

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

SCHEDULE 14A

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

Filed by the Registrant

Filed by a party other than the Registrant

CHECK THE APPROPRIATE BOX:

<input checked="" type="checkbox"/>	Preliminary Proxy Statement
<input type="checkbox"/>	Confidential, for Use of the Commission Only (as permitted by Rule 14a-6(e)(2))
<input type="checkbox"/>	Definitive Proxy Statement
<input type="checkbox"/>	Definitive Additional Materials
<input type="checkbox"/>	Soliciting Material under to § 240.14a-12



Assembly Biosciences, Inc.

(Name of Registrant as Specified In Its Charter)
(Name of Person(s) Filing Proxy Statement, if other than the Registrant)

PAYMENT OF FILING FEE (CHECK ALL BOXES THAT APPLY):

<input checked="" type="checkbox"/>	No fee required
<input type="checkbox"/>	Fee paid previously with preliminary materials
<input type="checkbox"/>	Fee computed on table in exhibit required by Item 25(b) per Exchange Act Rules 14a-6 and 0-11



**ASSEMBLY BIOSCIENCES, INC.
331 Oyster Point Blvd., Fourth Floor
South San Francisco, California 94080**

**NOTICE OF 2022 ANNUAL MEETING OF STOCKHOLDERS
To Be Held Wednesday, May 25, 2022**

April 12, 2022

Dear Stockholders:

You are cordially invited to attend the 2022 Annual Meeting of Stockholders (the Annual Meeting) of Assembly Biosciences, Inc., a Delaware corporation (we, us, Assembly or the Company). The Annual Meeting will be held on Wednesday, May 25, 2022 at 8:00 a.m. Pacific Daylight Time (PDT) solely by remote communication (i.e., a virtual-only stockholder meeting) at www.virtualshareholdermeeting.com/ASMB2022 to protect the safety, health and well-being of our stockholders, directors, employees and the public during the ongoing COVID-19 pandemic. The meeting will be held for the following purposes:

1. To elect the eight nominees named in the attached proxy statement to our Board of Directors (the Board);
2. To approve, on a non-binding advisory basis, our named executive officers' compensation, as disclosed in the proxy statement accompanying this notice;
3. To ratify the selection of Ernst & Young LLP as our independent registered public accounting firm for the fiscal year ending December 31, 2022;
4. To approve an amendment to the Assembly Biosciences, Inc. 2018 Stock Incentive Plan to increase the number of shares reserved for issuance thereunder by 2,000,000 shares;
5. To amend and restate our Fifth Amended and Restated Certificate of Incorporation to increase the authorized number of shares of common stock from 100,000,000 to 150,000,000;
6. To approve a stock option exchange program for non-executive employees; and
7. To vote on such other matters that may properly come before the meeting and any adjournment or postponement thereof.

These matters are more fully described in the proxy statement accompanying this notice.

Our Board of Directors has fixed the close of business on March 28, 2022 as the record date for the determination of stockholders entitled to notice of and to vote at the Annual Meeting and any adjournment or postponement thereof. See the attached proxy statement for information on how to attend the virtual Annual Meeting and vote during the meeting.

To ensure your representation at the Annual Meeting, you are requested to submit your vote as instructed in the Notice of Internet Availability of Proxy Materials that will be sent to you. You may also request a paper proxy card at any time on or before May 11, 2022 to submit your vote by mail. If you attend and vote at the Annual Meeting your proxy will not be used.

Important Notice Regarding the Availability of Proxy Materials for the Annual Meeting to be held solely by remote communication at www.virtualshareholdermeeting.com/ASMB2022 on Wednesday, May 25, 2022 at 8:00 a.m. PDT.

The proxy statement and the Annual Report for the fiscal year ended December 31, 2021 are available at: www.proxyvote.com.

For information regarding how to inspect the list of registered stockholders entitled to vote at the Annual Meeting, see “Questions and Answers About These Proxy Materials and Voting” in the accompanying proxy statement.

We hope that you will attend the virtual Annual Meeting, and we very much appreciate your continuing interest in our Company.

By Order of the Board of Directors,

A handwritten signature in black ink, appearing to read 'J. McHutchison', with a long horizontal stroke extending to the right.

John G. McHutchison, A.O., M.D.
Chief Executive Officer and President

You are cordially invited to attend the Annual Meeting by remote communication. Whether or not you expect to attend the Annual Meeting, please vote over the Internet using your 16-digit control number as instructed in your Notice of Internet Availability of Proxy Materials or proxy card or vote by mail by requesting a printed copy of the proxy card. Even if you have voted by proxy, you may still vote at the Annual Meeting if you attend by remote communication. Please note, however, that if you hold your shares through a broker or nominee and you wish to vote at the Annual Meeting, you must obtain your control number from your broker or nominee to vote.



**ASSEMBLY BIOSCIENCES, INC.
331 Oyster Point Blvd., Fourth Floor
South San Francisco, California 94080**

**PROXY STATEMENT
FOR THE 2022 ANNUAL MEETING OF STOCKHOLDERS**

MAY 25, 2022

INFORMATION CONCERNING SOLICITATION AND VOTING

The Board of Directors (the Board) of Assembly Biosciences, Inc., a Delaware corporation (we, us, Assembly or the Company), is soliciting your proxy to vote at the 2022 Annual Meeting of Stockholders (the Annual Meeting) to be held on Wednesday, May 25, 2022 at 8:00 a.m. Pacific Daylight Time (PDT) solely by remote communication (i.e., a virtual-only stockholder meeting) at www.virtualshareholdermeeting.com/ASMB2022 to protect the safety, health and well-being of our stockholders, directors, employees and the public during the ongoing COVID-19 pandemic. Any adjournments or postponements of the meeting also will be held by remote communication at the same location.

You are invited to attend the Annual Meeting to vote on the proposals described in this proxy statement. However, you do not need to attend the meeting to vote your shares. Instead, you may follow the instructions in the Notice of Internet Availability of Proxy Materials (the Proxy Availability Notice) described below to submit your proxy through the Internet, or you may vote by mail by using the proxy card provided or requesting a printed copy of the proxy card.

We sent the Proxy Availability Notice on or about April 12, 2022 to our stockholders of record and beneficial owners as of March 28, 2022, the record date for the Annual Meeting. The proxy materials, including this proxy statement, proxy card or voting instruction card and our Annual Report for the fiscal year ended December 31, 2021 are being distributed and made available on or about April 12, 2022. This proxy statement contains important information for you to consider when deciding how to vote on the matters brought before the Annual Meeting. Please read it carefully.

This proxy statement and the Proxy Availability Notice contain instructions for accessing and reviewing our proxy materials on the Internet and for voting by proxy over the Internet, by phone or by mail. The Proxy Availability Notice and the proxy card also will provide instructions on how you can elect to receive future proxy materials electronically or in printed form by mail. If you choose to receive future proxy materials electronically, you will receive an email next year with instructions containing a link to the proxy materials and a link to the proxy voting site. Your election to receive proxy materials electronically or in printed form by mail will remain in effect until you terminate such election. You will need to obtain your own Internet access if you choose to access the proxy materials and/or vote over the Internet. If you prefer to receive printed copies of our proxy materials, the Proxy Availability Notice contains instructions on how to request the materials by mail. For stockholders who have elected to receive proxy materials electronically, you will not receive printed copies of the proxy materials unless you request them. If you elect to receive the materials by mail, you may also vote by proxy on the proxy card or voter instruction card that you will receive in response to your request.

Choosing to receive future proxy materials electronically will allow us to provide you with the information you need more rapidly, will save us the cost of printing and mailing documents to you and will conserve natural resources.

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PROXY STATEMENT SUMMARY

This proxy summary highlights information that may be contained elsewhere in this proxy statement. This summary does not contain all information that you should consider, and you should read the entire proxy statement carefully before voting. Page references are supplied to help you find further information in this proxy statement.

Proxy Voting Matters

		<i>Our Board's Recommendation</i>
<i>Proposal No. 1 – Election of Directors (page 11)</i> The Board and its Nominating and Governance Committee believe that the eight director nominees possess the necessary qualifications to provide effective oversight of our business.	<input checked="" type="checkbox"/>	FOR each Director Nominee
<i>Proposal No. 2 – Executive Compensation (page 27)</i> The Board recommends that stockholders approve, on a non-binding advisory basis, our named executive officers' compensation.	<input checked="" type="checkbox"/>	FOR
<i>Proposal No. 3 – Ratification of the Selection of Ernst & Young LLP as Independent Auditors (page 31)</i> The Board and its Audit Committee believe that the continued retention of Ernst & Young LLP to serve as the Independent Auditors for the fiscal year ending December 31, 2022 is in the best interests of the Company and its stockholders. As a matter of good corporate governance, stockholders are being asked to ratify the Audit Committee's selection of the Independent Auditors.	<input checked="" type="checkbox"/>	FOR
<i>Proposal No. 4 – Amendment to 2018 Stock Incentive Plan to Increase Number of Reserved Shares by 2,000,000 Shares (page 32)</i> The Board believes that it is in the best interest of the Company to increase the number of shares reserved under our 2018 Stock Incentive Plan by 2,000,000 shares.	<input checked="" type="checkbox"/>	FOR
<i>Proposal No. 5 – Amendment and Restatement of Our Fifth Amended and Restated Certificate of Incorporation to Increase Number of Authorized Shares of Common Stock (page 43)</i> The Board believes that it is in the best interest of the Company to amend and restate our Fifth Amended and Restated Certificate of Incorporation to increase the authorized number of shares of common stock from 100,000,000 to 150,000,000.	<input checked="" type="checkbox"/>	FOR
<i>Proposal No. 6 – Approval of a Stock Option Exchange Program for Non-Executive Employees (page 45)</i> The Board believes that it is in the best interest of the Company to approve a stock option exchange program for non-executive employees that would allow these non-executive employees to exchange certain significantly out-of-the-money stock options for new stock options exercisable for fewer shares of our common stock with an exercise price equal to the fair market value of our common stock on the new grant date.	<input checked="" type="checkbox"/>	FOR

Governance Highlights

We are committed to good corporate governance, which promotes the long-term interests of stockholders, strengthens Board and management accountability and helps build public trust in the Company. The Board of Directors and Corporate Governance section beginning on page 18 describes our governance framework, which includes the following highlights:

- Board Independence*
 - Seven of our eight Board nominees are independent.
 - Dr. McHutchison, our Chief Executive Officer and President, is the only management nominee standing for election to the Board.
 - The independent directors hold regular executive sessions, and any independent director may raise matters for discussion at these executive sessions.
- Independent Chair*
 - The Chair of the Board is independent.
- Board Composition*
 - The Board will be comprised of eight directors following the Annual Meeting.
 - We regularly assess our Board size and can adjust the number of directors according to our needs.
 - Our directors possess a diverse mix of skills, experience and backgrounds.
- Accountability to Stockholders*
 - *Proxy Access.* Our Bylaws provide proxy access, allowing a stockholder or group of up to 20 stockholders continuously owning an aggregate of 3% or more of our outstanding common stock for at least three years to nominate and include in our proxy materials director nominees constituting up to the greater of 20% of the number of directors then in office or two nominees, provided the stockholders and nominees otherwise satisfy the requirements of our Bylaws.
 - *Stockholders' Right to Call Special Meetings.* Our Fifth Amended and Restated Certificate of Incorporation (the Certificate of Incorporation) and Bylaws allow stockholders who hold in the aggregate at least 25% of our outstanding common stock to request special stockholders' meetings, provided they otherwise satisfy the requirements of our Bylaws.
 - *Annual Election of Directors.* Our Certificate of Incorporation provides for the annual election of all directors.
 - *Majority Voting Standard in Uncontested Director Elections.* Directors must receive more "for" votes than "against" votes to be elected in uncontested director elections.
 - *No Poison Pill.* We do not have a poison pill.
- Independent Board Committees*
 - The Audit, Compensation and Nominating and Governance committees are composed entirely of independent directors, and each of the standing committees has a charter that is reviewed annually and posted on our website.
 - Our Board and each committee may engage independent advisors in its sole discretion.
- Risk Oversight*
 - Our full Board is responsible for risk oversight and has designated committees to have particular oversight of certain key risks. Our Board also oversees management as it fulfills its responsibilities of balancing assessment and mitigation of risks and with taking appropriate risk in operating the business.
- Board/Committee Self-evaluation*
 - We have an annual self-evaluation process for the Board and each of its standing committees.
- Ethics/Corporate Responsibility*
 - All of our directors and executive officers are required to abide by our Code of Conduct.
 - Our Board has adopted Corporate Governance Guidelines to assist in the exercise of its responsibilities.

Executive Compensation

Our Compensation Philosophy is “Provide Competitive Overall Compensation That Attracts, Retains and Motivates Superior Performers.” We believe that executive compensation should be designed to closely align the interests of our named executive officers (NEOs) and stockholders and to attract, motivate, reward and retain superior management talent. Our executive compensation is comprised of the following components:

	Plan/Compensation	Purpose	Relevant Performance Metric	Fixed or Variable?
Annual/Short Term Incentives	<i>Base Salary</i>	Provide competitive compensation for individual performance and level of responsibility associated with position	N/A	Fixed
	<i>Annual Performance-based Cash Bonus</i>	Provide a short-term annual performance-based cash incentive opportunity through a bonus plan that is based upon achievement of established performance goals	Both Company-wide and individual goals	Variable
Long-Term Incentive	<i>Long-term Equity Incentive Awards</i>	Provide long-term incentive opportunities in the form of equity awards in order to retain those individuals with the leadership abilities necessary for increasing long-term stockholder value while aligning their interests with our stockholders’ interests	Equity awards vest over a three- or four-year period and incentivize performance, because stock options have value only to the extent the market value of our common stock increases and restricted stock units only have value if the executive continues to provide services through the vesting period	Variable

QUESTIONS AND ANSWERS ABOUT THESE PROXY MATERIALS AND VOTING

Why did I receive the Notice of Internet Availability of Proxy Materials instead of a full set of proxy materials?

In accordance with the rules and regulations adopted by the U.S. Securities and Exchange Commission (SEC), we have elected to provide access to our proxy materials over the Internet instead of mailing a printed copy of our proxy materials to each stockholder. Accordingly, we sent a Proxy Availability Notice on or about April 12, 2022 to most stockholders of record entitled to vote at the Annual Meeting. Stockholders may access the proxy materials on a website referred to in the Proxy Availability Notice commencing on or about April 12, 2022 or may request a printed set of the proxy materials be sent to them by following the instructions in the Proxy Availability Notice.

Why did I receive a full set of proxy materials and the Proxy Availability Notice?

We are providing paper copies of the proxy materials to stockholders who have previously requested to receive them in paper form or for whom an election to receive proxy materials electronically by email or over the Internet are not on file. If you would like to reduce the environmental impact and the costs incurred by us in mailing proxy materials, you may elect to receive all future proxy materials electronically by email or over the Internet. To sign up for electronic delivery, please follow the instructions provided with your proxy materials and on your proxy card or voting instruction card for using the Internet and, when prompted, indicate that you agree to receive or access future stockholder communications electronically. Alternatively, you can go to www.proxyvote.com and enroll for online delivery of Annual Meeting and proxy materials.

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

If you receive more than one Proxy Availability Notice, your shares may be registered in more than one name or in different accounts. Please follow the voting instructions on each Proxy Availability Notice to ensure that all of your shares are voted. All of your shares may be voted at www.proxyvote.com regardless of which account they are registered or held in.

How do I attend the Annual Meeting?

You will not be able to attend the Annual Meeting in person at a physical location because it is being held in a virtual only format due to the COVID-19 pandemic. However, the Annual Meeting has been designed to provide stockholders comparable rights and opportunities to participate as they would have at an in-person meeting, and stockholders of record as of the close of business on March 28, 2022 will be able to participate, vote their shares and ask questions during the meeting by audio webcast. To be admitted to the virtual-only Annual Meeting, you should visit www.virtualshareholdermeeting.com/ASMB2022 and enter the 16-digit control number found on your Proxy Availability Notice.

Additional details on attending and participating in the virtual-only Annual Meeting:

- Access the meeting platform beginning at 7:45 a.m. PDT on May 25, 2022.
- Vote during the Annual Meeting by following the instructions available on the meeting website during the meeting.
- Submit a question during the meeting by visiting www.virtualshareholdermeeting.com/ASMB2022, entering your 16-digit control number and submitting the question in the “Ask a Question” field. Pertinent questions will be answered during the meeting, subject to time constraints.
- If you encounter any difficulties while accessing the virtual-only meeting, contact the technical support number that will be posted on the Virtual Shareholder Meeting log-in page. Technical support will be available beginning at 7:30 a.m. PDT on May 25, 2022 and will remain available until the Annual Meeting has ended.
- A list of stockholders entitled to vote will be available for inspection by stockholders of record for any legally valid purpose related to the Annual Meeting during the Annual Meeting by following the link

provided when you log in to www.virtualshareholdermeeting.com/ASMB2022 and for a period of ten days prior to the Annual Meeting by sending a request to corpsecretary@assemblybio.com.

Whether or not you attend the Annual Meeting, we urge you to vote and submit your proxy in advance of the meeting by one of the methods described in this proxy statement.

Who can vote at the Annual Meeting?

Only stockholders of record at the close of business on March 28, 2022 will be entitled to vote at the Annual Meeting. On the record date, there were 48,120,437 shares of common stock outstanding and entitled to vote.

Stockholder of Record: Shares Registered in Your Name

If on March 28, 2022, your shares were registered directly in your name with our transfer agent, American Stock Transfer & Trust Company, LLC, then you are a stockholder of record. As a stockholder of record, you may vote while attending the meeting or by proxy. Whether or not you plan to attend the meeting, we urge you to fill out and return your proxy card or vote by proxy over the telephone or Internet as instructed below to ensure your vote is counted.

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

If on March 28, 2022, your shares were held not in your name, but rather in an account at a broker, bank or other similar organization, then you are the beneficial owner of shares held in “street name” and the Proxy Availability 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 or other agent regarding how to vote the shares in your account and should follow the instructions provided by your broker, bank or other agent to vote your shares. You are also invited to attend the Annual Meeting.

What am I voting on?

There are six matters scheduled for a vote:

1. Election of eight directors;
2. Approval, on a non-binding advisory basis, of our named executive officers’ compensation, as disclosed in this proxy statement in accordance with SEC rules;
3. Ratification of the selection by the Audit Committee of the Board of Ernst & Young LLP as our independent registered public accounting firm for the fiscal year ending December 31, 2022;
4. Approval of an amendment to the Assembly Biosciences, Inc. 2018 Stock Incentive Plan (the 2018 Plan) to increase the number of shares reserved for issuance thereunder by 2,000,000 shares;
5. Amendment and restatement of our Fifth Amended and Restated Certificate of Incorporation (our Certificate of Incorporation) to increase the authorized number of shares of common stock from 100,000,000 to 150,000,000; and
6. Approval of a stock option exchange program for non-executive employees (the Stock Option Exchange Program).

What if another matter is properly brought before the 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?

For each of the matters, including each of our nominees to the Board, to be voted on, you may vote “FOR” or “AGAINST,” or you may abstain from voting.

The procedures for voting depend upon whether your shares are registered in your name or are held by a bank, broker or other nominee:

Stockholder of Record: Shares Registered in Your Name

If you are a stockholder of record, you may vote at the Annual Meeting, vote by proxy over the Internet, vote by proxy over the telephone or vote by proxy using a proxy card that we have provided or will provide upon request. Whether or not you plan to attend the meeting, we urge you to vote by proxy to ensure your vote is counted. You may still attend and vote at the meeting even if you have already voted by proxy.

- To vote at the meeting, attend the Annual Meeting, and follow the instructions available on the meeting website during the meeting.
- To vote over the Internet, go to www.proxyvote.com to complete an electronic proxy card. You will be asked to provide the company control number from your proxy card or Proxy Availability Notice. Your vote must be received by 11:59 p.m. Eastern Daylight Time (EDT) on May 24, 2022 to be counted.
- To vote over the telephone, dial toll-free +1.800.690.6903 using a touch-tone phone and follow the recorded instructions. You will be asked to provide the company control number from your proxy card or Proxy Availability Notice. Your vote must be received by 11:59 p.m. EDT on May 24, 2022 to be counted.
- To vote using a proxy card, complete, sign and date the proxy card and return it pursuant to the instructions provided. Your vote must be received by May 24, 2022 to be counted.

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 nominee, you should have received a Proxy Availability Notice containing a voting instruction form from that organization rather than from us. In order to provide voting instructions to the holder of record of your shares, please refer to the materials forwarded by your broker, bank, or other nominee.

