request to X4 Pharmaceuticals, Inc., Attn: Corporate Secretary, 61 North Beacon Street, 4th Floor, Boston, MA 02134 or contact the Corporate Secretary at (857) 529-8300. 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 brokers.

OTHER MATTERS

The Board of Directors knows of no other matters that will be presented for consideration at the Annual Meeting. If any other matters are properly brought before the Annual Meeting, it is the intention of the persons named in the accompanying proxy to vote on such matters in accordance with their best judgment.

By Order of the Board of Directors,

A handwritten signature in black ink that reads "Adam Mostafa". The signature is written in a cursive style with a long horizontal stroke extending from the end of the name.

Adam Mostafa
Chief Financial Officer, Treasurer and Corporate
Secretary

April 29, 2024

A copy of the Company's Annual Report to the Securities and Exchange Commission on Form 10-K for the fiscal year ended December 31, 2023 is available without charge upon written request to: Corporate Secretary, X4 Pharmaceuticals, Inc., 61 North Beacon Street, 4th Floor, Boston, MA 02134.



X4 PHARMACEUTICALS, INC.
 61 N. BEACON STREET
 4TH FLOOR
 BOSTON, MA 02134



**SCAN TO
 VIEW MATERIALS & VOTE**



VOTE BY INTERNET - www.proxyvote.com or scan the QR Barcode above
 Use the Internet to transmit your voting instructions and for electronic delivery of information.
 Vote by 11:59 p.m. Eastern Time on June 9, 2024. Have your proxy card in hand when you
 access the web site and follow the instructions to obtain your records and to create an
 electronic voting instruction form.

ELECTRONIC DELIVERY OF FUTURE PROXY MATERIALS
 If you would like to reduce the costs incurred by our company in mailing proxy materials,
 you can consent to receiving all future proxy statements, proxy cards and annual reports
 electronically via e-mail or the Internet. To sign up for electronic delivery, please follow the
 instructions above to vote using the Internet and, when prompted, indicate that you agree
 to receive or access proxy materials electronically in future years.

VOTE BY PHONE - 1-800-690-6903
 Use any touch-tone telephone to transmit your voting instructions. Vote by 11:59 p.m.
 Eastern Time on June 9, 2024. Have your proxy card in hand when you call and then follow
 the instructions.

VOTE BY MAIL
 Mark, sign and date your proxy card and return it in the postage-paid envelope we have
 provided or return it to Vote Processing, c/o Broadridge, 51 Mercedes Way, Edgewood,
 NY 11717 by 11:59 p.m. Eastern Time on June 9, 2024.

TO VOTE, MARK BLOCKS BELOW IN BLUE OR BLACK INK AS FOLLOWS:

V43438-P06870

KEEP THIS PORTION FOR YOUR RECORDS
 DETACH AND RETURN THIS PORTION ONLY

THIS PROXY CARD IS VALID ONLY WHEN SIGNED AND DATED.

X4 PHARMACEUTICALS, INC.

The Board of Directors recommends a vote FOR the nominees listed in proposal 1.

1. To elect three (3) nominees, David McGirr, Paula Ragan, Ph.D. and Michael Wyzga to the Board of Directors to hold office until the 2027 Annual Meeting of Stockholders and until their successors are duly elected and qualified.

For All	Withhold All	For All Except
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

To withhold authority to vote for any individual nominee(s), mark "For All Except" and write the number(s) of the nominee(s) on the line below.

Nominees:

- 01) David McGirr
 02) Paula Ragan, Ph.D.
 03) Michael Wyzga

The Board of Directors recommends a vote FOR proposals 2 and 3.

2. To ratify the selection by the Audit Committee of the Board of Directors of PricewaterhouseCoopers LLP as the independent registered public accounting firm of the Company for its fiscal year ending December 31, 2024.
3. To hold a non-binding, advisory "say-on-pay" vote on the Company's executive compensation.

For	Against	Abstain
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

NOTE: Such other business as may properly come before the meeting or any adjournment thereof.

Please sign exactly as your name(s) appears hereon. When signing as attorney, executor, administrator, or other fiduciary, please give full title as such. Joint owners should each sign personally. All holders must sign. If a corporation or partnership, please sign in full corporate or partnership name by authorized officer.

Signature [PLEASE SIGN WITHIN BOX]	Date

Signature (Joint Owners)	Date

Important Notice Regarding the Availability of Proxy Materials for the Annual Meeting:
The Notice and Proxy Statement and Annual Report are available at www.proxyvote.com.

V43439-P06870



**Proxy for Annual Meeting of Stockholders to be held
on Monday, June 10, 2024 at 12:00 PM EDT**

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

Please vote, date and sign this Proxy on the reverse side and return it in the enclosed envelope.

The Stockholder(s) signing on the reverse side (the "undersigned"), having received the Annual Report and Proxy Statement, hereby appoint(s) Paula Ragan and Adam Mostafa, and either of them, Proxies of the undersigned (with full power of substitution) to attend the Annual Meeting of X4 Pharmaceuticals, Inc. (the "Company") to be held on Monday, June 10, 2024 at 12:00 PM EDT, at the offices of Goodwin Procter, 100 Northern Ave, 17th Floor Boston, MA 02210, and all adjournments and postponements thereof (the "Meeting"), and to vote all shares of Common Stock of the Company that the undersigned would be entitled to vote, if personally present, in regard to all matters that may properly come before the Meeting.

The undersigned hereby confer(s) upon the Proxies, and either of them, discretionary authority to consider and act upon such business, matters or proposals as may properly come before the Meeting. **The Proxy, when properly executed, will be voted in the manner specified herein. If no specification is made, the Proxies intend to vote FOR all nominees for director in Proposal 1; FOR Proposals 2 and 3.**

Continued and to be signed on reverse side.