- To vote at the Annual Meeting, contact your broker, bank or other nominee to obtain your control number and follow the instructions on the meeting website.
- To vote over the Internet, go to www.proxyvote.com to complete an electronic proxy. You will be asked to provide your sixteen-digit control number from your voting instruction form. Your vote must be received by 11:59 p.m. EDT on May 24, 2022 to be counted.
- To vote over the telephone, dial toll-free +1.800.454.8683 using a touch-tone phone and follow the recorded instructions. You will be asked to provide the company control number from your voting instruction form or Proxy Availability Notice. Your vote must be received by 11:59 p.m. EDT on May 24, 2022 to be counted.
- To vote using the voting instruction form accompanying the Proxy Availability Notice, complete, sign and date the voting instruction form and return it pursuant to the instructions provided. Your vote must be received by May 24, 2022 to be counted.

<p>Internet proxy voting is provided 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.</p>

How many votes do I have?

You have one vote for each share of common stock you owned as of March 28, 2022 for each matter that is voted upon at the Annual Meeting.

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 nominees for their reasonable out-of-pocket expenses for forwarding proxy materials to beneficial owners and seeking instruction with respect thereto.

Can I vote my shares by filling out and returning the Proxy Availability Notice?

No. The Proxy Availability Notice does, however, provide instructions on how to vote by Internet, mail (by requesting a paper proxy card or voting instruction card), and during the Annual Meeting.

If you receive a proxy statement and a paper proxy card together with the Proxy Availability Notice, the paper proxy card may be used to vote your shares.

Can I change my vote or revoke my proxy after submitting my proxy?*Stockholder of Record: Shares Registered in Your Name*

Yes. You can change your vote or revoke your proxy at any time before the deadline to vote. If you are the record holder of your shares, you may change your vote or revoke your proxy in any one of the following ways:

- You may grant a subsequent proxy by telephone or over the Internet.
- You may submit another properly completed proxy card with a later date.
- You may send a timely written notice that you are revoking your proxy to our Corporate Secretary at 331 Oyster Point Blvd., Fourth Floor, South San Francisco, California 94080.
- You may attend and vote at the Annual Meeting. Simply attending the meeting will not, by itself, revoke your proxy.

Your most recent vote (prior to the deadline) by Internet, telephone or proxy card or vote at the Annual Meeting will be the one that is counted.

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

Yes. You can change your vote or revoke your voting instruction form at any time before the deadline to vote. If your shares are held by your broker or bank as a nominee or agent, you should follow the instructions provided by your broker, bank or other nominee. Note that you may also revoke your proxy in any one of the following ways:

- You may grant a subsequent voting instruction over the Internet or by telephone.
- You may attend and vote at the Annual Meeting by obtaining your control number from your broker, bank or other nominee. Simply attending the meeting will not, by itself, revoke your voting instruction form.

Your most current vote (prior to the deadline) by voting instruction form, telephone or Internet proxy or vote at the Annual Meeting will be the one that is counted.

What are “broker non-votes”?

Broker non-votes occur when a beneficial owner of shares held in “street name” does not give voting instructions to the broker, bank or other nominee holding the shares as to how to vote on matters deemed “non-routine.” Generally, if shares are held in street name, the beneficial owner of the shares is entitled to give voting instructions to the broker, bank or other nominee holding the shares. If the beneficial owner does not provide voting instructions, the broker, bank or other nominee can still vote the shares with respect to matters that are considered to be “routine,” but not with respect to “non-routine” matters.

The only “routine” matters on the agenda for the Annual Meeting is Proposal No. 3—Ratification of the Selection of the Independent Registered Public Accounting Firm and Proposal No. 5—Approval of an Amendment and Restatement of Fifth Amended and Restated Certificate of Incorporation. Accordingly, the “non-routine” matters on the agenda for the Annual Meeting are Proposal No. 1—Election of Directors, Proposal No. 2—Advisory Vote to Approve Our Named Executive Officers’ Compensation, Proposal No. 4—Approval of an Amendment to the Assembly Biosciences, Inc. 2018 Stock Incentive Plan and Proposal No 6—Approval of a Stock Option Exchange Program for Non-Executive Employees. Therefore, it is critical that you indicate your vote on these proposals if you want your vote to be counted.

How are votes counted?

Votes will be counted by the inspector of elections appointed for the meeting.

With respect to the election of directors, you may vote “FOR” or “AGAINST” each of the nominees, or you may abstain from voting for one or more nominees. Neither abstentions nor broker non-votes will have any effect on the election of the nominees, but abstentions and broker non-votes will be counted to determine whether a quorum is present at the Annual Meeting.

With respect to the other proposals, you may vote “FOR” or “AGAINST” or you may abstain from voting. Neither abstentions nor broker non-votes will have any effect on the votes Proposal No. 2, Proposal No. 3, Proposal No. 4 and Proposal No. 6, but abstentions and broker non-votes will be counted to determine whether a quorum is present at the Annual Meeting.

What if I return a proxy card or otherwise vote but do not make specific choices?

If you return a signed and dated proxy card or otherwise vote without marking voting selections, your shares will be voted:

- “FOR” the election of the eight director nominees identified in this proxy statement;
- “FOR” the approval, on a non-binding advisory basis, of our named executive officers’ compensation;
- “FOR” the ratification of the selection of Ernst & Young LLP as our independent registered public accounting firm for the fiscal year ending December 31, 2022;
- “FOR” the approval of an amendment to the 2018 Plan to increase the number of shares reserved for issuance thereunder by 2,000,000 shares;
- “FOR” approval of an amendment and restatement of our Certificate of Incorporation to increase the authorized number of shares of common stock from 100,000,000 to 150,000,000;
- “FOR” approval of the Stock Option Exchange Program; and
- To transact such other business as may properly come before the Annual Meeting and any adjournments or postponements thereof as determined in the discretion of your proxyholder.

What is the quorum requirement?

A quorum of stockholders is necessary to hold a valid meeting. A quorum will be present if stockholders holding a majority of the outstanding shares entitled to vote as of the Record Date are present at the virtual Annual Meeting or represented by proxy. On the record date, there were 48,120,437 shares of common stock outstanding and entitled to vote. As a result, the holders of 24,060,219 shares must be present in person or represented by proxy at the Annual Meeting for there to be a quorum.

Your shares will be counted toward a quorum only if you submit a valid proxy (or one is submitted on your behalf by your broker, bank or other nominee) by May 24, 2022 or if you vote at the Annual Meeting. Abstentions and broker non-votes will be counted toward the quorum requirement. If there is no quorum, the holders of a majority of shares present at the Annual Meeting or represented by proxy may adjourn the Annual Meeting to another date.

Once a share is represented for any purpose at the Annual Meeting, it is deemed present for quorum purposes for the remainder of the meeting and any adjournment thereof unless a new record date is set for the adjournment.

How many votes are needed to approve each proposal?

Assuming the presence of a quorum at the Annual Meeting, the following sets forth the votes necessary for each of the proposals being submitted to the stockholders:

Proposal	Description	Vote Required	Discretionary Voting Allowed
No. 1	Election of Directors	Majority of Votes Cast	No
No. 2	Advisory Vote on Named Executive Officers' Compensation	Majority of Votes Cast	No
No. 3	Ratification of the Selection of Ernst & Young LLP as Independent Registered Public Accounting Firm for 2021	Majority of Votes Cast	Yes
No. 4	Amendment of the 2018 Plan to Increase the Number of Shares Reserved for Issuance Thereunder by 2,000,000 Shares	Majority of Votes Cast	No
No. 5	Amendment and Restatement of Our Certificate of Incorporation to Increase the Authorized Number of Shares of Common Stock from 100,000,000 to 150,000,000	Majority of Outstanding Shares	Yes
No. 6	Stock Option Exchange Program	Majority of Votes Cast	No

Election of Directors

Directors will be elected by the affirmative vote of the majority of the votes cast (meaning the number of shares voted "FOR" a nominee must exceed the number of shares voted "AGAINST" that nominee). If any nominee for director receives a greater number of votes "AGAINST" his or her election than votes "FOR" such election, our Corporate Governance Guidelines require that person to promptly tender his or her written resignation to the Chair of the Board within five days following the certification of the vote. Abstentions and broker non-votes are not considered votes cast for the election of directors and will have no effect on the election of nominees.

Amendment and Restatement of Our Certificate of Incorporation

Adoption of Proposal No. 5 requires the affirmative vote of a majority of the outstanding shares. Abstentions and broker non-votes, if any, will have the same effect as a vote "AGAINST" Proposal No. 5.

Other Proposals

Adoption of Proposal No. 2, Proposal No. 3, Proposal No. 4 and Proposal No. 6 requires the affirmative vote of the majority of votes cast. Abstentions and broker non-votes are not considered votes cast and will have no effect on the vote for these proposals.

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 reported 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 report preliminary results and, within four business days after the final results are known to us, file an additional Form 8-K to report the final results.

What proxy materials are available on the Internet?

The proxy statement and our Annual Report for the fiscal year ended December 31, 2021 are available free of charge at www.proxyvote.com. You can request a copy of our Annual Report free of charge by calling +1.833.509.4583 or by sending an email to our Corporate Secretary at corpsecretary@assemblybio.com. Please include your contact information with the request.

Our Annual Report on Form 10-K for the fiscal year ended December 31, 2021 as filed with the SEC is accessible free of charge on our website. It contains audited consolidated financial statements for our fiscal years ended December 31, 2020 and 2021. The Annual Report on Form 10-K, without exhibits, is included in the 2021 Annual Report to Stockholders that is available with this proxy statement.

CAUTIONARY STATEMENT REGARDING FORWARD-LOOKING STATEMENTS

This proxy statement contains forward-looking statements relating to future events that involve known and unknown risks, uncertainties and other factors that could cause our actual results, levels of activity, performance or achievement to differ materially from those expressed or implied by these forward-looking statements.

Statements that include the words may, will, would, could, should, might, believes, hopes, estimates, projects, potential, expects, plans, anticipates, intends, continues, forecast, designed, goal or the negative of those words or other comparable words, that express uncertainty, are forward-looking statements. We intend such forward-looking statements to be covered by the safe harbor provisions contained in Section 27A of the Securities Act of 1933, as amended (the Securities Act), and Section 21E of the Securities Exchange Act of 1934, as amended (the Exchange Act). Except as required by law, we assume no obligation to update publicly any forward-looking statements, whether as a result of new information, future events or otherwise.

PROPOSAL NO. 1: ELECTION OF DIRECTORS

General

Our Amended and Restated Bylaws provide that the number of our directors is to be within a range of three to ten, with the exact number set by the Board. The number of directors currently comprising the full Board is nine, but the Board expects to reduce the number of directors to eight immediately following the Annual Meeting.

Our Board currently consists of nine directors. One of our current directors, Myron Z. Holubiak, will not stand for re-election and will retire at the end of his current term. There are eight nominees for election to the Board this year. Each director to be elected and qualified will hold office until the next annual meeting of the stockholders and until his or her successor is duly elected and qualified, or, if sooner, until the director's death, resignation or removal. Each of the nominees listed below is currently a director. Other than Sir Michael Houghton, Ph.D., who the Board appointed as a director in July 2021, each of the director nominees was previously elected by the stockholders. Directors are elected by a majority of the votes cast in the election of such director, requiring that the number of votes cast "for" a director nominee exceed the number of votes cast "against" that director nominee.

Nominees for Director

The Nominating and Governance Committee has recommended, and the Board has approved, the nomination of each of William R. Ringo, Jr., Anthony E. Altig, Gina Consylman, Richard D. DiMarchi, Ph.D., Sir Michael Houghton, Ph.D., Lisa R. Johnson-Pratt, M.D., Susan Mahony, Ph.D. and John G. McHutchison, A.O., M.D. to serve as a director of our Company. The Board has determined that all of these nominees for director, except for Dr. McHutchison, are independent as determined in accordance with the rules of the Nasdaq Stock Market. There are no family relationships among any of our nominees for director or executive officers. The respective names, ages, lengths of service on our Board and brief biographical summaries of our nominees for director are as follows. For more information regarding the experience, qualifications, attributes and skills of the director nominees, see the matrix on page 19.

<u>Name</u>	<u>Age</u>	<u>Director Since</u>	<u>Business Experience</u>
William R. Ringo, Jr.	76	2014	Mr. Ringo became a director in July 2014 upon the closing of the Assembly Pharmaceuticals, Inc. acquisition through a reverse merger by our predecessor company, Ventrus Biosciences, Inc. (the Merger) and became non-executive Chairman of the Board in February 2015. Mr. Ringo served as Interim Chief Executive Officer of Five Prime Therapeutics, Inc. (Five Prime) from September 2019 until April 2020. From July 2010 until December 2015, Mr. Ringo was a senior advisor with Barclays Capital, the global investment banking division of Barclays Bank PLC. From July 2010 until December 2015, Mr. Ringo served as a strategic advisor with Sofinnova Ventures, a life sciences-focused investment firm. Prior to his advisory roles with Barclays Capital and Sofinnova Ventures, Mr. Ringo served as Senior Vice President of Strategy and Business Development for Pfizer Inc., a biopharmaceutical company, from April 2008 until his retirement in April 2010. From 2004 to 2006, Mr. Ringo served as President and Chief Executive Officer of Abgenix, Inc., a biotechnology company acquired by Amgen, Inc. From 2001 to 2007, he served on various boards of directors, including the following public companies: Encysive Pharmaceuticals, Inc.; Inspire Pharmaceuticals, Inc.; and InterMune, Inc., where he was the non-executive chairman of the board of directors after serving as interim Chief Executive Officer from June 2003 to September 2003. His experience in the global pharmaceutical sector also includes nearly 30 years with Lilly. Over the course of his career with Lilly, Mr. Ringo served in numerous executive roles, including Product Group President for oncology and critical care, President of internal medicine products, President of the infectious diseases business unit, and Vice President of sales and marketing for U.S. pharmaceuticals. He also was a member of Lilly's operating committee. From 1994 to 2002, he served as a director and chairman of the board for Community Health Systems, Inc. and from February 2011 until the October 2013 acquisition by Amgen, Inc., on the Onyx Pharmaceuticals, Inc. board of directors. In the last five years, Mr. Ringo served as a director of Immune Design Corp., Sangamo Biosciences, Inc., Mirati Technologies, Inc., each public companies, and Dermira, Inc. (Dermira) prior to Dermira being acquired by Lilly and Five Prime prior to Five Prime being acquired by Amgen Inc. Prior to being acquired, both Dermira and Five Prime were also public companies. In addition, Mr. Ringo currently serves as the chairman of the board at Sensei Biotherapeutics, Inc. Mr. Ringo received a B.S. in business administration and an M.B.A. from the University of Dayton.

Because of these and other professional experiences, Mr. Ringo possesses extensive knowledge of our business and industry and experience in senior leadership, financial audit, business development, public company board service, governance, financing and capital markets and corporate operations. Among other experience, qualifications, attributes and skills, Mr. Ringo's extensive management experience in the pharmaceutical industry and experience in the capital markets, as well as his experience serving on the boards of directors of public pharmaceutical companies and on the boards of directors of several private pharmaceutical companies, led to the conclusion of our Board that he should serve as a director due to our business focus and strategy.

Name	Age	Director Since	Business Experience
Anthony E. Altig	66	2012	<p>Mr. Altig joined our Board in January 2012. From 2008 until his retirement in December 2017, Mr. Altig was the Chief Financial Officer of Biotix Holdings, Inc., a company that manufactures microbiological consumables, which was acquired by Mettler Toledo in September 2017. From 2004 to 2007, Mr. Altig served as the Chief Financial Officer of Diversa Corporation (subsequently Verenum Corporation), a public company developing specialized industrial enzymes. Prior to joining Diversa, Mr. Altig served as the Chief Financial Officer of Maxim Pharmaceuticals, Inc., a public biopharmaceutical company. Mr. Altig formerly served as a director and chairman of the audit committee of TearLab Corporation (formerly OccuLogix, Inc.), an eyecare technology company that was a public company until it was taken private in July 2020, and as a director of MultiCell Technologies, Inc. and Optimer Pharmaceuticals, Inc., a pharmaceutical company that was a public company until its acquisition by Cubist Pharmaceuticals, Inc. in October 2013. Mr. Altig received his B.B.A. in business from the University of Hawaii at Manoa and is a Certified Public Accountant (inactive).</p>

Because of these and other professional experiences, Mr. Altig possesses particular knowledge and experience in finance and accounting, financial audit, public company board service, corporate governance and corporate operations that strengthen the Board's collective qualifications, skills and experience. Among other experiences, qualifications, attributes and skills, Mr. Altig's extensive management experience and financial expertise, as well as his experience serving on the boards of directors of several public pharmaceutical and healthcare companies, led to the conclusion of our Board that he should serve as a director due to our business focus and strategy.

Name	Age	Director Since	Business Experience
Gina Consylman	50	2020	Ms. Consylman joined our Board in October 2020. Since November 2021, Ms. Consylman has served as Chief Financial Officer of bluebird bio, Inc (bluebird bio). Prior to that, Ms. Consylman served as the Chief Financial Officer of bluebird bio's Severe Genetic Disease business. Prior to joining bluebird bio, from November 2017 until July 2021, Ms. Consylman served as Senior Vice President, Chief Financial Officer of Ironwood Pharmaceuticals, Inc. (Ironwood). From September 2017 until November 2017, Ms. Consylman was Ironwood's interim Chief Financial Officer, from August 2015 until November 2017, she served as Ironwood's Vice President of Finance and Chief Accounting Officer and from June 2014 until July 2015, she served as Ironwood's Vice President, Corporate Controller and Chief Accounting Officer. Prior to joining Ironwood, Ms. Consylman served as Vice President, Corporate Controller and Principal Accounting Officer of Analogic Corporation from February 2012 until June 2014. Prior to that, Ms. Consylman served in various roles of increasing responsibility at Biogen Inc. from November 2009 until February 2012, culminating in her role as Senior Director, Corporate Accounting. Prior to that, Ms. Consylman served as Corporate Controller at Varian Semiconductor Equipment Associates, Inc. From October 2018 until November 2021, Ms. Consylman served on the board of directors and as chair of the audit committee of Verastem, Inc., a public company. Ms. Consylman received her B.S. in accounting from Johnson & Wales University and a M.S. in taxation from Bentley University. Ms. Consylman is a Certified Public Accountant.

Because of these and other professional experiences, Ms. Consylman possesses particular knowledge and experience in finance and accounting, financial audit, public company board service and corporate governance and corporate operations that strengthen the Board's collective qualifications, skills and experience. Among other experiences, qualifications, attributes and skills, Ms. Consylman's extensive management experience and financial expertise, as well as her experience serving on the board of directors of Verastem, Inc., led to the conclusion of our Board that she should serve as a director due to our business focus and strategy.

Richard D. DiMarchi, Ph.D.	69	2014	Dr. DiMarchi joined our Board in July 2014 upon the closing of the Merger. Dr. DiMarchi was a co-founder of Assembly Pharmaceuticals, Inc. and served on its board from its inception in 2012 through the Merger. Dr. DiMarchi is a Distinguished Professor of Chemical Biology and Gill Chair in Biomolecular Sciences at Indiana University and Chief Scientific Officer of MBX Biosciences, Inc. From February 2016 until March 2020, Dr. DiMarchi served as Vice President of Research at Novo Nordisk Research Labs. Dr. DiMarchi was a co-founder and board member of biotechnology companies Ambrx, Inc. (until it was acquired by a consortium of entities affiliated with Shanghai Fosun Pharmaceutical Group, HOPU Investments, China Everbright Limited's healthcare fund and WuXi PharmaTech) and Marcadia Biotech Inc. (until it was acquired by Roche in 2010). Dr. DiMarchi was also a founder of Calibrium LLC, which was acquired by Novo Nordisk in 2015 and an advisor to Twilight Ventures. Dr. DiMarchi retired as Group Vice President at Eli Lilly & Company (Lilly), where he provided leadership for more than two decades in biotechnology, endocrine research, and product development. Dr. DiMarchi previously served as a board member of the biotechnology trade group BIO, Ionis Pharmaceuticals, Inc. (f/k/a Isis Pharmaceuticals, Inc.) and Millennium BioTherapeutics, Inc. His current research is focused on developing macromolecules with enhanced therapeutic properties through biochemical and chemical optimization. Dr. DiMarchi contributed significantly to the discovery of Humalog® and to the commercial development of pharmaceutical products Humulin®, Humatrope®, Glucagon®, Xigris®, Forteo®, and Evista®. Dr. DiMarchi is the recipient of numerous prestigious awards and in 2014 was inducted to the National Inventors Hall of Fame and in 2015 to the National Academy of Medicine. Dr. DiMarchi received a B.S. with honors from Florida Atlantic University and his Ph.D. in Biochemistry from Indiana University and completed his postdoctoral studies at the Rockefeller University.
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Because of these and other professional experiences, Dr. DiMarchi possesses particular knowledge and experience with our business and industry, innovation and academia. Among other experiences, qualifications, attributes and skills, Dr. DiMarchi's scientific training and knowledge, extensive experience in the pharmaceutical industry, as well as his experience serving on the board of directors of several private pharmaceutical companies, led to the conclusion of our Board that he should serve as a director due to our business focus and strategy.

Name	Age	Director Since	Business Experience
Sir Michael Houghton, Ph.D.	71	2021	<p>Sir Michael Houghton, Ph.D. joined our Board in July 2021. Since 2010, Dr. Houghton has served as the La Ka Shing Professor in the Department of Medical Microbiology and Immunology at the University of Alberta. Dr. Houghton is also the director of the La Ka Shing Applied Virology Institute. In 2020, Dr. Houghton was jointly named the 2020 Nobel Prize winner in Physiology or Medicine along with Harvey J. Alter and Charles M. Rice in recognition of the discovery of hepatitis C virus (HCV). Between 2010 and 2018, Dr. Houghton was also the Canada Excellence Research Chair in Virology at the University of Alberta. Prior to joining the University of Alberta, Dr. Houghton served as Chief Scientific Officer at Epiphany Biosciences, Inc. (Epiphany) from 2007 until 2009. Before joining Epiphany, Dr. Houghton served as Vice President, Hepatitis C and Virology Research at Novartis Vaccines & Diagnostics, Inc. (Novartis). Prior to that, Dr. Houghton served in a number of positions of increasing responsibility at Chiron Corporation (Chiron) from 1982 until 2006. Dr. Houghton serves on the boards of directors of Prophysis Inc., Aurora Vaccines Inc, Achlys Inc., Heka Therapeutics Inc. and Egerio Inc., all private Canadian startup companies. Dr. Houghton received his B.Sc. in Biological Sciences from the University of East Anglia and his Ph.D. in Biochemistry from King's College at the University of London and was awarded an Honorary Doctorate of Sciences from the University of East Anglia.</p>

Because of these and other professional experiences, Dr. Houghton possesses particular knowledge and experience with our business and industry, innovation and academia. Among other experiences, qualifications, attributes and skills, Dr. Houghton's scientific training and knowledge, extensive experience in the pharmaceutical industry, as well as serving on the board of directors of several private pharmaceutical companies, led to the conclusion of our Board that he should serve as a director due to our business focus and strategy.

Name	Age	Director Since	Business Experience
Lisa R. Johnson-Pratt, M.D.	58	2021	<p>Dr. Johnson-Pratt was elected to our Board in May 2021. Since November 2020, Dr. Johnson-Pratt has served as Senior Vice President, Commercial of Ionis Pharmaceuticals, Inc. (Ionis). Prior to that, Dr. Johnson-Pratt served as Senior Vice President of Akcea Therapeutics, Inc. (Akcea) from March 2020 until Ionis’s acquisition of Akcea, which was consummated in October 2020. Prior to that, Dr. Johnson-Pratt served as Vice President of Global Franchise Operations at GlaxoSmithKline plc (GSK) from January 2018 until July 2019, and from June 2015 until July 2019, she served as GSK’s Head, Pipeline and Oncology Commercial Strategy. From 2013 until 2015, Dr. Johnson-Pratt was the Global Marketing Director at Stiefel Laboratories, Inc. Dr. Johnson-Pratt worked for Merck & Co., Inc. from 2004 until 2013, in a series of positions of increasing responsibility, culminating in her role as Business Unit Director (Mature Brands). Dr. Johnson-Pratt serves on the board of directors of Tracoon Pharmaceuticals, Inc., a public company. Dr. Johnson-Pratt earned a B.S. in science from Howard University, a Diploma of Pharmaceutical Medicine from the Royal College of Physicians, and an M.D. from Howard University.</p> <p>Because of these and other professional experiences, Dr. Johnson-Pratt possesses particular knowledge and in experience with the medical and the pharmaceutical industries. Among other experiences, qualifications, attributes and skills, Dr. Johnson-Pratt’s medical training and her extensive commercial experience in the pharmaceutical industry led to the conclusion of our Board that she should be nominated to serve as a director due to our business focus and strategy.</p>
Susan Mahony, Ph.D.	57	2017	<p>Dr. Mahony joined our Board in December 2017. From 2011 until her retirement in August 2018, Dr. Mahony served as Senior Vice President and President of Lilly Oncology and was a member of the executive committee at Lilly. Prior to that, from 2000 until 2011, Dr. Mahony served in a variety of leadership roles at Lilly, including Senior Vice President Human Resources and Diversity, President and General Manager Lilly Canada, and Executive Director Global Development. Dr. Mahony worked in sales and marketing at Bristol-Myers Squibb Company from 1995 to 2000, at Amgen Limited from 1991 to 1995, and at Schering Plough from 1989 to 1991. Dr. Mahony is on the board of directors of Vifor Pharma, Zymeworks Inc. and Horizon Therapeutics plc, which are all public companies. Dr. Mahony earned a B.Sc. and Ph.D. in pharmacy and was awarded an Honorary Doctorate from Aston University, and she earned an M.B.A. from London Business School.</p> <p>Because of these and other professional experiences, Dr. Mahony possesses particular knowledge and experience in all aspects of corporate functions and company operations that strengthen the Board’s collective qualifications, skills and experience. Among other experiences, qualifications, attributes and skills, Dr. Mahony’s extensive experience in management at public pharmaceutical companies, together with her experience serving on the board of directors of public and private companies, led to the conclusion of our Board that she should serve as a director due to our business focus and strategy.</p>

Name	Age	Director Since	Business Experience
John G. McHutchison, A.O., M.D.	64	2019	<p>Dr. McHutchison has served as our Chief Executive Officer and President and as a director since August 2019. Prior to joining us, Dr. McHutchison was the Chief Scientific Officer and Head of Research and Development at Gilead Sciences, Inc. (Gilead). Prior to joining Gilead in 2010, Dr. McHutchison worked at Duke University Medical Center, where he served as Associate Director of the Duke Clinical Research Institute. He also held the positions of Professor of Medicine in the Division of Gastroenterology at Duke University Medical Center, Associate Director at Duke Clinical Research Institute and Co-Director of the Duke Clinical and Translational Science Award. Prior to his positions at Duke University, Dr. McHutchison spent nearly ten years at Scripps Clinic, most recently as Medical Director, Liver Transplantation. He also previously held an Assistant Professorship in Medicine at the University of Southern California. In June 2018, Dr. McHutchison was appointed an Officer of the Order of Australia in recognition of his distinguished service to medical research in gastroenterology and hepatology. Dr. McHutchison has undergraduate degrees in medicine and surgery from the University of Melbourne in Australia and completed his residency in internal medicine and fellowship in gastroenterology at the Royal Melbourne Hospital. He is a member of the Royal Australasian College of Physicians. Dr. McHutchison currently serves on the board of directors of Metacrine, Inc., a public company, and Evox Therapeutics and Oxford BioTherapeutics, both private companies.</p>

Because of these and other professional experiences, Dr. McHutchison possesses extensive knowledge of our business and industry and experience in senior leadership, clinical development, innovation and technology development, corporate operations and academia. Among other experiences, qualifications, attributes and skills, Dr. McHutchison's status as an internationally recognized leader in infectious diseases, liver diseases, and gastrointestinal diseases and the leadership he demonstrated at Gilead as he led the organization in the successful filing of numerous New Drug Applications across multiple therapeutic areas, including the curative treatment regimens for chronic hepatitis C and treatment of chronic hepatitis B, led to the conclusion of our Board that he should serve as a director due to our business focus and strategy.

Required Vote

Assuming a quorum is present, directors will be elected by the affirmative vote of the majority of the votes cast (meaning the number of shares voted "FOR" a nominee must exceed the number of shares voted "AGAINST" that nominee). All elected nominees will serve until the 2023 Annual Meeting of Stockholders and until their successors have been duly elected and qualified or, if sooner, until the director's death, resignation or removal. If any current director receives a greater number of votes "AGAINST" his or her election than votes "FOR" such election, our Corporate Governance Guidelines require that person to promptly tender his or her written resignation to the Chairman of the Board within five days following the certification of the vote. Abstentions and broker non-votes are not considered votes cast for the election of directors and will have no effect on the election of nominees.

Recommendation of the Board of Directors

THE BOARD OF DIRECTORS RECOMMENDS A VOTE "FOR" THE ELECTION OF EACH NAMED NOMINEE FOR DIRECTOR.

THE BOARD OF DIRECTORS AND CORPORATE GOVERNANCE

This section describes key corporate governance guidelines and practices that we have adopted. Complete copies of the charters of our committees of the Board and our Corporate Governance Guidelines, Code of Conduct and Code of Ethics described below may be found in the Investors section of our website at investor.assemblybio.com. Alternatively, you can request a copy of any of these documents free of charge by writing to Assembly Biosciences, Inc., attn: Corporate Secretary, 331 Oyster Point Blvd., Fourth Floor, South San Francisco, California 94080. Information on our website is not incorporated by reference into this proxy statement.

Meetings of the Board

Our Company is managed under the general oversight of the Board as provided by the laws of Delaware and our Amended and Restated Bylaws. During the year ended December 31, 2021, the Board held five meetings and acted by unanimous written consent six times. Our independent directors met in executive sessions at which only independent directors were present at the end Board meetings twice in 2021.

The Board has adopted a formal policy that a Board meeting be held on the same date as the annual stockholders meeting and all directors of the Company are encouraged to attend our annual meetings of stockholders. Every 2022 director nominee that served as a director or was a director nominee at the time of the 2021 Annual Meeting was in attendance. Dr. Houghton was neither a nominee for election nor a member of our Board at the time of the 2021 Annual Meeting.

Board Composition

Our Nominating and Governance Committee aims to assemble a Board that brings together a variety of perspectives and skills derived from high quality business and professional experience. Directors must possess high ethical standards, integrity and strong values and be committed to representing the best interests of our stockholders. The Board is composed of individuals that enhance the gender, age and ethnic diversity of the Board.

In fulfilling its responsibilities to select and recommend director nominees to serve on our Board, our Nominating and Governance Committee annually evaluates our incumbent Board members and other candidates, if any, against the following criteria in determining whether to recommend these directors for nomination:

- the appropriate size of our Board and its committees;
- the perceived needs of our Board for particular skills, background and business experience;
- the skills, background, reputation and depth and breadth of business experience of nominees;
- nominees' independence from management;
- diversity, including of experience, competency in relevant fields, gender, race, ethnicity and age; and
- applicable regulatory and listing requirements, including independence requirements and legal considerations.

Our Corporate Governance Guidelines provide that the Nominating and Governance Committee must be satisfied that each recommended nominee to the Board meets the following minimum qualifications:

- experience at a strategic or policymaking level in a business, government, non-profit or academic organization of high standing;
- highly accomplished in his or her respective field, with superior credentials and recognition;
- well regarded in the community with a long-term reputation for high ethical and moral standards;
- sufficient time and availability to devote to the affairs of the Company, particularly accounting for the number of boards of directors on which he or she may serve; and

- demonstrated history of actively contributing at board meetings, to the extent he or she serves or has previously served on other boards of directors.

Other than the foregoing, there are no stated minimum criteria for director nominees, although our Nominating and Governance Committee also may consider such other factors as it may deem, from time to time, to be in the best interests of our Company and our stockholders.

We seek a variety of types and degrees of knowledge, skills and experiences among our Board members. The following matrix provides information regarding our Board nominees, including select knowledge, skills, experiences and attributes possessed by our members that the Board believes are relevant to our business. The matrix is not intended to encompass all of the knowledge, skills, experiences or attributes of the nominees, and the fact that a particular knowledge, skill, experience or attribute is not listed does not mean that a nominee does not possess it. In addition, the absence of a particular knowledge, skill, experience or attribute does not mean that that particular nominee is unable to contribute to decision-making in that area.

	Ringo	Altig	Consylman	DiMarchi	Houghton	Johnson-Pratt	Mahony	McHutchison
Public Board Experience	•	•	•	•	•	•	•	•
Finance	•	•	•				•	
Accounting	•	•	•					
Corporate Governance	•	•	•					•
Compensation	•		•				•	
Executive Experience	•	•	•	•	•	•	•	•
Operations	•	•	•			•	•	•
Strategic Planning	•	•	•	•		•	•	•
Pharmaceutical Industry	•	•	•	•	•	•	•	•
Academia				•	•			•
Years	8	10	2	8	1	1	5	3
Number	1	0	0	0	0	1	3	1

Total Number of Directors	9			
	Female	Male	Non-Binary	Did Not Disclose Gender
Part I: Gender Identity				
Directors	3	6	0	0
Part II: Demographic Background				
African American or Black	1	0	0	0
Alaskan Native or Native American	0	0	0	0
Asian	0	0	0	0
Hispanic or Latinx	0	0	0	0
Native Hawaiian or Pacific Islander	0	0	0	0
White	2	6	0	0
Two or More Races or Ethnicities	0	0	0	0
LGBTQ+	0	0	0	0
Did Not Disclose Demographic Background	0	0	0	0

Independence of Directors

Our Board assesses the independence of each of our directors under the Nasdaq Stock Market Rules (the Nasdaq listing rules), because our common stock is listed on The Nasdaq Global Select Market. Using the test provided in Rule 5605(a)(2) of the Nasdaq listing rules, the Board has determined that, except for John G. McHutchison, A.O., M.D., our Chief Executive Officer and President, all director nominees (William R. Ringo, Jr., Anthony E. Altig, Gina Consylman, Richard D. DiMarchi, Ph.D., Sir Michael Houghton, Ph.D., Lisa R. Johnson-Pratt, M.D. and Susan

Mahony, Ph.D.) are independent. As part of this determination of independence, our Board considered the relationships that each non-employee director or director nominee has with us and all other facts and circumstances that the Board deemed relevant in determining independence, including the beneficial ownership of our capital stock by such individuals and the association of certain of our directors with third parties, including Indiana University, from whom we license certain intellectual property. After considering these factors, our Board has affirmatively determined that none Mr. Ringo, Mr. Altig, Ms. Consylman, Dr. DiMarchi, Dr. Houghton, Dr. Johnson-Pratt and Dr. Mahony has a relationship with us that would interfere with the exercise of independent judgment in carrying out his or her responsibilities as a director. Our Board also affirmatively determined that Myron Z. Holubiak, who is not standing for re-election to the Board does not have any relationships that would interfere with the exercise of independent judgment in carrying out his responsibilities and is independent.

Board Leadership Structure

Our Board does not have a specific policy regarding the separation of the roles of the Chair of the Board and the Chief Executive Officer and believes it is in the best interests of our Company and our stockholders to be able to exercise discretion in combining or separating these positions as we deem appropriate considering prevailing circumstances. The roles are currently separated, with Mr. Ringo serving as independent Chair. The Board believes that this structure currently best serves the interests of our stockholders because it allows our Chief Executive Officer to focus primarily on our business strategy and operations and most effectively leverages the experience of the Chair. It also enhances the Board's independent oversight of our senior management team and enables better communication and relations between the Board, the Chief Executive Officer and other members of our senior management team. In that regard, our independent Chair presides at Board meetings and the executive sessions of the non-management and independent directors of the Board. Our approach provides flexibility and allows our Board to modify our leadership structure in the future as appropriate. We believe that we, like many U.S. companies, are well served by this flexible leadership structure.

Risk Oversight

The Board is actively involved in the oversight of risks that could affect us. This oversight is conducted primarily through committees of the Board, particularly the Audit Committee, the Compensation Committee and the Nominating and Governance Committee, but the full Board has retained responsibility for general oversight of risks. The Board satisfies this responsibility through regular reports by each committee chair regarding the committee's considerations and actions, as well as through regular reports directly from officers responsible for oversight of particular risks.

The Audit Committee is responsible for information security, with a particular focus on cybersecurity. Management provides regular briefings to the Audit Committee if there are any information security breaches. In recent years, we have implemented a variety of initiatives, including enhancement of our email security, evaluation of data protection capabilities of our information technology systems and implementation of a new cybersecurity incident response policy. In addition, we have also implemented a cybersecurity awareness initiative to enable our employees to identify and mitigate information security risks. The initiative is comprised of employee trainings on phishing and other malicious attacks, smart habit creation and best practices regarding file sharing, host security and email security, and we have incorporated cybersecurity training into our employee onboarding process to ensure that all new employees have the necessary skills to identify and mitigate information security risks. In addition, we recently purchased cybersecurity insurance that would defray the costs of an information security breach. We have not experienced any material information security breaches since August 2018, when our email system was hacked. We became aware of the breach and closed access prior to incurring any expenses related to the attack.

Board Committees

The Board has four standing committees. Each committee operates under a charter that has been adopted by the Board, which can be found in the Corporate Governance section of the Investors section of our website at www.assemblybio.com. Information on our website is not incorporated by reference into this proxy statement. Each of the committees has authority to engage legal counsel or other experts or consultants as it deems appropriate to carry out its responsibilities. The table below sets forth the current membership of each of the standing committees and the number of meetings each committee held in 2021. All directors attended 75% or more of the aggregate number of meetings of the Board and meetings of the committees on which he or she served during the period for

which he or she was a director or committee member, as applicable, in 2021. The Board expects to review 2022 committee assignments at its meeting immediately following the Annual Meeting, including, due to Mr. Holubiak's retirement, appointing (1) a director that meets the Nasdaq requirements to serve as the third member of both the Compensation Committee and the Nominating and Governance Committee and (2) a new Chair of the Compensation Committee at the Board meeting immediately following the Annual Meeting.

	Independent	Audit Committee	Compensation Committee	Nominating and Governance Committee	Science and Technology Committee
William R. Ringo, Jr.*	•	•	•	•**	
Anthony E. Altig+	•	•**		•	
Gina Consylman+	•	•			
Richard D. DiMarchi, Ph.D.	•				•**
Myron Z. Holubiak***	•		•**	•	
Sir Michael Houghton, Ph.D.	•				•
Lisa R. Johnson-Pratt, M.D.	•				•
Susan Mahony, Ph.D.	•		•		•
John G. McHutchison, A.O., M.D.					•

* Chairman of the Board

** Committee Chair

*** Mr. Holubiak is not standing for re-election.

+ "Audit Committee Financial Expert" as defined in Item 407(d) of Regulation S-K

Audit Committee

The Audit Committee oversees our accounting and financial reporting processes, the audit process, our process for monitoring compliance with laws, regulations and our Code of Conduct and Code of Ethics, and the quality and integrity of our consolidated financial statements and reports. In addition, the Audit Committee oversees the qualification, selection, independence and performance of our independent registered public accounting firm and recommends to the Board the appointment of our independent registered public accounting firm. Our Audit Committee is also responsible for reviewing and approving all related person transactions, including transactions with executive officers and directors, for potential conflicts of interests.

At the direction of the Nominating and Governance Committee, the Audit Committee conducts an annual performance evaluation of the Audit Committee and reports to the Board on the results of such evaluation.

The charter for our Audit Committee requires that the Audit Committee have at least three independent directors. Our Audit Committee currently consists of Mr. Altig (Chair), Ms. Consylman and Mr. Ringo. The Board annually reviews the Nasdaq listing rules' definition of independence for Audit Committee members and has determined that Mr. Altig, Ms. Consylman and Mr. Ringo are each independent under the Nasdaq listing rules for audit committee membership and within the meaning of Section 10A-3(b)(1) of the Exchange Act.

The Board has also determined that Mr. Altig and Ms. Consylman each qualify as an "audit committee financial expert" as that term is defined in Item 407(d) of Regulation S-K promulgated by the SEC. In making that determination, the Board relied on the past experience of Mr. Altig and Ms. Consylman. The Board made a qualitative assessment of Mr. Altig's level of knowledge and experience based on several factors, including his experience as the chief financial officer of several public companies and having been a certified public accountant. The Board made a qualitative assessment of Ms. Consylman's level of knowledge and experience based on a number of factors, including her current role as Chief Financial Officer of bluebird bio, Inc., her past role as Chief Financial Officer of Ironwood Pharmaceuticals and the series of accounting and finance roles of increasing responsibility at Ironwood Pharmaceuticals, Analogic, Biogen and Varian Semiconductor Equipment Associates, her past role as the audit committee chair at Verastem, Inc. and her experience as a certified public accountant at Ernst & Young LLP.

Compensation Committee

The charter for our Compensation Committee requires the committee to have not less than three independent members, subject to the Nasdaq listing rules. Our Compensation Committee currently consists of Mr. Holubiak (Chair), Dr. Mahony and Mr. Ringo. Our Board has determined that Mr. Holubiak, Dr. Mahony and Mr. Ringo are each independent under the Nasdaq listing rules for compensation committee membership and that each is a “non-employee director” as defined in Rule 16b-3 promulgated under the Exchange Act. Due to Mr. Holubiak’s retirement from the Board as of the Annual Meeting, the Board will appoint both (1) a director that meets the Nasdaq requirements to serve as the Compensation Committee’s third member and (2) a new Chair of the Compensation Committee at the Board meeting immediately following the Annual Meeting.

The purpose of our Compensation Committee is to discharge our Board’s responsibilities relating to compensation of our directors, executive officers and employees and to administer our equity compensation and other benefit plans. In carrying out these responsibilities, our Compensation Committee reviews all components of executive officer compensation for consistency with our Compensation Committee’s primary objectives of attracting and retaining key management personnel, driving long-term strategic values and enhancing stockholder value. The Compensation Committee charter specifies that the Compensation Committee will, among other things:

- review the recommendations of management with respect to setting our annual corporate goals and objectives and advise the Board regarding such annual corporate goals and objectives;
- taking into consideration the Board-approved corporate goals and objectives, review and approve achievement of the annual goals and objectives;
- evaluate the principal executive officer’s and the other executive officers’ performance in light of approved goals and objectives;
- determine and approve the compensation levels and other terms of employment of the principal executive officer and other executive officers based on this evaluation, including with respect to each executive officer, his or her base salary, cash and equity-based compensation, annual performance-based cash bonus, special benefits, perquisites and incidental benefits and other incentive compensation, benefits and terms of employment;
- review and approve the compensation of our other employees that the Compensation Committee may specify from time to time, and delegate authority to specified executive officer(s) to review and approve the compensation of other nonexecutive officer employees;
- review and approve any employment agreements, severance plans (including any benefits to be provided in connection with a change in control) and any other compensatory agreements for the principal executive officer, other executive officers and specified other employees, including adopting, amending and terminating such agreements, plans or arrangements;
- review with the principal executive officer and any other appropriate officers the material criteria used by the principal executive officer and management in evaluating employee performance throughout the Company and in establishing appropriate compensation, retention, incentive, severance and benefit policies and programs;
- review and recommend to the Board changes to the compensation of our directors;
- oversee the administration of, and periodically review and make changes to, our incentive compensation plans, equity-based compensation plans, and any material employee benefit, bonus, retirement, severance and other compensation plans;
- prepare the Compensation Committee report and recommend the inclusion of the report in our proxy statement or Annual Report on Form 10-K as required;
- retain and approve the compensation of any compensation consultants; and
- evaluate the independence of any such compensation consultants.

Under the Compensation Committee charter, the Compensation Committee may, in its discretion, delegate its duties to a subcommittee consisting of one or more of its members and delegate authority to specified executive officers to review and approve the compensation of nonexecutive officer employees. At the direction of the Nominating and Governance Committee, the Compensation Committee conducts an annual performance evaluation and reports to the Board on its results.

The charter of the Compensation Committee grants the Compensation Committee full authority to obtain, at our expense, advice and assistance from compensation consulting firms, legal counsel and other advisors as it deems appropriate to assist it in the evaluation of the compensation of directors, the principal executive officer or the other executive and non-executive officers of the Company, and the fulfillment of its other duties.

Nominating and Governance Committee

The charter for the Nominating and Governance Committee requires the committee to consist of not less than two independent directors, subject to the Nasdaq listing rules. Our Nominating and Governance Committee currently consists of three directors, Mr. Ringo (Chair), Mr. Altig and Mr. Holubiak. The Board has determined that each of Mr. Ringo, Mr. Altig and Mr. Holubiak are independent under the Nasdaq listing rules. Due to Mr. Holubiak's retirement from the Board as of the Annual Meeting, at the Board meeting immediately following the Annual Meeting, the Board will appoint a director that meets the Nasdaq requirements to serve as the Nominating and Governance Committee's third member.

The primary purpose of our Nominating and Governance Committee is to select, and recommend to our Board, director nominees for each election of directors and recommend any corporate governance guidelines it deems appropriate. Additionally, the Nominating and Governance Committee has general oversight of our compliance with legal and regulatory requirements of our business operations, other than compliance with securities laws and regulations, including our financial reporting and disclosure obligations, or anti-bribery laws, which in each case is the responsibility of the Audit Committee.

Candidates for nomination as director may come to the attention of our Nominating and Governance Committee from time to time through incumbent directors, management, stockholders or third parties. Our Amended and Restated Bylaws contain provisions for stockholders to recommend persons for nomination as a director candidate and, subject to certain conditions, to nominate director candidates for inclusion in our proxy statement, as set forth in this proxy statement under "Deadline for Stockholder Proposals for 2023 Annual Meeting of Stockholders." Candidates for potential nomination may be considered at meetings of our Nominating and Governance Committee at any point during the year. Such candidates will be evaluated against the criteria set forth above, and the Nominating and Governance Committee's policy is to evaluate any recommendation for director nominees proposed by stockholders using the same criteria. If our Nominating and Governance Committee believes at any time that it is desirable that our Board consider additional candidates for nomination, the Committee may poll directors and management for suggestions or conduct research to identify possible candidates and may, if our Nominating and Governance Committee believes it is appropriate, engage a third-party search firm to assist in identifying qualified candidates.

After director candidates have been identified, the Nominating and Governance Committee conducts a review and evaluation of the qualifications of any proposed director candidate as it deems appropriate. There is no difference in the evaluation process of a candidate recommended by a stockholder as compared to the evaluation process of a candidate identified by any of the other means described above.

If the Nominating and Governance Committee determines that a candidate should be nominated for election to the Board, the candidate's nomination is then recommended to the Board, and the directors may in turn conduct their own review to the extent they deem appropriate. When the Board has agreed upon a candidate, such candidate is recommended to the stockholders for election at an annual meeting of stockholders or appointed as a director by a vote of the Board as appropriate.

The Nominating and Governance Committee engaged a third-party search firm in 2020 in identifying and evaluating Ms. Consylman and utilized the services of the same search firm in 2021 in identifying and evaluating Dr. Johnson-Pratt. Although Dr. Houghton was identified by our Chief Executive Officer, the same third-party search firm reviewed Dr. Houghton prior to his appointment by the Board.

All of the director nominees (William R. Ringo, Jr., Anthony E. Altig, Gina Consylman, Richard D. DiMarchi, Ph.D., Sir Michael Houghton, Ph.D., Lisa R. Johnson-Pratt, M.D., Susan Mahony, Ph.D. and John G. McHutchison, A.O., M.D.) have been recommended by the Nominating and Governance Committee to the Board for re-election as our directors at the Annual Meeting, and the Board has approved such recommendations.

The Nominating and Governance Committee also develops and oversees an annual self-evaluation process for the Board and each of its standing committees and ensures that the results of such evaluations are reported to the Board.

Science and Technology Committee

Our Science and Technology Committee currently consists of Dr. DiMarchi (Chair), Dr. Houghton, Dr. Johnson-Pratt, Dr. Mahony and Dr. McHutchison. The primary purpose of our Science and Technology Committee is to assist the Board with oversight of our research and development activities, including to advise the Board with respect to strategic and tactical scientific matters. In furtherance of its purpose, the Science and Technology Committee reviews, among other things:

- our overall scientific and research and development strategy;
- progress of our research and development programs;
- our regulatory compliance/quality programs, as applicable;
- related external scientific research, discoveries and commercial developments, as appropriate;
- our overall intellectual property strategies and our portfolio of patents;
- management's decisions regarding the allocation, deployment, utilization of and investment in our scientific assets; and
- management's decisions regarding acquiring or divesting scientific technology or otherwise investing in research or development programs.

The Science and Technology Committee charter requires that the Science and Technology Committee meet at least twice per year. The Chair of the Science and Technology Committee, in consultation with the other members and management, may set meeting agendas. The Science and Technology Committee will review and assess the adequacy of its charter at least once annually and recommend changes to the Board for approval.

Code of Ethics and Code of Conduct

Our Board has adopted a Code of Ethics for our principal executive officer and all senior financial officers and a Code of Conduct applicable to all of our employees and our directors. Both codes can be found in the Corporate Governance section of the Investors section of our website at www.assemblybio.com. If we make any substantive amendments to, or grant any waivers from, the Code of Ethics or Code of Conduct, as applicable, for our principal executive officer, principal financial officer, principal accounting officer, controller or persons performing similar functions, or any officer or director, we will disclose the nature of such amendment or waiver on our website or in a Current Report on Form 8-K.

Director Compensation

Our directors play a critical role in guiding our strategic direction and overseeing the management of our Company. The many responsibilities and risks and the substantial time commitment of being a director require that we provide adequate compensation commensurate with our directors' workload and opportunity costs. Non-employee directors receive a combination of annual cash retainers and equity awards in amounts that correlate to their responsibilities and levels of Board participation, including service on Board committees. Dr. McHutchison does not receive separate compensation for service as a director because he is a Company employee.

The following table sets forth the annual cash compensation payable to our non-employee directors in 2021.

Director Position	Annual Cash Compensation(1)
All Non-Employee Directors	\$ 40,000
Chair of the Board	\$ 80,000
Audit Committee Chair	\$ 20,000
Audit Committee Members (other than Chair)	\$ 10,000
Chair of Compensation Committee	\$ 15,000
Compensation Committee Members (other than Chair)	\$ 7,500
Chair of Nominating & Governance or Science and Technology Committees	\$ 10,000
Nominating & Governance or Science and Technology Committee Members (other than Chair)	\$ 5,000

- (1) The annual cash compensation that we paid to Board members, other than Dr. McHutchison, was based on their positions on the Board or the committees of the Board, and we do not compensate the Board members on a per meeting basis. The amounts reflected in the table were in effect for 2021.

Upon appointment or election to the Board, each new non-employee director appointed or elected is granted options to purchase 30,000 shares of our common stock, which vests over three years in three approximately equal installments on each anniversary of the date of grant. Each year, on the date of our annual meeting of stockholders, each non-employee director that is re-elected receives a grant of an equity award that will vest in full upon the earlier of the first anniversary of the grant date and the next annual meeting of stockholders. The exercise price per share of equity awards that constitute options is the fair market value of a share of our common stock on the date of the grant of the option. All options have a term of ten years. Non-employee directors elected to serve on the Board at the 2021 annual meeting of stockholders were granted options to purchase 15,000 shares of common stock.

The following table sets forth information regarding cash and non-cash compensation earned by or paid to each of our non-employee directors serving as directors during 2021.

Name	Fees Earned or Paid in Cash (\$)	Option Awards (\$)(1)(2)	Total (\$)
Anthony E. Altig	65,000	47,613	112,613
Gina Consylman	50,000	47,613	97,613
Richard D. DiMarchi, Ph.D.	50,000	47,613	97,613
Myron Z. Holubiak	60,000	47,613	107,613
Michael Houghton	20,625	82,412	103,037
Lisa Johnson-Pratt	28,125	95,227	123,352
Susan Mahony, Ph.D.	54,375	47,613	101,988
William R. Ringo, Jr.	107,500	47,613	155,113

- (1) As of December 31, 2021, our non-employee directors held the following unexercised options to purchase shares of our common stock: Mr. Altig, 134,000 shares; Ms. Consylman, 35,000 shares; Dr. DiMarchi, 134,000 shares; Mr. Holubiak, 134,000 shares; Dr. Houghton, 30,000 shares; Dr. Johnson-Pratt, 30,000 shares; Dr. Mahony, 62,500 shares; and Mr. Ringo, 119,000 shares. Our non-employee directors did not hold any other equity awards as of such date. In connection with joining the Board in 2021, Dr. Houghton and Dr. Johnson-Pratt each received awards of 30,000 stock options. All other directors received awards of 15,000 stock options in connection with their re-election to the Board.
- (2) The reported amounts in the table above represent the aggregate grant date fair value of the options granted in 2021 computed in accordance with Financial Accounting Standards Boards (FASB) Accounting Standards Codification Topic 718, *Compensation—Stock Compensation* (ASC Topic 718). Assumptions used in the calculation of these amounts are included in Note 9 of the consolidated financial statements included in our Annual Report on Form 10-K for the year ended December 31, 2021.

Stockholder Communications

Stockholders and other interested parties may communicate with the Board by writing to Jason A. Okazaki, our Chief Operating Officer and Corporate Secretary, at Assembly Biosciences, Inc., 331 Oyster Point Blvd., Fourth Floor, South San Francisco, California 94080. Upon receipt of a stockholder communication indicating a desire to communicate with the Board, Mr. Okazaki will review the communication and determine whether the communication should be directed to the Board or any individual director. All communications will be forwarded in this manner; provided, however, that Mr. Okazaki reserves the right not to forward to the Board or any individual director any materials that he deems in his reasonable discretion to be unduly frivolous, hostile, threatening or similarly inappropriate for communication to the Board or any individual director.

Stockholder Engagement

General

Senior management regularly engages with our stockholders at industry conferences and investor meetings. In response to feedback gained through our engagement program, we remain focused on delivering on our research and clinical development strategies, and we continue to enhance the transparency and disclosure of our financial, operational and environmental and governance performance.

Our investor relations team keeps the Board regularly updated on the views of stockholders and provides reports from financial and other advisers concerning institutional stockholder feedback.

Say on Pay Outreach

In response to our 2021 Say on Pay proposal, in which approximately 74% of the shares voted supported our executive compensation program, we conducted a stockholder outreach program in October and November 2021. During our outreach efforts, we contacted our top 20 stockholders as of September 2021, which represented 53% of our outstanding shares, held by nine fund managers, one private equity fund, nine hedge funds and one venture capital firm.

Three stockholders, each in our top five holders, requested a meeting in response to our outreach. The meetings focused primarily on our executive compensation program, particularly a perceived misalignment between pay and performance. In each meeting, we explained that we have experienced recent steep declines in our stock price, as the stock price fell approximately 70% in 2020 and approximately 62% in 2021. These declines have resulted from a combination of (1) disappointing results of Study 211 released in late 2020, in which all patients relapsed, indicating that no patients were cured of HBV and (2) our discontinuation of clinical development of 2158 due to elevated ALT levels in our Phase 2 study, which was announced in September 2021. While these results can be expected to impact our stock price, the declines have been exacerbated by well documented, sector-wide weakness in the biotech market that began in early 2021 and accelerated near the end of 2021.

As a result of these steep declines, use of models relying on Grant Date Fair Value (GDFV) of equity awards result in an apparent disconnect between pay and performance. We believe focus on Realizable Pay (RP) is a more appropriate measurement of alignment. For additional information regarding GDFV and RP, see “Executive Compensation—Executive Summary—Alignment of Pay and Performance.”

We plan to continue our robust outreach efforts and to engage in additional outreach in the lead up to our 2022 Say on Pay vote.

Environmental, Social and Governance Focus

Management and the Board recognize that, as we continue to grow and advance our pipeline of product candidates, it is important to also focus our corporate responsibility programs on issues that support long-term sustainability of our operations and manage relevant environmental, social and governance (ESG) risks. In 2020, we highlighted our programs, achievements and future plans on ESG issues by adding a sustainability section to our corporate website, which can be found at www.assemblybio.com/sustainability, and we updated this site in 2021. The information posted on our website is not intended to be incorporated into this proxy statement.

PROPOSAL NO. 2: ADVISORY VOTE TO APPROVE OUR NAMED EXECUTIVE OFFICERS' COMPENSATION

General

Under the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (the Dodd-Frank Act) and Section 14A of the Exchange Act, our stockholders are entitled to vote to approve, on a non-binding advisory basis, the compensation of our named executive officers (NEOs) as disclosed in this proxy statement in accordance with SEC rules. This vote is commonly known as the "Say on Pay" vote. This vote is not intended to address any specific item of compensation, but rather our NEOs' overall compensation and the philosophy, policies and practices described in this proxy statement.

We provide our stockholders with the opportunity to cast an advisory vote on our NEOs' compensation every year. Approximately 74% of the votes cast on our Say on Pay vote were voted in favor of the proposal in 2021.

Our NEOs' compensation addressed by this vote is disclosed in the "Executive Compensation" section of this proxy statement and the compensation tables and the related narrative disclosure contained in this proxy statement. As discussed in these disclosures, our compensation philosophy is to provide competitive overall compensation that attracts and retains top performers. To achieve these goals, our compensation program is structured to:

- provide a mix of compensation that offers (1) targeted annual performance-based cash bonus opportunities based on Company-wide performance against Board-approved corporate goals weighted to reflect their relative importance to the achievement of our goals, measured over a 12-month period and, for all employees other than our CEO, performance against individual performance objectives set by our employees in consultation with their managers, which may include certain department, group or team objectives applicable to these employees, and (2) the opportunity to share in our long-term success through equity incentive awards, including, in certain circumstances, performance-based equity awards;
- provide market-competitive base salaries, performance-based cash bonus opportunities, long-term equity awards and other compensation components and benefits that are competitive with those companies that compete with us for available high caliber talent; and
- deliver equitable pay for our NEOs, considering each NEO's title, role, breadth and complexity of responsibility, criticality of the role to the organization, experience, qualifications and performance, in both an individual and team context.

Accordingly, the Board is asking stockholders to indicate their support for the compensation of our NEOs as described in this proxy statement by casting a non-binding advisory vote "FOR" the following resolution:

"RESOLVED, that the Company's stockholders hereby approve, on a non-binding advisory basis, the compensation of the Company's named executive officers, as disclosed in the proxy statement for the 2022 Annual Meeting of Stockholders pursuant to the compensation disclosure rules of the Securities and Exchange Commission, including the compensation tables and narrative discussion in the proxy statement for the 2022 Annual Meeting of Stockholders."

The "Executive Compensation" section of this proxy statement contains more details on our NEOs' compensation, and we urge you to read it carefully before casting your vote on this proposal. Because the vote is advisory, it is not binding on us, the Board or the Compensation Committee. Nevertheless, as demonstrated by our stockholder outreach in October and November 2021 and continued engagement efforts going forward, the views expressed by our stockholders, whether through this vote or otherwise, are important to our management, the Board and the Compensation Committee. Our management, the Board and the Compensation Committee intend to consider the results of this vote in making recommendations and determinations in the future regarding executive compensation arrangements and our executive compensation principles, policies and procedures.

We submit the compensation of our NEOs to our stockholders for a non-binding advisory vote on an annual basis. Accordingly, the next stockholder advisory vote on the compensation of our NEOs after the Annual Meeting is expected to take place at the 2023 Annual Meeting of Stockholders. The next non-binding advisory vote on the frequency of such non-binding advisory votes will occur no later than our 2024 annual meeting of stockholders.

Required Vote

Assuming a quorum is present, to be approved, the affirmative vote of the majority of the votes cast on Proposal No. 2 must be voted “FOR” the approval, on a non-binding advisory basis, of our NEOs’ compensation as disclosed in this proxy statement. Abstentions and broker non-votes will not be considered towards vote totals on Proposal No. 2 and will have no effect on the outcome of the vote.

Recommendation of the Board of Directors

THE BOARD OF DIRECTORS RECOMMENDS A VOTE “FOR” THE APPROVAL, ON A NON-BINDING ADVISORY BASIS, OF OUR NAMED EXECUTIVE OFFICERS’ COMPENSATION.

MATTERS RELATING TO OUR INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

Pre-Approval Policies and Procedures

The charter of the Audit Committee provides for Audit Committee preapproval of all auditing services and the terms thereof (which may include providing comfort letters in connection with underwritten securities offerings) and non-audit services (other than non-audit services prohibited under Section 10A(g) of the Exchange Act or the applicable rules of the SEC or the Public Company Accounting Oversight Board) to be provided to us by our independent registered public accounting firm. The preapproval requirement is waived with respect to the provision of non-audit services for us if the “de minimis” provisions of Section 10A(i)(1)(B) of the Exchange Act are satisfied. This authority to preapprove non-audit services may be delegated to one or more members of the Audit Committee, who shall present all decisions to pre-approve an activity to the full Audit Committee at its first meeting following such decision. The Audit Committee pre-approved all services provided by Ernst & Young LLP, our independent registered public accounting firm for the fiscal years ended December 31, 2021 and 2020.

Fees and Services

The following table represents aggregate fees billed to us for services related to the fiscal years ended December 31, 2021 and 2020 by Ernst & Young LLP, our independent registered public accounting firm:

Fees	2021	2020
Audit Fees(1)	\$ 1,309,944	\$ 1,702,583
Tax Fees(2)	88,190	143,582
All Other Fees(3)	530	2,340
Total	<u>\$ 1,398,664</u>	<u>\$ 1,848,505</u>

- (1) In 2021, Audit Fees consisted of fees and expenses covering the audit of our consolidated financial statements, review of the interim condensed consolidated financial statements, statutory audits, accounting and financial reporting consultations, and the issuance of consents in connection with registration statement filings with the SEC and comfort letters in connection with registered securities offerings. In 2020, Audit fees consisted of fees and expenses covering the integrated audit of our consolidated financial statements, our internal control over financial reporting, review of the interim condensed consolidated financial statements, statutory audits, accounting and financial reporting consultations, and the issuance of consents in connection with registration statement filings with the SEC and comfort letters in connection with registered securities offerings.
- (2) Tax Fees consisted of fees and expenses for corporate tax compliance, routine on-call tax services, international tax advisory services, indirect (non-income) tax advisory and tax incentives and domestic tax advisory services.
- (3) All Other Fees consisted of fees billed in the indicated year for an annual subscription to Ernst & Young LLP’s online resource library.

All of the services described above were pre-approved by our Audit Committee. The Audit Committee concluded that the provision of these services by Ernst & Young LLP would not affect their independence.

Report of the Audit Committee of the Board of Directors

The Audit Committee reviews our financial reporting process on behalf of the Board. Management has the primary responsibility for the preparation and integrity of the consolidated financial statements and the reporting process, including establishing and monitoring the system of internal financial controls. In this context, the Audit Committee hereby reports as follows:

1. The Audit Committee has reviewed and discussed our audited consolidated financial statements and internal control over financial reporting for the year ended December 31, 2021 with management.
2. The Audit Committee has discussed with Ernst & Young LLP, our independent registered public accounting firm, who is responsible for expressing an opinion on the conformity of our consolidated financial statements with generally accepted accounting principles in the United States, its judgments as to the quality, not just the acceptability, of our accounting principles and such other matters required to be

discussed by the applicable requirements of the Public Company Accounting Oversight Board (PCAOB) and the U.S. Securities and Exchange Commission.

3. The Audit Committee has received the written disclosures and the letter from Ernst & Young LLP required by the PCAOB regarding the independent accountant's communications with the Audit Committee concerning independence and has discussed with Ernst & Young LLP its independence from the Company and management.
4. Based on the review and discussions described above, among other things, the Audit Committee has recommended to the Board that the audited consolidated financial statements and management's assessment of the effectiveness of our internal control over financial reporting be included in our Annual Report on Form 10-K for fiscal year ended December 31, 2021.

Submitted by: The Audit Committee
 Anthony E. Altig, Chair
 Gina Consylman
 William R. Ringo, Jr.

PROPOSAL NO. 3: RATIFICATION OF THE SELECTION OF THE INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

General

The Audit Committee has selected Ernst & Young LLP as our independent registered public accounting firm for the fiscal year ending December 31, 2022. Ernst & Young LLP has served as our independent registered public accounting firm since 2015.

Neither our Amended and Restated Bylaws nor other governing documents or law require stockholder ratification of the selection of Ernst & Young LLP as our independent registered public accounting firm. However, the Board is submitting the selection of Ernst & Young LLP to the stockholders for ratification as a matter of good corporate practice. If the stockholders fail to ratify the selection, the Audit Committee will reconsider whether to retain Ernst & Young LLP. Even if the selection is ratified, the Audit Committee, in its discretion, may direct the appointment of different independent registered public accounting firm at any time during the year if the Audit Committee determines that such a change would be in the best interest of the Company and its stockholders. Representatives of Ernst & Young LLP are expected to attend the Annual Meeting, where they will have an opportunity to make a statement and be available to respond to appropriate questions.

Required Vote

Assuming a quorum is present, to be approved, the affirmative vote of the majority of the votes cast on Proposal No. 3 must be voted "FOR" the ratification of the selection of Ernst & Young LLP as our independent registered public accounting firm for the fiscal year ending December 31, 2022. Abstentions and broker non-votes will not be considered towards vote totals on Proposal No. 3.

Recommendation of the Board of Directors

THE BOARD OF DIRECTORS RECOMMENDS A VOTE "FOR" THE RATIFICATION OF THE SELECTION OF ERNST & YOUNG LLP AS OUR INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM.

Background

On May 30, 2018, we adopted the Assembly Biosciences, Inc. 2018 Stock Incentive Plan, which has been subsequently amended by Amendment No. 1 to Assembly Biosciences, Inc. 2018 Stock Incentive Plan effective as of May 17, 2019, Omnibus Amendment to Assembly Biosciences, Inc. Stock Plans effective as of March 11, 2020, Amendment No. 3 to Assembly Biosciences, Inc. 2018 Stock Incentive Plan, effective as of June 11, 2020 and Amendment No. 4 to Assembly Biosciences, Inc. 2018 Stock Incentive Plan, effective as of May 20, 2021 (as amended from time to time, the 2018 Plan). The 2018 Plan provides for the grant of equity awards to our employees, non-employee directors and consultants and is necessary to ensure that we can continue to grant equity awards to eligible recipients at levels determined to be appropriate by the Board, the Compensation Committee and/or the Chief Executive Officer pursuant to his Board delegated authority.

As of March 28, 2022, there were stock options to acquire 6,048,294 shares of common stock and 13,635 cash settled stock appreciation rights (SARs) outstanding under our equity compensation plans. In addition, there were 529,052 shares subject to unvested restricted stock units (RSUs) with time-based vesting and 374,214 shares subject to unvested RSUs with performance-based vesting outstanding under our equity compensation plans. As of March 28, 2022, there were approximately 4,442,171 shares of common stock available and unallocated under our equity compensation plans, of which 234,169 shares are only issuable as inducement awards to new employees under our 2017 Inducement Award Plan, our 2019 Inducement Award Plan and our 2020 Inducement Award Plan collectively. As a result, as of March 28, 2022, there were approximately 4,208,002 shares of common stock available under our shareholder approved plans, of which 3,477,513 shares of common stock remain available and unallocated for issuance under the 2018 Plan.

After the record date for the Annual Meeting, on March 29, 2022, we issued an aggregate of annual performance equity awards to our employees totaling 2,204,825 shares of common stock, which consisted of stock options to acquire 1,460,550 shares of our common stock, 475,275 RSUs with time-based vesting, 255,000 RSUs with performance-based vesting and 14,000 cash settled SARs under our 2018 Plan. As a result, as of March 29, 2022, there were 1,272,688 shares of common stock available and unallocated for issuance under the 2018 Plan.

We also expect to issue an additional 140,000 stock options under the 2018 Plan at the Board meeting immediately following the Annual Meeting in connection with the re-election of seven non-employee directors.

On March 10, 2022, the Board, upon the recommendation of the Compensation Committee and subject to the approval of our stockholders at the Annual Meeting, approved Amendment No. 5 to the 2018 Plan (the Amendment) to increase the number of shares reserved under the 2018 Plan from 6,600,000 to 8,600,000 (as further amended, the Amended Plan). The proposed increase of 2,000,000 shares equals approximately 4.2% of the Company's outstanding shares. It should be noted that in Proposal No. 6 (approval of a stock option exchange program for non-executive employees) is approved and the exchange is conducted, shares from exchanged options that are in excess of the shares needed to issue replacement grants (as described in Proposal No. 6) will not be returned to the plan pool under the 2018 Plan.

Purpose

The purpose of the Amended Plan is to encourage ownership in the Company by our employees, directors and consultants and our affiliates whose long-term employment by, or involvement with, us is considered essential to our continued progress. Our culture of ownership aligns the interests of equity award recipients and stockholders and also permits award recipients to share in our success alongside our stockholders. The Amended Plan provides an essential component of the total compensation package offered to our employees and other 2018 Plan participants. It reflects the importance that we place on both motivating and retaining employees and other 2018 Plan participants to achieve superior results over the long term and rewarding our employees and other 2018 Plan participants based on long-term achievements. We strongly believe that our equity compensation programs and emphasis on employee and non-employee director stock ownership have been integral to building and retaining a strong employee base. We also believe these programs have contributed to our continued pipeline progress and serve as valuable motivation for our employees as we seek to achieve superior performance in the future. All of our, and our affiliates', employees, directors and our consultants are eligible to participate in the Amended Plan.

The purpose of the Amendment is to increase the number of shares reserved for issuance under the 2018 Plan by 2,000,000 shares. We believe the ability to grant market-competitive equity awards is a necessary and powerful recruiting and retention tool for us to attract and retain the quality and number of personnel we need to continue the forward momentum of our business. Our employees are critical to the continued development of: (1) our lead core inhibitor product candidate in our hepatitis B virus (HBV) program, vebicorvir (VBR), which is in ongoing Phase 2 clinical studies evaluating VBR in combination with other HBV therapeutics with different mechanisms of action, the advancement of our next generation core inhibitor product candidates; (2) ABI-H3733 (currently in Phase 1b clinical studies) and ABI-4334 (currently undergoing Investigational New Drug enabling studies), through clinical development; (3) a HBV/hepatitis D virus (HDV) entry inhibitor, molecules that disrupt covalently closed circular DNA (cccDNA); and (4) a small molecule targeting a novel, currently undisclosed target to add to combination treatments with our core inhibitor product candidates, as well as other small molecules targeting other novel, currently undisclosed targets outside of HBV.

We believe that 2,000,000 shares is a modest increase that will be sufficient to meet our retention and anticipated hiring needs until the next annual meeting of stockholders and will underpin one of our core compensation philosophies, pay for performance, by giving our employees and other 2018 Plan participants the opportunity to share in our long-term success and motivate the creation of long-term stockholder value through equity compensation.

Rationale

We believe you should vote to approve the Amendment for the following reasons:

- *Ability to continue to make equity grants helps us avoid unnecessary business disruption.* If the Amendment is not approved, we may have to restructure existing compensation programs for reasons not directly related to the achievement of our business objectives. Such restructuring will likely necessitate the replacement of components of compensation to be awarded in equity with cash, or with other instruments that may not necessarily align employee interests with those of stockholders as effectively as equity awards do. If we were to replace equity awards with cash, this would divert our cash reserves away from our research and development activities and our clinical studies, which would negatively impact the progress of our product candidates and research and development activities, and in turn, impair stockholder value. We believe that such actions would be highly disruptive to both our business and our employees.
- *We are committed to sound equity compensation practices.* We recognize that equity compensation awards dilute stockholder equity and must be used prudently. We strive to align our compensation practices with industry norms among our peer group described in this proxy statement under “Executive Compensation—Executive Summary—How We Determine Executive Compensation—Role of the Compensation Committee; Oversight of Executive Compensation—Peer Group Process.” We believe our use of equity has consistently been responsible and mindful of stockholder interests.
- *Equity awards align the interests of management with those of stockholders.* We believe the grant of equity awards, particularly stock options and performance-based vesting RSUs, are effective tools to align management and stockholder interests, as management only realizes value from these awards if our stock price appreciates and meaningful performance metrics are achieved.
- *The Amended Plan contains provisions that protect stockholder interests.* The Amended Plan contains features designed to strongly align the interests of our employees and directors with those of our stockholders, including a minimum vesting requirement of one year for all time-vesting awards that are made to employees, subject to acceleration in the event of death, disability, retirement, separation of service or a Corporate Transaction (as defined below), and a minimum vesting requirement of the earlier of (1) one year and (2) the next annual meeting of the stockholders for time-based vesting awards that are made to directors, subject to acceleration in the event of death, disability or a Corporate Transaction (as discussed below). The Amended Plan also has no automatic acceleration of vesting provisions upon a Corporate Transaction unless the equity awards are not assumed in connection with the Corporate Transaction.

- *Equity compensation helps us to attract and retain talent.* A talented, motivated and effective management team and workforce are essential to our continued progress. Equity compensation is an important component of our total compensation because we believe it will incentivize managers and employees to think and act like owners. Our employees are our most valuable assets, and the equity awards granted under the Amended Plan are vital to our ability to both attract and retain outstanding and highly skilled team members. To align the interests of our new hires with those of our current stockholders, our practice is to provide new hires with meaningful initial equity awards upon hiring. Of the 2,242,711 shares of common stock underlying equity awards granted in 2021, approximately 15% were issued to new hires, 23% were issued as retention awards to existing employees and 7% were issued to non-employee directors. We plan to continue our practice of providing meaningful initial equity awards to new hires, as well as making annual performance awards and retention award grants to existing employees to ensure continued alignment with our stockholders. We believe that our stockholders' long-term interests are best served by maintaining these equity compensation practices. If the Amendment is not approved by stockholders, retaining the best talent will be increasingly difficult, particularly during the current highly competitive labor market as the number of shares available and unallocated under the 2018 Plan is projected to fall below the number of shares of common stock that we will need to grant annual performance equity awards to employees in 2023 at levels comparable to those granted in 2022.
- *We recruit employees in highly competitive labor markets and need to provide competitive compensation arrangements to attract and retain talent.* The San Francisco Bay Area, where we are headquartered and where 80% of our employees are located, is among the most challenging markets in the world for hiring, particularly for life sciences and biotechnology companies. The challenges of recruiting in the Bay Area have been exacerbated by recent hiring trends, as the labor market nationwide has become increasingly competitive over the last several years. To continue to attract and retain an experienced and highly educated workforce with the skills necessary to advance our programs, we need to offer competitive compensation packages consisting of attractive cash and equity components. Our Compensation Committee has retained Aon's Human Capital Solutions practice, which is a part of Aon plc (Aon) to serve as an independent outside compensation consultant. In this capacity, Aon collects and analyzes compensation information from a comparative group of biotechnology companies and provides us with recommendations regarding these compensation packages.
- *Our current equity-pay mix aligns employee incentives with stockholder gains.* Our employee compensation consists of base salary payable in cash, annual performance-based cash bonuses and long-term incentives in the form of equity awards. Our annual long-term performance equity incentive award grants are a combination of stock option and RSUs; however, in certain circumstances, the Compensation Committee may consider other equity awards under the Amended Plan, including restricted stock, SARs and dividend equivalent rights. Equity awards provide effective incentives for our employees to work toward achieving business results and scientific advances that will increase the long-term value of our stock as employees only realize value from stock options and SARs if the shares of common stock appreciate and the value of other equity awards depends on the price of our common stock.

2019 – 2021 Burn Rate and Outstanding Awards Overhang

The following tables provide certain additional information regarding our equity incentive program and our equity burn rate over the last three years and overhang as of March 29, 2022. Note that burn rate and overhang are calculated on a non-diluted basis.

Burn Rate

In late 2019, we began the transition of our leadership from our remaining founders to an executive team led by John G. McHutchison, A.O., M.D. After Dr. McHutchison joined us, Luisa M. Stamm, M.D., Ph.D., our Chief Medical Officer, and a new Chief Financial Officer, who left the Company in June 2021, each joined in 2019. In 2020, Jason A. Okazaki, now our Chief Operating Officer, joined as Chief Legal and Business Officer, William E. Delaney IV, Ph.D. joined as Chief Scientific Officer and Nicole S. White, Ph.D., now our Chief Manufacturing Officer, joined as SVP of Pharmaceutical Development and Manufacturing. In each case, these critical hires were offered total compensation packages that included inducement equity grants.

In 2021, we completed the wind-down of our Microbiome program, which included all of our Microbiome staff leaving the company, and the Chief Financial Officer hired in 2019 left the Company. Both of these events resulted in significant forfeitures of awards. Also in 2021, due to the steep declines of our stock price in 2020 and 2021, we implemented a broad-based supplemental equity award program, which led to more awards being granted than occurs in a typical year. For full details regarding the supplemental equity award program, see “Executive Compensation—Summary Compensation Table—Narrative Disclosure to Summary Compensation Table—Long-Term Equity Incentive Awards—Performance-Based Retention Equity Grants.”

Burn Rate	2019	2020	2021
Stock options granted	1,948,700	1,649,340	1,521,370
Full value shares granted	465,428	536,164	721,341
Total equity awards	2,414,128	2,185,504	2,242,711
Weighted average common shares outstanding	26,258,790	35,427,120	43,280,383
Burn rate(1)	9.2%	6.2%	5.2%
Total equity awards forfeited	512,582	501,403	2,337,635
Net burn rate(2)	7.2%	4.8%	-0.2%

- (1) Burn Rate equals number of shares subject to equity awards granted during a fiscal year divided by weighted average common shares outstanding for that fiscal year.
- (2) Net Burn Rate equals (a) number of shares subject to equity awards granted during a fiscal year minus total equity awards forfeited during that fiscal year, divided by (b) weighted average shares of common stock outstanding for that fiscal year.

Outstanding Awards Overhang

Prior to 2018, in connection with our founders and certain other employees leaving the Company, it was the Company’s practice to extend stock options until the end of their ten-year term rather than cause them to be forfeited following those employees’ departures. No members of the leadership team that began and continued that practice remain with the Company. This practice has caused our overhang to be higher than many of our peer companies due to the large number of equity awards held by former employees. As time passes, we expect our overhang pressure to be significantly reduced. For example, 927,238 stock options held by former members of management are scheduled to expire in 2024. However, until these legacy awards expire or are exercised, it is imperative that we maintain a sufficient number of shares under the 2018 Plan for the reasons described above under “Rationale.”

Current Overhang (As of March 29, 2022)

Total number of shares of common stock subject to outstanding stock options(1)	7,508,844
Weighted-average exercise price of outstanding stock options	\$ 9.86
Weighted-average remaining term of outstanding stock options	6.98 years
Total number of shares of common stock subject to outstanding full value awards(2)	1,633,541
Total number of shares of common stock available for grant under our equity compensation plans	2,237,346
Total number of shares of common stock subject to outstanding stock options and outstanding full value awards(1)(2)	9,142,385
Total number of shares of common stock outstanding	48,120,437
Per-share closing price of common stock as reported on Nasdaq Global Select Market	\$ 2.30

- (1) Includes shares underlying stock options that will not be available to return to the 2018 Plan if such stock options are forfeited or terminate, including the following: 278,369 under the 2010 Equity Incentive Plan (2010 Plan); 1,747,501 under the Assembly Biosciences, Inc. Amended and Restated 2014 Stock Incentive Plan (2014 Plan); 588,540 under the 2017 Inducement Award Plan (2017 Inducement Plan); 500,000 under the 2019 Inducement Award Plan (2019 Inducement Plan); 662,769 under the 2020 Inducement Award Plan (2020 Inducement Plan); and 466,238 options assumed by us in connection with our merger with Assembly Pharmaceuticals.
- (2) Includes shares underlying RSUs that will not be available to return to the 2018 Plan if such RSUs are forfeited or terminated, including the following: 7,077 under the 2014 Plan; 7,500 under the 2017 Inducement Plan; and 58,750 under the 2020 Inducement Plan.

We also expect to issue an additional 140,000 stock options under the 2018 Plan at the Board meeting immediately following the Annual Meeting in connection with the election of seven non-employee directors.

The closing price of our common stock as reported on The Nasdaq Global Select Market on March 28, 2022, the record date for this annual meeting, was \$2.18.

Material Terms of the Amended Plan

The following is a summary of the principal provisions of the Amended Plan and its operation, including the proposed Amendment. A copy of the proposed Amendment is attached as Appendix A to this proxy statement. A copy of the full 2018 Plan (as amended to date), with proposed deletions indicated by strike-out and proposed revisions to be made by the Amendment indicated by bold and underline, is attached as Appendix B to this proxy statement and is incorporated herein by reference. The following description of the Amended Plan does not purport to be complete and is qualified in its entirety by reference to Appendix B. Capitalized terms used in this summary and not otherwise defined will have the meanings ascribed to such terms in the Amended Plan.

Purpose of the Amended Plan. The purpose of the Amended Plan is to encourage ownership in the Company by employees, directors and consultants of the Company and its affiliates whose long-term employment by or involvement with the Company is considered essential to our continued progress and, thereby, aligning the interests of the award recipients and stockholders and permitting the award recipients to share in our success. The Amended Plan provides an essential component of the total compensation package offered to our employees and other plan participants. It reflects the importance we place on motivating employees and other plan participants to achieve superior results over the long-term and paying employees and other plan participants based on such achievements. We strongly believe that our equity compensation programs and emphasis on employee and non-employee director stock ownership have been integral to our progress and that a continuation of, and emphasis on, those programs is necessary for us to achieve superior performance in the future. All of our employees, directors and consultants and those of our affiliates are eligible to participate in the Amended Plan.

Types of Awards. The Amended Plan provides for the grant of non-qualified and incentive stock options (Options), SARs, dividend equivalent rights, unrestricted stock, restricted stock, RSUs or other rights or benefits under the Amended Plan (collectively, Awards).

Shares Subject to the Amended Plan. No more than 8,600,000 shares of common stock may be issued pursuant to Awards under the Amended Plan. The number of shares available for Awards, as well as the terms of outstanding Awards, are subject to adjustment as provided in the Amended Plan for stock splits, stock dividends, recapitalizations and other similar events.

Each share of common stock subject to an Award granted pursuant to the Amended Plan will reduce the aggregate number of shares available under the Amended Plan by one share of common stock. Any shares of common stock that again become available for issuance under the Amended Plan due to a forfeiture, expiration or cancellation of an Award (or if the Award otherwise becomes unexercisable) will generally be added back to the aggregate plan limit of the Amended Plan in this same manner and such shares will again be available for subsequent Awards, except as prohibited by law. In the event any Option or other Award granted under the Amended Plan is exercised through the tendering of shares of common stock (either actually or through attestation) or withholding shares of common stock, or in the event tax withholding obligations are satisfied by tendering or withholding shares of common stock, any shares of common stock so tendered or withheld shall not again be available for awards under the Amended Plan. Shares of Common Stock subject to a SAR granted pursuant to Section 6(k) of the Amended Plan that are not issued in connection with cash or stock settlement of the exercise of the SAR shall not again be available for award under the Amended Plan. Shares of common stock reacquired by the Company on the open market or otherwise using cash proceeds from the exercise of Options shall not be available for awards under the Amended Plan.

Director Compensation Limit. The Amended Plan provides that the grant date value of all Awards awarded under the Amended Plan and all other cash compensation paid by the Company to any non-employee director in any calendar year shall not exceed \$1,000,000.

Administration. The Amended Plan will be administered by the Board or a committee designated by the Board (the Committee), which committee is constituted in such a manner as to satisfy the applicable laws and to permit such

grants and related transactions under the Amended Plan to be exempt from Section 16(b) of the Exchange Act in accordance with Rule 16b-3. Once appointed, such Committee shall continue to serve in its designated capacity until otherwise directed by the Board. Currently, the Compensation Committee generally serves as the Committee specified in the Amended Plan and acts as the administrator thereunder; however, the Board delegated authority to our Chief Executive Officer acting as a committee of one to serve as the administrator in the context of granting awards under the Amended Plan to newly hired employees or in connection with promotions to individuals that are not Section 16 officers, direct reports of the Chief Executive Officer or above the level of Vice President. Awards granted by the Chief Executive Officer are limited to a preset range prepared in consultation with our Compensation Consultant and consistent with our compensation philosophy. We refer to the entity or individual administering the Amended Plan as the Administrator.

Subject to the terms of the Amended Plan, the Administrator has express authority to determine the employees, directors or consultants who will receive Awards, the number of shares of common stock or other consideration to be covered by each Award, and the terms and conditions of Awards. The administrator has broad discretion to prescribe, amend and rescind rules relating to the Amended Plan and its administration, to interpret and construe the Amended Plan and the terms of all Award agreements, and to take all actions necessary or advisable to administer the Amended Plan or to effectuate its purposes. Subject to the terms of the Amended Plan, the administrator may accelerate the vesting of any Award, allow the exercise of unvested Awards, and may modify, replace, cancel or renew any Award.

Indemnification. We will indemnify and defend members of the Committee and their delegates to the extent permitted by law on an after-tax basis against all reasonable expenses, including attorneys' fees, actually and necessarily incurred in connection with the defense of any claim, investigation, action, suit or proceeding, or in connection with any appeal therein, to which they or any of them may be a party by reason of any action taken or failure to act under or in connection with the Amended Plan, or any Award granted thereunder, and against all amounts paid by them in settlement thereof (provided such settlement is approved by the Company) or paid by them in satisfaction of a judgment in any such claim, investigation, action, suit or proceeding, except in relation to matters as to which it shall be adjudged in such claim, investigation, action, suit or proceeding that such person is liable for gross negligence, bad faith or intentional misconduct; provided, however, that within 30 days after the institution of such claim, investigation, action, suit or proceeding, such person shall offer to us, in writing, the opportunity at our expense to defend the same.

Minimum Vesting. Time-based awards granted to employees under the Amended Plan are subject to a one-year minimum vesting requirement other than in the case of death, disability, retirement, separation of service or a Corporate Transaction. Time-based awards granted to directors under the Amended Plan may not vest until the earlier of one year from the grant date and the next annual meeting of the stockholders, other than in the case of death, disability or a Corporate Transaction.

Eligibility. The Administrator may grant Options that are intended to qualify as incentive stock options (ISOs) only to employees of the Company or an affiliate that is a "parent corporation" or "subsidiary corporation" within the meaning of Section 424 of the Code, and may grant all other Awards to any employee, director or consultant. The Amended Plan and the discussion below use the term "Grantee" to refer to the holder of an Award, or the shares of common stock issuable or issued upon exercise, vesting or settlement of an Award, under the Amended Plan.

Options. Options granted under the Amended Plan provide Grantees with the right to purchase shares of common stock at a predetermined exercise price. The Administrator may grant Options that are intended to qualify as ISOs or Options that do not so qualify (Non-Qualified Stock Options). To qualify as ISOs, Options must meet additional federal tax requirements, including a \$100,000 limit on the value of shares subject to ISOs that first become exercisable by a Grantee in any one calendar year.

Exercise Price of Options. The exercise price of ISOs granted to Grantees who own more than ten percent of the common stock of the Company or an affiliate on the grant date of the ISO may not be less than 110% of the fair market value of the shares of common stock subject to the ISO on the grant date. The exercise price of all other Options may not be less than 100% of the fair market value of the shares of common stock subject to the Option on the grant date.

Exercise of Options. To the extent exercisable in accordance with the applicable Award agreement, each Option may be exercised in whole or in part, and from time to time during its term, subject to earlier termination relating to a Grantee's termination of continuous service. With respect to Options, the Administrator has the discretion to accept payment of the exercise price by any of the following methods (or any combination of them): cash or check in U.S. dollars, promissory note with such recourse, interest, security and redemption provisions as the Administrator determines, surrender of shares of common stock, broker assisted exercise, with respect to Options that are not ISOs, by net exercise or by past or future services rendered to the Company or an affiliate. No more than 4,600,000 shares of common stock may be granted in the form of incentive stock options.

Prohibition on Repricing. Except in connection with certain corporate adjustment events, we may not, without stockholder approval, amend an Award granted under the Amended Plan to reduce the Award's exercise price per share, cancel and regrant new Awards with lower prices per share than the original price per share of the cancelled Awards, or cancel any Awards in exchange for cash or the grant of replacement Awards with an exercise price that is less than the exercise price of the original Awards, essentially having the effect of a repricing.

Restricted Stock and Restricted Stock Units. The Administrator may grant (1) shares of restricted stock that are forfeitable until certain vesting requirements are met and (2) RSUs that represent the right to receive payment, in cash or in shares of common stock or other securities or a combination thereof, subject to the passage of time and continuous service or the attainment of performance criteria as established by the Administrator. The Administrator has discretion to determine the terms and conditions under which a Grantee's interests in restricted stock and RSUs become vested and non-forfeitable.

Unrestricted Stock. The Administrator may grant unrestricted stock in lieu of paying cash compensation.

Dividend Equivalent Rights. The Administrator may grant awards of dividend equivalent rights, which entitle the Grantee to compensation measured by dividends paid with respect to shares of common stock.

Income Tax Withholding. As a condition for the issuance of shares of common stock pursuant to Awards, the Amended Plan requires the Grantee to make such arrangements as we may require for satisfaction of any applicable federal, state, local or foreign withholding tax obligations that may arise in connection with the Award or the issuance of shares of common stock. Subject to approval by the Administrator, Grantees may elect to have their tax withholding obligations satisfied by tendering previously owned shares of common stock or authorizing the Company to withhold shares of common stock to be issued pursuant to exercise or vesting. Any shares held back to satisfy such tax withholding will not be available for future issuance under the Amended Plan.

Transferability. Unless the Administrator provides otherwise, in its sole discretion, no Award may be sold, pledged, assigned, hypothecated, transferred, or disposed of in any manner other than by will or by the laws of descent or distribution and may be exercised, during the lifetime of the Grantee, only by the Grantee. Notwithstanding the foregoing, the Grantee may designate one or more beneficiaries of the Grantee's Award in the event of the Grantee's death on a beneficiary designation form provided by the Administrator.

Certain Corporate Transactions. Effective upon the consummation of a Corporate Transaction, all outstanding Awards under the Amended Plan shall terminate unless they are assumed or replaced in connection with the Corporate Transaction. To the extent all outstanding Awards granted under the Amended Plan shall terminate, except as may be otherwise expressly provided in the relevant Award Agreement, all Awards with solely time-based vesting that are not vested and/or exercisable immediately prior to the effective time of the Corporate Transaction shall become fully vested and exercisable as of immediately prior to the effective time of the Corporate Transaction and all Awards with conditions and restrictions relating to the attainment of performance goals shall be deemed to vest and become nonforfeitable as of the Corporate Transaction as provided in the relevant Award Agreement or if not provided for in the relevant Award Agreement shall be deemed to vest and become nonforfeitable as of the Corporate Transaction assuming the higher of (a) achievement of all relevant performance goals at the "target" level (prorated based upon the length of time within the performance period that has elapsed prior the Corporate Transaction or partial achievement of the performance goals), or (b) actual achievement of all relevant performance goals as of the date of such Corporate Transaction. In the event of such termination of the Awards, the Company shall have the option (in its sole discretion) to (1) make or provide for a payment, in cash or in kind, to the Grantees holding Options and SARs, in exchange for the cancellation thereof, in an amount equal to the difference between (A) the Sale Price multiplied by the number of Shares subject to outstanding Options and SARs and (B) the aggregate exercise price of all such outstanding Options and SARs (provided that, in the case of an Option or SAR with an exercise price equal to or more than the Sale Price, such Option or SAR shall be cancelled for no

consideration); or (2) permit each Grantee, within a specified period of time prior to the consummation of the Corporate Transaction as determined by the Administrator, to exercise all outstanding Options and SARs (to the extent then exercisable including due to acceleration as contemplated by Section 13(a) of the Amended Plan if the Awards are not assumed or replaced) held by such Grantee as of immediately prior to the effective time of the Corporate Transaction. In the event of a termination of Awards pursuant to Section 13(a) of the Amended Plan, the Company shall also have the option (in its sole discretion) to make or provide for a payment, in cash or in kind, to the Grantees holding other Awards in an amount equal to the Sale Price multiplied by the number of vested Shares under such Awards. For purposes of Section 13(a) of the Amended Plan, "Sale Price" means the value as determined by the Administrator of the consideration payable, or otherwise to be received by stockholders, per share pursuant to a Corporate Transaction.

The Administrator has the authority, exercisable either in advance of any actual or anticipated Corporate Transaction or at the time of an actual Corporate Transaction and exercisable at the time of the grant of an Award under the Amended Plan or any time while an Award remains outstanding, to provide for the full or partial automatic vesting and exercisability of one or more outstanding unvested Awards under the Amended Plan and the release from restrictions on transfer and repurchase or forfeiture rights of such Awards in connection with a Corporate Transaction on such terms and conditions as the Administrator may specify. The Administrator also shall have the authority to condition any such Award vesting and exercisability or release from such limitations upon the subsequent termination of the continuous service of the Grantee within a specified period following the effective date of the Corporate Transaction. The Administrator may provide that any Awards so vested or released from such limitations in connection with a Corporate Transaction shall remain fully exercisable until the expiration or sooner termination of the Award. Any ISOs accelerated in connection with a Corporate Transaction shall remain exercisable as an ISO under the Code only to the extent the \$100,000 limitation of Section 422(d) of the Code is not exceeded.

"Corporate Transaction" means any of the following transactions, provided, however, that the Administrator shall determine under (4) and (5) whether multiple transactions are related, and its determination shall be final, binding and conclusive: (1) a merger or consolidation in which we are not the surviving entity, except for a transaction the principal purpose of which is to change the state in which we are incorporated; (2) the sale, transfer or other disposition of all or substantially all of our assets; (3) the complete liquidation or dissolution of the Company; (4) any reverse merger or series of related transactions culminating in a reverse merger (including, but not limited to, a tender offer followed by a reverse merger) in which we are the surviving entity but (A) the shares of common stock outstanding immediately prior to such merger are converted or exchanged by virtue of the merger into other property, whether in the form of securities, cash or otherwise, or (B) in which securities possessing more than 50% of the total combined voting power of our outstanding securities are transferred to a person or persons different from those who held such securities immediately prior to such merger or the initial transaction culminating in such merger; or (5) acquisition in a single or series of related transactions by any person or related group of persons (other than the Company or by a Company-sponsored employee benefit plan) of beneficial ownership (within the meaning of Rule 13d-3 of the Exchange Act) of securities possessing more than 50% of the total combined voting power of our outstanding securities.

Term of the Amended Plan; Amendments and Termination. The term of the Amended Plan is ten years from May 30, 2018, except that no ISOs may be granted after April 5, 2028. The Board may, from time to time, amend, alter, suspend, discontinue or terminate the Amended Plan; provided, that any amendment to increase the number of shares of common stock available for Awards under the Amended Plan and certain other amendments will be subject to stockholder approval. Additionally, no amendment, suspension or termination of the Amended Plan shall materially and adversely affect Awards already granted unless it relates to an adjustment pursuant to certain transactions that change our capitalization or it is otherwise mutually agreed between the Grantee and the Administrator.

Notwithstanding the foregoing, the Administrator may adopt such amendments to the Amended Plan and the applicable award agreement or adopt other policies and procedures (including amendments, policies and procedures with retroactive effect), or take any other actions, that the Administrator determines are necessary or appropriate to (1) exempt the Award from Section 409A of the Code and/or preserve the intended tax treatment of the benefits provided with respect to the Award, or (2) comply with the requirements of Section 409A of the Code and related Department of Treasury guidance.

Expected U.S. Federal Income Tax Consequences. The following is a brief summary of certain U.S. federal tax consequences of certain transactions under the Amended Plan. This summary is not intended to be complete and does not describe state or local tax consequences. Grantees in the Amended Plan should review the current tax

treatment with their individual tax advisors at the time of grant, exercise, vesting or any other transaction relating to an Award or the underlying shares.

Under the Code, we will generally be entitled to a deduction for U.S. federal income tax purposes at the same time and in the same amount as the ordinary income that Grantees recognize pursuant to Awards. For Grantees, the expected U.S. federal income tax consequences of Awards are as follows:

- *Non-Qualified Stock Options.* A Grantee will not recognize income at the time a Non-Qualified Stock Option is granted. At the time a Non-Qualified Stock Option is exercised, the Grantee will recognize ordinary income in an amount equal to the excess of (a) the fair market value of the shares of common stock issued to the Grantee on the exercise date over (b) the exercise price paid for the shares. At the time of sale of shares acquired pursuant to the exercise of a Non-Qualified Stock Option, the appreciation (or depreciation) in value of the shares after the date of exercise will be treated either as short-term or long-term capital gain (or loss) depending on how long the shares have been held.
- *ISOs.* A Grantee will not recognize income upon the grant of an ISO. There are generally no tax consequences to the Grantee upon exercise of an ISO (except that the amount by which the fair market value of the shares at the time of exercise exceeds the option exercise price is a tax preference item possibly giving rise to an alternative minimum tax). If the shares of common stock are not disposed of within two years from the date the ISO was granted or within one year after the ISO was exercised, any gain realized upon the subsequent disposition of the shares will be characterized as long-term capital gain and any loss will be characterized as long-term capital loss. If either of these holding period requirements are not met, then a “disqualifying disposition” occurs and (a) the Grantee recognizes ordinary income in the amount by which the fair market value of the shares at the time of exercise exceeded the exercise price for the ISO and (b) any remaining amount realized on disposition (except for certain “wash” sales, gifts or sales to related persons) will be characterized as capital gain or loss.
- *Stock Appreciation Rights.* A Grantee will not recognize income at the time a SAR is granted. At the time a SAR is exercised, the Grantee will recognize ordinary income in an amount equal to the excess of (a) the fair market value of the shares of common stock issued or the amount of cash paid, to the Grantee on the exercise date over (b) the exercise price paid for the shares. At the time of sale of shares acquired pursuant to the exercise of a SAR, the appreciation (or depreciation) in value of the shares after the date of exercise will be treated either as short-term or long-term capital gain (or loss) depending on how long the shares have been held.
- *Restricted Stock and Restricted Stock Units.* In general, a Grantee will not recognize income at the time of grant of restricted stock or RSUs, unless the Grantee elects with respect to restricted shares to accelerate income taxation to the date of a restricted stock award by making a timely Section 83(b) election. If the Grantee makes such an election, such Grantee would recognize ordinary compensation income equal to the excess of the fair market value of the restricted shares on the grant date over any amount the Grantee pays for them (in which case subsequent gain or loss would be capital in nature). In the absence of an election to accelerate income taxation to the date of an Award, a Grantee will recognize taxable compensation income at the time the Award vests in an amount equal to the excess of the fair market value of any property that the Grantee receives over the amount paid for such property by the Grantee, or, in the case of RSUs, upon receipt of cash or shares of common stock.
- *Unrestricted Stock.* In general, a Grantee will recognize income at the time of grant of unrestricted stock.
- *Parachute Payments.* Under certain circumstances, the grant, accelerated vesting, cash-out or accelerated lapse of restrictions on Awards in connection with a change in control of the Company might be deemed an “excess parachute payment” for purposes of the golden parachute tax provisions of Code Section 280G, and the Grantee may be subject to a 20% excise tax and we may be denied a tax deduction.
- *Income Taxes and Deferred Compensation.* The Amended Plan provides that Grantees are solely responsible and liable for the satisfaction of all taxes and penalties that may arise in connection with Awards (including any taxes arising under Section 409A of the Code). Nevertheless, the Amended Plan permits the Administrator to establish one or more programs under the Amended Plan to permit selected

Grantees the opportunity to elect to defer receipt of consideration upon exercise or vesting of an Award or other event that absent the election would entitle the Grantee to payment or receipt of shares of common stock or other consideration under an Award. The Administrator may establish the election procedures, the timing of such elections, the mechanisms for payments of, and accrual of interest or other earnings, if any, on amounts, shares of common stock or other consideration so deferred, and such other terms, conditions, rules and procedures that the Administrator deems advisable for the administration of any such deferral program.

Eligibility

Persons eligible to participate in the Amended Plan are our employees, directors and other consultants and those of our affiliates as selected from time to time by the Administrator in its discretion. As of March 28, 2022, approximately 112 individuals are currently eligible to participate in the Amended Plan, which includes five executive officers, 100 full-time employees who are not executive officers and seven non-employee directors. At this time, we do not have any plans to make future grants to any consultants.

New Plan Benefits

Because the grant of Awards under the Amended Plan is within the discretion of the Administrator, we cannot determine the dollar value or number of shares of common stock that will in the future be received by or allocated to any participant in the Amended Plan. Accordingly, in lieu of providing information regarding benefits that will be received under the Amended Plan, the following table provides information concerning the benefits that were received by the following persons and groups during 2021 under the 2018 Plan: (a) each named executive officer; (b) all current executive officers, as a group; (c) all current directors who are not executive officers, as a group; and (d) all employees who are not executive officers as a group.

Name and Position	Options		Stock Awards	
	Weighted Average Exercise Price (\$)	Number of Awards (#)	Dollar Value (\$)(1)	Number of Awards (#)
John G. McHutchison, A.O., M.D. <i>Chief Executive Officer and President</i>	4.33	305,000	419,475	117,500
Jason A. Okazaki <i>Chief Operating Officer</i>	4.33	82,500	184,488	48,750
William E. Delaney IV, Ph.D. <i>Chief Scientific Officer</i>	4.33	67,500	173,663	46,250
All current executive officers, as a group	4.33	455,000	777,625 (2)	212,500
All current directors who are not executive officers, as a group(3)	4.03	120,000	—	—
All current employees who are not executive officers, as a group	4.33	400,250	1,604,883	422,963

(1) The valuation of stock awards is based on the grant date fair value computed in accordance with FASB ASC Topic 718. For a discussion of the assumptions used in calculating these values, see Note 9 to of the consolidated financial statements included in the Annual Report on Form 10-K for the fiscal year ended December 31, 2021.

(2) Represents the aggregate grant date fair value for the group.

(3) Non-employee directors including Mr. Ringo, Mr. Altig, Ms. Consylman, Dr. DiMarchi, Mr. Holubiak and Dr. Mahony were granted options to purchase 15,000 shares of common stock at the Board meeting following the 2021 Annual Meeting in connection with their re-election to the Board at the 2021 Annual Meeting. Dr. Johnson-Pratt was granted options to purchase 30,000 shares of common stock at the Board meeting following the 2021 Annual Meeting in connection with her election to the Board at the 2021 Annual Meeting.

Equity Plans

The following table sets forth information as of December 31, 2021 regarding shares of common stock that may be issued under our equity compensation plans:

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 ⁽¹⁾ (b)	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a)) (c)
Equity compensation plans approved by our stockholders	5,271,260 (2)	\$ 10.47	5,114,258 (3)
Equity compensation plans not approved by our stockholders	1,860,980 (4)	\$ 14.98	203,248 (5)
Total	7,132,240		5,317,506

- (1) The weighted average exercise price is calculated solely based on the exercise prices of the outstanding stock options and does not reflect the shares that will be issued upon the vesting of outstanding awards of RSUs, which have no exercise price.
- (2) This number includes the following: 278,369 shares subject to stock options granted under the 2010 Plan; 1,751,322 shares subject to outstanding awards granted under the 2014 Plan, of which 1,743,308 were subject to outstanding stock options and 8,014 were subject to outstanding RSUs; 2,788,966 shares subject to outstanding awards granted under the 2018 Plan, of which 1,891,756 were subject to outstanding stock options, 883,575 were subject to outstanding RSUs and 13,635 are underlying stock appreciation rights (which are not included in column (a) but are reflected in column (c)); and 466,238 options assumed by us in connection with our merger with Assembly Pharmaceuticals. This number excludes purchase rights currently accruing under the Assembly Biosciences, Inc. Amended and Restated 2018 Employee Stock Purchase Plan (2018 ESPP).
- (3) This number includes: no shares under the 2010 Plan, which has been frozen; 733,295 shares available for issuance under the 2014 Plan; 3,337,448 shares available for issuance under the 2018 Plan; and 1,043,515 shares reserved for issuance under the 2018 ESPP. As of February 28, 2022, assuming each participant purchases the maximum number of shares in the current offering period, no more than 155,000 shares are subject to purchase in the current offering, which ends on May 13, 2022.
- (4) This number includes 596,690 shares subject to outstanding awards granted under the 2017 Inducement Plan, of which 589,190 were subject to outstanding stock options and 7,500 were subject to outstanding RSUs; 500,000 shares subject to stock options granted under the 2019 Inducement Plan; and 764,290 shares subject to outstanding awards granted under the 2020 Inducement Plan, of which 693,040 were subject to outstanding stock options and 71,250 were subject to outstanding RSUs.
- (5) This number includes: 191,288 shares available for issuance under the 2017 Inducement Plan, no shares under the 2019 Inducement Plan and 11,960 shares available for issuance under the 2020 Inducement Plan.

Required Vote

Assuming a quorum is present, to be approved, the affirmative vote of the majority of the votes cast on Proposal No. 4 must be voted “FOR” approval of the Amendment. Abstentions and broker non-votes will not be considered towards vote totals on Proposal No. 4.

Recommendation of the Board of Directors

THE BOARD OF DIRECTORS RECOMMENDS A VOTE “FOR” APPROVAL OF THE AMENDMENT TO THE ASSEMBLY BIOSCIENCES, INC. 2018 STOCK INCENTIVE PLAN.

PROPOSAL NO. 5: AMENDMENT AND RESTATEMENT OF OUR CERTIFICATE OF INCORPORATION TO INCREASE SHARES OF AUTHORIZED COMMON STOCK

General

On March 10, 2022, our Board approved the amendment and restatement of our Fifth Amended and Restated Certificate of Incorporation (the Amendment and Restatement), to increase the authorized number of shares of common stock, par value \$0.001 per share (Common Stock) from 100,000,000 to 150,000,000 shares and directed that the Amendment and Restatement be submitted to a vote of our stockholders at the Annual Meeting. The text of the proposed Sixth Amended and Restated Certificate of Incorporation, with proposed deletions indicated by strike-out and proposed revisions indicated by bold and underline, is attached to this proxy statement as Appendix C. If the stockholders approve this Proposal No. 5, subject to the discretion of the Board, we will promptly file the Amendment and Restatement with the Secretary of State of the State of Delaware after the Annual Meeting.

The Fifth Amended and Restated Certificate of Incorporation, which is currently in effect, authorizes the issuance of up to 105,000,000 shares of stock, of which 100,000,000 shares are designated as Common Stock and 5,000,000 shares are designated as preferred stock. No shares of preferred stock are issued and outstanding. If adopted, the Amendment and Restatement will not result in an increase in the number of authorized shares of preferred stock.

The following details the availability of our common stock as of December 31, 2021.

Authorized shares of Common Stock	100,000,000
Shares of Common Stock Issued and Outstanding	48,120,437
Reserved for issuance:	
Stock options assumed in 2014 Merger	466,238
2010 Equity Incentive Plan	278,369
Amended and Restated 2014 Stock Incentive Plan	2,484,617
2017 Inducement Award Plan	787,978
2018 Stock Incentive Plan	6,126,414
2019 Inducement Award Plan	500,000
2020 Inducement Award Plan	776,250
Amended and Restated 2018 Employee Stock Purchase Plan	1,043,515
Authorized shares of Common Stock available for future issuances	39,416,182
Percentage of authorized shares available	39.4%

Because only approximately 39.4% of our total authorized Common Stock is available for future issuance, which number will be further reduced if Proposals No. 4 is approved at the Annual Meeting or if we raise additional capital through the sale and issuance of Common stock, the Board believes that it is appropriate to increase our authorized shares of Common Stock from 100,000,000 to 150,000,000.

Purpose

The Board believes it is in our best interest to increase the number of authorized shares of Common Stock to give us greater flexibility in considering and planning for future corporate needs, including, but not limited to: raising additional capital, which is needed to fund our ongoing clinical and nonclinical research programs; making long-term equity incentive awards under our equity compensation plans; attracting and retaining key employees, executive officers and directors; considering potential strategic transactions, including mergers, acquisitions and business combinations; and other general corporate purposes. The Board believes that additional authorized shares of Common Stock will enable us to take timely advantage of market conditions and favorable financing and acquisition opportunities that may become available to us without the delay and expense associated with convening a special meeting of our stockholders.

We have no current plan, commitment, arrangement, understanding or agreement regarding the issuance of the additional shares of Common Stock that will result from our adoption of the proposed Amendment and Restatement. Except as otherwise required by law or the Nasdaq listing rules, the newly authorized shares of Common Stock will be available for issuance at the discretion of the Board (without further action by the stockholders) for various future

corporate needs, including those outlined above. While adoption of the proposed Amendment and Restatement would not have any immediate dilutive effect on the proportionate voting power or other rights of our existing stockholders, any future issuance of additional authorized shares of our Common Stock may, among other things, dilute the earnings per share of the Common Stock and the equity and voting rights of those holding Common Stock at the time the additional shares are issued.

In addition to the corporate purposes mentioned above, an increase in the number of authorized shares of our Common Stock may make it more difficult to, or discourage an attempt to, obtain control of us by means of a takeover bid that the Board determines is not in the best interest of us and our stockholders. However, the Board does not intend or view the proposed increase in the number of authorized shares of our Common Stock as an anti-takeover measure and is not aware of any attempt or plan to obtain control of us.

Rights of Additional Authorized Shares

Any authorized shares of Common Stock, if and when issued, would be part of our existing class of Common Stock and would have the same rights and privileges as the shares of Common Stock currently outstanding. Our stockholders do not have pre-emptive rights with respect to the Common Stock, nor do they have cumulative voting rights. Accordingly, should the Board issue additional shares of Common Stock, existing stockholders would not have any preferential rights to purchase any of such shares, and their percentage ownership of our then outstanding Common Stock could be reduced.

Potential Adverse Effects of the Amendment and Restatement

Future issuances of Common Stock or securities convertible into Common Stock could have a dilutive effect on our earnings per share, book value per share and the voting power and interest of current stockholders. In addition, the availability of additional shares of Common Stock for issuance could, under certain circumstances, discourage or make more difficult any efforts to obtain control of us. The Board is not aware of any attempt, or contemplated attempt, to acquire control of us, nor is this proposal being presented with the intent that it be used to prevent or discourage any acquisition attempt. However, nothing would prevent the Board from taking any such actions that it deems to be consistent with its fiduciary duties.

Required Vote

Assuming a quorum is present, to be approved, a majority of the shares of common stock outstanding and entitled to vote on Proposal No. 5 must be affirmatively voted "FOR" the Amendment and Restatement. Abstentions and broker non-votes, if any, will be deemed a vote against Proposal No. 5.

Recommendation of the Board of Directors

THE BOARD OF DIRECTORS RECOMMENDS A VOTE "FOR" THE AMENDMENT AND RESTATEMENT OF OUR CERTIFICATE OF INCORPORATION TO INCREASE THE AMOUNT OF AUTHORIZED COMMON STOCK FROM 100,000,000 SHARES TO 150,000,000 SHARES.

PROPOSAL NO. 6: APPROVAL OF A STOCK OPTION EXCHANGE PROGRAM FOR NON-EXECUTIVE EMPLOYEES

Background

We are seeking stockholder approval of a stock option exchange program for our current non-executive employees that would allow these non-executive employees to exchange certain significantly out-of-the-money stock options (i.e., options with respect to which the exercise price exceeds the current market value of our common stock, also known as “underwater” stock options) for new stock options exercisable for fewer shares of our common stock with an exercise price equal to the fair market value of our common stock on the new grant date, with new vesting terms. Unless indicated otherwise, all numbers presented in this proposal are as of December 23, 2021, the date for which analysis related to the proposed stock option exchange program was performed by Aon’s Human Capital Solutions practice, part of Aon plc (Aon), our independent compensation consultant. These numbers are provided for illustrative purposes only: if the proposed stock option exchange program is approved at the Annual Meeting and implemented, an updated analysis will be conducted prior to filing the Schedule TO with the SEC in the third or fourth quarter of 2022 to effect the exchange.

Stockholder-Friendly Design

In discussing strategies to address our employees’ out-of-the-money stock options, we were particularly focused on creating a strategy that is compatible with the interests of our stockholders. We believe that the proposed stock option exchange program meets that objective by providing a more cost-effective and stockholder-friendly retention and incentive tool than simply issuing additional equity awards or paying cash compensation to retain and motivate our non-executive employees. We believe that the benefits of the proposed stock option exchange program, including reducing our overhang (meaning potential shares committed but unissued) and its approximate value-neutrality (i.e., keeping the aggregate accounting value of the current stock options surrendered and the new stock options issued approximately consistent) contribute to an alignment of the program with the interests of our stockholders. In particular (and as discussed in more detail below):

- We believe that the proposed stock option exchange program would result in a net reduction of the overhang from our equity compensation program (a reduction of up to 1.2% of our overhang on account of stock options, depending upon the level of participation in the proposed stock option exchange program).
- Exchange ratios for the program are intended to result in a “value for value” exchange, meaning that the accounting fair value of replacement options granted will be approximately equal to the fair value of the options that are surrendered. In other words, the exchange is designed not to result in a windfall to participants.
- Shares from exchanged options that are in excess of the shares needed to issue replacement grants will not be returned to the plan pool, limiting the future dilution that could otherwise have resulted from the program.

We believe that these design features, among others, create a proposed stock option exchange program that is aligned with the interests of our stockholders.

Rationale

We believe that an effective and competitive employee equity incentive program is imperative for the future growth and success of our business. We rely on our employees to implement our strategic initiatives, to expand and develop our business and to conduct the research necessary to discover product candidates and to develop and advance those product candidates toward approval by the U.S. Food and Drug Administration and comparable foreign regulatory agencies. Competition for these employees, particularly in the biotech industry, is intense and many companies use stock options as a means of attracting, motivating and retaining their employees. We use stock options as a key part of our equity incentive and retention programs because our Board believes that equity compensation encourages employees to act like owners of the business, motivating them to work toward our success and rewarding their contributions by allowing them to benefit from increases in the value of our shares alongside our stockholders.

When the Compensation Committee approves a stock option award, it establishes the exercise price that the employee must pay to purchase shares of our common stock when the option is exercised. The per share exercise price is set at the closing price of a share of our common stock as reported by Nasdaq on the date the stock option is issued. As a result, an employee receives value only if he or she exercises an option and sells the purchased shares at a price that exceeds the stock option's exercise price.

We have experienced recent steep declines in our stock price, as the stock price fell approximately 70% in 2020 and approximately 62% in 2021. We believe these declines have resulted from a combination of (1) disappointing results of Study 211 of vebicorvir released in late 2020, in which all patients relapsed, indicating that no patients were cured of HBV and (2) our discontinuation of clinical development of ABI-H2158 due to elevated alanine transaminase levels in our Phase 2 study, which was announced in September 2021. The declines have been exacerbated by well documented, sector-wide weakness in the biotech market that began in early 2021 and accelerated near the end of 2021. Unfortunately, while we strive to design and develop the best product candidates, we cannot control if data is positive or negative, and we do not have any control over market dynamics in the biotech sector. Despite our two data setbacks, we have continued to progress other clinical and nonclinical studies, generate and advance next generation product candidates and expand our product candidate pipeline.

As a result of the recent decline of our stock price, many of our outstanding stock options had exercise prices significantly greater than the closing price of our common stock as reported by Nasdaq on December 23, 2021 of \$2.27. Since Aon's analysis related to the proposed stock option exchange program was conducted, our stock price has continued to decline likely because of the weak biotech market. As of the market close on March 28, 2022, the record date for the Annual Meeting, our stock price was \$2.18. As of December 23, 2021, there were options to purchase 4,818,115 shares of our common stock outstanding with exercise prices ranging from \$2.24 per share to \$56.69 per share. These out-of-the-money options are no longer effective either performance or retention incentives.

We believe that to enhance long-term stockholder value, we need to maintain competitive employee incentive and retention programs. An equity stake in our success is a critical component of these programs. We believe the proposed stock option exchange program will provide us with an opportunity to restore for eligible participants the incentive to remain with us and to continue to contribute to the future growth and success of our business. Although we continue to believe that stock options are an important component of our employees' total compensation, many of our employees view their existing stock options as having little or no value because of the significant difference between the option exercise prices and the current market price of our common stock. As a result, these employees' stock options do not provide the incentive and retentive values that our Board believes is necessary to motivate our employees to increase long-term stockholder value.

When considering how best to continue incentivizing and rewarding our employees who have out-of-the-money stock options, the Compensation Committee engaged Aon to review and evaluate strategies to address this issue. Along with considering the proposed stock option exchange program, we also considered the following options: (1) do nothing; (2) increasing cash compensation; and (3) exchanging out-of-the-money stock options for RSUs. Based on Aon's recommendations and all relevant factors, the Compensation Committee determined that a program under which employees could exchange stock options with an exercise price greater than or equal to the "Threshold Exercise Price" (described below), was most attractive for several reasons, including the following:

- *Reasonable, balanced incentives.* We believe that the opportunity to exchange existing eligible stock options for new options for fewer shares, together with a new vesting requirement and term, represents a reasonable and balanced exchange program with the potential for a significant positive impact on employee retention, motivation and performance. We believe that the new options issued in the exchange program will provide a meaningful retention period for employees during the next two years at a time when we expect to continue to experience retention challenges due to the highly competitive job market in our industry.
- *Reduction of the number of shares subject to outstanding options.* In addition to the out-of-the-money stock options having little or no retention value, they also contribute to our stock option overhang until they are exercised or expire unexercised. As of December 23, 2021, there were approximately 1,001,275 outstanding stock options with an exercise price equal to or greater than \$3.94 per share with a weighted average exercise price of \$19.09, including 648,000 stock options exercisable for over \$15.00, that would have been eligible to participate in the option exchange program if it had commenced on that day.

If approved by our stockholders, the proposed stock option exchange program is expected to reduce the overhang of outstanding stock options by eliminating the ineffective options that are currently outstanding and issued to our non-executive employees. Under the proposed stock option exchange program, eligible participants will receive stock options exercisable for fewer shares than the exchanged stock options. Based on the number of outstanding stock options as of December 23, 2021, and assuming that all eligible options were exchanged in the program, stock options to purchase 1,001,275 shares would have been exchanged and cancelled, while new stock options covering approximately 431,015 shares would have been issued. This would have resulted in a net reduction in the overhang of our equity awards by approximately 570,260 shares, or approximately 1.2% of our total overhang on account of stock options. The actual reduction in our overhang that may result from the option exchange program could vary significantly and is dependent upon several factors, including the commencement date of the program, the actual level of participation in the program and the actual exchange ratios. All eligible stock options that are not exchanged will remain outstanding and in effect in accordance with their existing terms.

- *Reduced pressure for additional grants.* If we are unable to implement the proposed stock option exchange program, we may find it necessary to issue additional stock options to our employees at current market prices, increasing our overhang. These grants would also deplete the current pool of shares available for future grants under our 2018 Stock Incentive Plan and would also result in increased stock compensation expense, which could negatively impact our stock price.
- *Impact on accounting expense.* Under applicable accounting rules, we are required to continue to recognize compensation expense related to these out-of-the-money stock options as they vest, even if they are never exercised because they remain underwater. We believe the proposed stock option exchange program will allow us to recapture retentive and incentive value from the compensation expense that we have recorded and will continue to record in our financial statements with respect to our eligible stock options. The new stock options are not expected to result in significant additional compensation expense and therefore will not have a material adverse impact on our reported earnings.
- On March 10, 2022, informed by a recommendation from the Compensation Committee, the Board approved our pursuit of a stock option exchange program for current non-executive employees, which excludes former employees, members of our Board, our executive officers and consultants. If stockholders approve this proposal, we intend to commence the exchange program during the third or fourth quarter of 2022. The Board or the Compensation Committee will determine the actual start date for the exchange program. If the exchange program does not commence within one year of the Annual Meeting, we will consider any future exchange or similar program to be a new one and will seek new stockholder approval before implementing it.
- Although stockholder approval is not required to implement the proposed stock option exchange program under the terms of our equity incentive plans, we do not intend to undertake the option exchange program unless stockholders approve this proposal.

When determining the eligibility of options for this program, the Compensation Committee (with advice from Aon) determined that stock options granted on or after August 1, 2020 would not be eligible to participate. Because the price of our stock has been depressed for over the past year, this decision was made to maximize the retentive value of our equity program, while also being conscious that these awards are intended to be long-term in nature.

Members of the Board, executive officers of the Company, former employees and consultants will not be eligible to participate in the stock option exchange program. Together, the holdings of the Board and executive officers constitute approximately 44% of our outstanding stock options as of March 28, 2022. All of these stock options will continue to be governed by their existing terms.

Exchange ratios for those eligible to participate will be designed to result in a “value for value” exchange, which means that the accounting fair value of new stock options granted will be approximately equal to the accounting fair value of the stock options that are surrendered. None of the shares subject to surrendered stock options (in excess of the replacement options issued under the exchange program) will return to our authorized share pool nor reserves for the equity plan under which they were issued or any of our other equity plans.

The minimum exercise price of options eligible to be exchanged will be determined by the greater of the 52-week intraday high trading price of our common stock and 1.5 times the then-current trading price of our shares (in each case as of a date shortly prior to the commencement date of the offer). Using this minimum price is designed to ensure that only outstanding options with an exercise price that is significantly out of the money will be eligible for the exchange program.

Material Terms

An overview of the key features of the proposed stock option exchange program is provided below.

<i>Eligible Participants</i>	All current employees except executive officers; directors, consultants and former employees are not eligible
<i>Type of Exchange</i>	Stock Options for Stock Options
<i>Eligible Stock Options</i>	<p>Stock options with exercise prices above the greater of (1) the 52-week high for Company stock and (2) 1.5 times the current trading price of our shares, in each case as of a date shortly prior to the commencement date of the offer</p> <p>Stock options scheduled to expire before the exchange offer will be completed are excluded from participating in the offer</p> <p>Stock options that were granted on or after August 1, 2020 are excluded from participating in the offer</p>
<i>Elections</i>	Employees may elect to exchange individual grants; however, if an employee elects to exchange a specific grant, all stock options granted on the same date must be exchanged
<i>Term of Replacement Stock Options</i>	All new stock options will have a six-year maximum contractual term
<i>Vesting of New Stock Options</i>	New stock options will vest on the first anniversary of the issuance of the new stock options (with respect to vested stock options that are exchanged) and on the second anniversary of the issuance of the new stock options (with respect to unvested stock options that are exchanged), in each case subject to continued employment
<i>Plan to Be Issued Under</i>	All new stock options will be issued under the 2018 Stock Incentive Plan; excess shares resulting from the stock option exchange will not be returned to the plan pool of the applicable equity incentive plan
<i>Illustrative Exchange Ratios</i>	Exchange ratios will depend on the value of out-of-the-money stock options, which options will be grouped into value ranges to simplify administration; exchange ratios are expected to range from 1.90-to-1 to 3.15-to-1 (described in more detail below)
<i>Total Grants Eligible for Exchange, Price and Term</i>	Had the offer been commenced on December 23, 2021, stock options to purchase 1,001,275 with a weighted average exercise price of \$19.09 and a weighted average remaining term of 6.45 years would have been eligible for the proposed stock option exchange program
<i>Total Replacement Grants, Price and Term</i>	Had the offer been commenced on December 23, 2021, assuming 100% participation, 431,015 stock options would have been granted as new stock options with an exercise price based on our closing stock price on the date of the exchange and a maximum term of six years

Exchange Ratio

The table below illustrates for eligible stock options, the applicable exercise price range, the approximate number of options in each such range (along with the weighted average exercise price and remaining term for stock options in that category), the applicable exchange ratio and the approximate number of new stock options issuable with respect to exchanged stock options, assuming 100% participation in the offer, had the offer been commenced as of December 23, 2021. If the proposed stock option exchange program is approved, the exercise price ranges and exchange ratios will be determined immediately prior to the commencement of the stock option exchange program in a manner consistent with that used to formulate the illustration below.

Per Share Exercise Price (\$)	Outstanding Stock Options in Range	Weighted Average Exercise Price (\$)	Weighted Average Years Remaining in Term	Exchange Ratio	New Stock Options Issuable (assuming full participation)
3.94 – 15.00	353,168	11.84	6.25	1.90 to 1	186,000
15.01 – 19.50	287,332	16.57	6.99	2.20 to 1	131,000
19.51+	360,775	27.95	6.21	3.15 to 1	115,000

Implementing the Stock Option Exchange Program

We have not commenced the stock option exchange program and do not intend to do so unless our stockholders approve this Proposal No. 6. If we receive stockholder approval of the stock option exchange program, the stock option exchange program may commence at a time determined by the Board or the Compensation Committee, with terms substantially consistent with those described in this proposal. Even if the stockholders approve this proposal, the Board or the Compensation Committee may still later determine not to implement the stock option exchange program.

Upon commencement of the stock option exchange program, employees holding eligible stock options would receive written materials (the “offer to exchange”) explaining the precise terms and timing of the stock option exchange program. Employees would be given at least 20 business days (or such longer period as we may elect to keep the stock option exchange program open) to elect to exchange all, some or none of their eligible stock options, on a grant-by-grant basis, for new stock options. After the offer to exchange is closed, the eligible stock options surrendered for exchange would be cancelled, and the Compensation Committee would approve grants of new stock options to participating employees in accordance with the applicable exchange ratios and other terms of the program. At or before commencement of the exchange program, we will file the offer to exchange and other related documents with the SEC as part of a tender offer statement on Schedule TO. Employees, as well as stockholders and members of the public, will be able to access the offer to exchange and other documents we file with the SEC free of charge from the SEC’s website at www.sec.gov.

Other Matters

Treatment of Net Shares

The net shares underlying eligible stock options in excess of the shares underlying the new stock options granted in the stock option exchange program will not be returned to the pool available for issuance under the 2018 Stock Incentive Plan.

Accounting Treatment

The incremental compensation expense associated with the stock option exchange program will be measured as the excess, if any, of the fair value of each new stock option granted to participants in the program, measured as of the date the new stock options are granted, over the fair value of the stock options surrendered in exchange for the new stock options, measured immediately prior to the cancellation. We do not expect the incremental compensation expense, if any, to be material. We will recognize any such incremental compensation expense ratably over the vesting period of the new stock options.

United States Federal Income Tax Consequences

We believe the exchange of eligible stock options for new options pursuant to the option exchange program should be treated as a non-taxable exchange, and no income should be recognized for United States federal income tax purposes by us or our employees upon the grant of the new stock options. However, the U.S. Internal Revenue Service is not precluded from adopting a contrary position, and the laws and regulations themselves are subject to change. A more detailed summary of the applicable tax considerations to eligible participants will be provided to them in connection with the offer when it is commenced.

Potential Modifications to Terms to Comply with Governmental Requirements

The terms of the stock option exchange program will be described in a tender offer statement that we will file with the SEC. Although we do not anticipate that the SEC will require us to modify the terms significantly, it is possible we will need to alter the terms of the program to comply with comments from the SEC. Changes in the terms of the program may also be required for tax purposes or to comply with applicable law outside of the United States for non-U.S. participants.

Required Vote

Assuming a quorum is present, to be approved, the affirmative vote of the majority of the votes cast on Proposal No. 6 must be voted "FOR" approval of a stock option exchange program for non-executive employees. Abstentions and broker non-votes will not be considered towards vote totals on Proposal No. 6.

Recommendation of the Board of Directors

THE BOARD OF DIRECTORS RECOMMENDS A VOTE "FOR" APPROVAL OF A STOCK OPTION EXCHANGE PROGRAM FOR NON-EXECUTIVE EMPLOYEES.

EXECUTIVE OFFICERS

As of March 28, 2022, our executive officers are: John G. McHutchison, A.O., M.D., our Chief Executive Officer and President; Jason A. Okazaki, our Chief Operating Officer; William E. Delaney IV, Ph.D, our Chief Scientific Officer; Luisa M. Stamm, M.D., Ph.D., our Chief Medical Officer; and Michael P. Samar, our Chief Financial Officer. Information regarding each of Mr. Okazaki, Dr. Delaney, Dr. Stamm and Mr. Samar is below. For information on Dr. McHutchison, see “Proposal No. 1—Election of Directors—Nominees for Director.”

Name	Age	Business Experience
Jason A. Okazaki	46	Mr. Okazaki has served as our Chief Operating Officer since August 2021. Mr. Okazaki served as our Chief Legal and Business Officer from March 2020 until his promotion to Chief Operating Officer. Prior to joining us, Mr. Okazaki served in a series of positions of increasing responsibility in Gilead’s legal department from 2006 until March 2020, culminating in his role as Senior Vice President, Legal, and Assistant Secretary. While at Gilead, Mr. Okazaki advised on strategic transactions, corporate governance, SEC matters and operational contracts. He also led the Asia and Latin America legal organizations. Prior to joining Gilead, Mr. Okazaki was a senior associate at Skadden, Arps, Slate, Meagher & Flom LLP, where he represented companies in connection with mergers, acquisitions and corporate finance matters. Mr. Okazaki received a B.A. in Economics from Stanford University and a J.D. from U.C. Hastings College of the Law.
William E. Delaney IV, Ph.D.	50	Dr. Delaney has served as our Chief Scientific Officer since May 2020. Prior to joining us, Dr. Delaney served in a series of positions of increasing responsibility in Gilead’s clinical virology and biology research groups from 2000 until May 2020, culminating in his role as Executive Director, Biology. Prior to joining Gilead, Dr. Delaney was a research and molecular development fellow at Victorian Infectious Diseases Reference Laboratory from 1999 until 2000. Dr. Delaney received a B.S. in Biotechnology from the University of Delaware and a Ph.D. in Cell and Molecular Biology from Penn State University, College of Medicine.
Luisa M. Stamm, M.D., Ph.D.	46	Dr. Stamm has served as our Chief Medical Officer since November 2019. Prior to joining us, Dr. Stamm served in a series of positions of increasing responsibility in Gilead’s clinical research group from July 2013 until November 2019, culminating in her role as Executive Director, Clinical Research. Prior to joining Gilead, Dr. Stamm was an instructor at Harvard Medical School from January 2013 until July 2013. From 2009 until July 2013, Dr. Stamm was a clinical and research fellow in infectious disease at Massachusetts General Hospital. Dr. Stamm received a B.A. in Biochemistry from Harvard University and an M.D. and a Ph.D. in Biomedical Sciences from the University of California, San Francisco.
Michael P. Samar	49	Mr. Samar has served as our Chief Financial Officer since August 2021. Mr. Samar served as Senior Vice President, Finance and Business Operations from July 2019 until his promotion to Chief Financial Officer. Prior to that, Mr. Samar served as Vice President, Finance and Business Operations from May 2019 until July 2019 and Vice President, Finance from June 2017 until April 2019. Prior to joining the Company, Mr. Samar served as Vice President of Finance at Acorda Therapeutics, Inc. from April 2016 until April 2017 following its acquisition of Biotie Therapies Corp., where he served in the same role from February 2014 until April 2016. Mr. Samar received a B.S.B.A. in Finance from Bryant University and an M.B.A. from Villanova University.

EXECUTIVE COMPENSATION

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

Named Executive Officers

Our NEOs for the fiscal year ended December 31, 2021 are:

Name	Roles During 2021
John G. McHutchison, A.O., M.D.	Chief Executive Officer and President
Jason A. Okazaki	Chief Operating Officer(1)
William E. Delaney IV, Ph.D.	Chief Scientific Officer

(1) Effective August 1, 2021, Mr. Okazaki was promoted to Chief Operating Officer. Prior to his promotion, Mr. Okazaki served as Chief Legal and Business Officer.

Executive Summary

Alignment of Pay and Performance

The first priority of our compensation program is to pay for performance. When conducting an analysis of the alignment of pay for performance, we believe that it is important to ensure that the model using the most appropriate alignment measure available is selected. We believe that analysis using Realizable Pay is most appropriate for determining the alignment of our pay and performance.

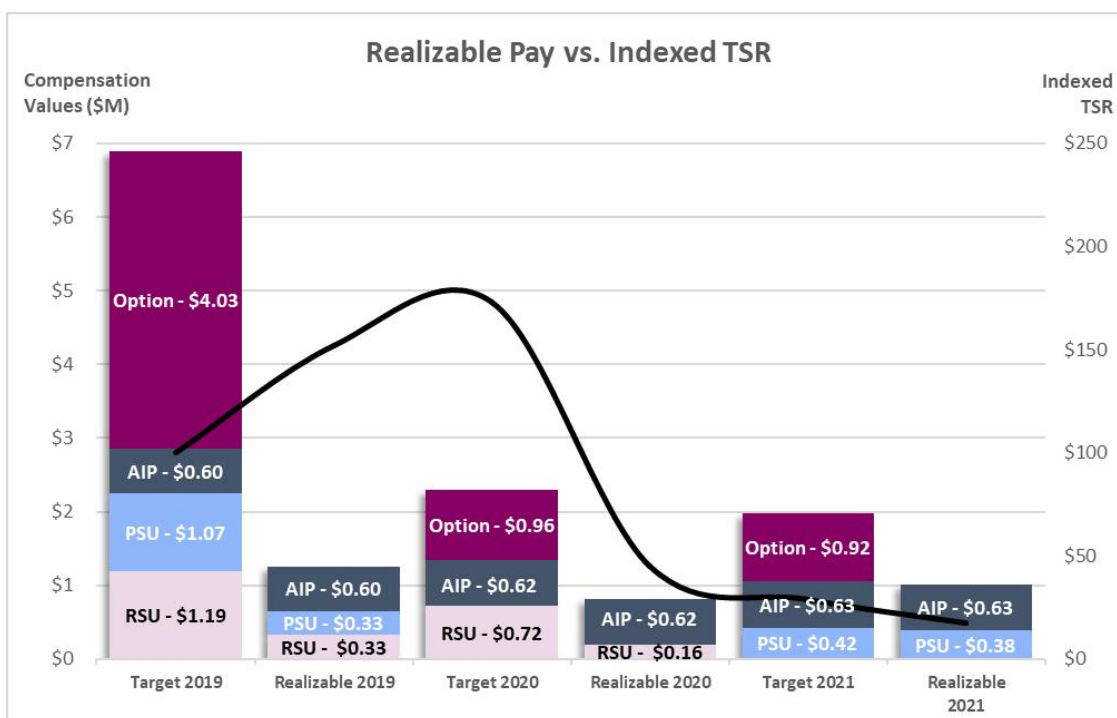
Given the extreme volatility of stock prices in the biotech industry, reliance on models using Grant Date Fair Values of equity awards can result in an apparent disconnect between pay and performance, as the volatility of stock prices in this industry creates a situation in which a company’s stock price at the time of a pay for performance analysis can be far different than it was at the time that equity grants were made. This is particularly true given the downward pressure on stock prices in the biotech sector over the last two years.

We believe that Realizable Pay is a more appropriate measurement of alignment of pay and performance of our executives, including Dr. McHutchison, and is more telling, as Realizable Pay has dropped significantly as our stock price has fallen.

For Dr. McHutchison:

- The Grant Date Fair Value of his equity awards since he joined us in August 2019 is approximately \$9.26 million
 - Stock option prices have ranged from \$4.33 in 2021 to \$14.45 in 2019
- Realizable value of those same equity awards, assuming a trading price of \$2.33, our stock price per share as of December 31, 2021, is \$0.7 million, which is 8.0% of Grant Date Fair Value
 - As of December 31, 2021, all of Dr. McHutchison’s stock options were underwater, his restricted stock units (RSUs) have lost 77.0% of their initial grant value, and 50,000 performance-based RSUs (out of 100,000) granted in September 2019 have been forfeited based on milestones not achieved

As demonstrated by the chart below, as our stock performance, measured by indexed total stockholder return (TSR) and depicted by the black line, has declined, so has Dr. McHutchison’s Realizable Pay—the two are very closely aligned. As our TSR increases, so too would Realizable Pay.



2021 Accomplishments

HBV Clinical Development

- Initiated a clinical study, ABI-0731-203 (Study 203), evaluating our lead core inhibitor product, vebicorvir (VBR), in a triple combination consisting of VBR + a nucleos(t)ide analog reverse transcriptase inhibitor (NrtI) + pegylated interferon alfa in hepatitis B virus (HBV) e antigen positive subjects
- Initiated a clinical study, ABI-0731-204 (Study 204), evaluating VBR in a triple combination consisting of VBR + NrtI + AB-729 (Arbutus Biopharma Corporation's investigational RNAi candidate) as compared to double combinations of VBR + NrtI and AB-729 + NrtI in virologically suppressed HBV patients
- Enrolled 75% of patients in Study 203 and Study 204
- Reported follow-up data from our most recently completed study for VBR, ABI-0731-211 (Study 211), related to virologic response, safety and resistance following treatment discontinuation at the European Association for the Study of the Liver's (EASL) International Liver Congress™ in June 2021 (EASL 2021)
- Reported follow up data from Study 211 demonstrating that patients had increases of HBV DNA and pre-genomic RNA after discontinuation of VBR despite continued NrtI treatment, further supporting that core inhibitors deepen viral suppression in combination with NrtIs at the American Association for the Study of Liver Diseases (AASLD) Annual Meeting in November 2021 (AASLD 2021)
- Reported Phase 1a safety and pharmacokinetics data for our first of two next-generation core inhibitors, ABI-H3733 (3733)
- Completed enrollment of a Phase 2 study of ABI-H2158 (2158) to determine safety of 2158 as compared to VBR

- Following complete enrollment of this study, elevated alanine transaminase (ALT) levels consistent with drug-induced hepatotoxicity were detected in five patients, leading us to discontinue both the study and clinical development of 2158

Research and Development

- Announced the selection of ABI-4334 (4334), our second next-generation core inhibitor, which we believe has a best-in-class preclinical profile
- Reported the enhanced potency and target coverage of 3733 and our discontinued core inhibitor, ABI-H2158, as compared to VBR for both antiviral inhibition and covalently closed circular DNA (cccDNA) establishment at EASL 2021
- Reported the preclinical characterization of 4334 at AASLD 2021
- Advanced research programs related to a cccDNA disruptor and two other small molecules targeting novel undisclosed HBV targets
- Initiated an exploratory virology discovery program for compounds directed at several non-HBV viral targets
- Developed and implemented a manufacturing strategy to support clinical development and optimize processes and formulation while significantly reducing costs
 - Resulted in improved formulation of 3733, resulting in substantially increased projected exposure

Corporate Development and Alliances

- Entered into a clinical trial collaboration agreement with Antios Therapeutics, Inc. (Antios) to evaluate VBR + NrtI + ATI-2173, Antios's investigational proprietary active site polymerase inhibitor nucleotide (ASPIN)
- Successfully wound down our Microbiome program and closed sale of certain of those assets, raising \$3.0 million with a subsequent potential milestone payment

Fundraising and Operational Excellence

- Raised net proceeds of approximately \$52.8 million from the sale and issuance of shares of common stock through a series of "at-the-market" (ATM) offerings
- Maintained employee turnover to below average market rates, including retaining all critical employees

Say on Pay Vote

At our 2021 Annual Meeting of Stockholders, our Say on Pay proposal received support of approximately 74% of the shares voted. In response to this level of support, we conducted a stockholder outreach program in October and November 2021. During our outreach efforts, we contacted our top 20 stockholders as of September 2021, which represented 53% of our outstanding shares, held by nine fund managers, one private equity fund, nine hedge funds and one venture capital firm.

Three stockholders, each among our then-top five holders, requested a meeting in response to our outreach. The meetings focused primarily on our executive compensation program, highlighting our pay and performance philosophy and our achievements over the prior year. We were represented at each of these meetings by our Chief Operating Officer, our Chief Human Resources Officer, our SVP, Investor Relations & Corporate Affairs and our Associate General Counsel.

In each meeting, we noted that we have experienced recent steep declines in our stock price, with the stock price falling approximately 70% in 2020 and another approximately 40% in 2021 through the dates of the meetings . We

believe that these declines have resulted from (1) disappointing results of Study 2011 released in late 2020, in which all patients relapsed, indicating that no patients were cured of HBV and (2) our discontinuation of clinical development of 2158 due to elevated ALT levels in our Phase 2 study, which was announced in September 2021. While these results can be expected to impact our stock price, the declines have been exacerbated by well documented, sector-wide weakness in the biotech market that began in early 2021 and accelerated near the end of 2021. Despite the disappointing results from the two studies, each were critically important in the development path for finite and curative therapies for HBV. The results of the studies have provided important insights that will help us as we continue to advance the rest of our clinical and preclinical pipeline.

During our outreach, we outlined for our stockholders why we believe that focus on Realizable Pay is a more appropriate measurement of alignment of pay and performance due to the recent sharp declines in our stock price. A focus on Grant Date Fair Value of equity awards in particular results in an apparent, but not actual, disconnect between pay and performance. For additional information regarding Grant Date Fair Value and Realizable Pay, see “—Alignment of Pay and Performance.”

All of our meetings were very positive, as the stockholders were receptive to our explanation of the merits of Realizable Pay focus as opposed to Grant Date Fair Value. Each of the holders with whom we met take their own approach to analyzing the compensation practices of the companies in their portfolios. All are supportive of our pay practices, and each voted “FOR” the approval of our NEOs’ 2020 compensation. We expect to continue our robust outreach efforts and to experience continued pay for performance scrutiny. As a result, we plan to engage in additional stockholder outreach in the lead up to our 2022 Say on Pay vote.

Prior to our 2021 Say on Pay vote, our executive compensation program has consistently had the support of over 90% of the shares voted by our stockholders since 2014, including over 99% of the shares voted in 2020 regarding our 2019 executive compensation.

Compensation Philosophy and Best Practices

Our Compensation Philosophy is, “Provide Competitive Overall Compensation That Attracts, Retains and Motivates Superior Performers.” In addition to striving to adhere to this philosophy, we have instituted the following executive compensation best practices:

What We Do	What We Don’t Do
<input checked="" type="checkbox"/> Conduct an annual Say on Pay vote	<input checked="" type="checkbox"/> No guaranteed performance-based cash bonuses
<input checked="" type="checkbox"/> Annual performance-based cash bonus opportunities tied to individual and Company-wide performance	<input checked="" type="checkbox"/> No excise tax gross ups
<input checked="" type="checkbox"/> Equity grants with multi-year vesting requirements	<input checked="" type="checkbox"/> No pension, deferred compensation or special retirement plans for executives
<input checked="" type="checkbox"/> Time-based equity grants with minimum vesting period of one year	<input checked="" type="checkbox"/> No special health or welfare benefits
<input checked="" type="checkbox"/> Entirely independent Compensation Committee	<input checked="" type="checkbox"/> No hedging or pledging of our stock
<input checked="" type="checkbox"/> Use an independent compensation consultant	<input checked="" type="checkbox"/> No significant perquisites provided to our NEOs
<input checked="" type="checkbox"/> Double-trigger severance and equity acceleration rights	<input checked="" type="checkbox"/> No stock option repricing without stockholder pre-approval

How We Determine Executive Compensation

Overview

The Compensation Committee believes that executive compensation should be designed to promote both our short-term and long-term goals, because pharmaceutical research and development require sustained and focused effort over many years. Accordingly, it is important that the Compensation Committee’s executive compensation program both motivate our executives to meet short- and long-term goals and align the financial interests of our employees, including our NEOs, with those of our stockholders. To achieve these goals, our compensation program is structured to:

- **Pay for Performance:** We offer (1) targeted annual performance-based cash bonus opportunities based on Company-wide performance against Board-approved corporate goals weighted to reflect their relative importance to the achievement of our goals, measured over a 12-month period and, for all employees other

than our CEO, performance against individual performance objectives set by our employees in consultation with their managers, which may include certain department, group or team objectives applicable to these employees, and (2) the opportunity to share in our long-term success through equity incentive awards, including, in certain circumstances, performance-based equity awards.

- **Attract and Retain Superior Performers:** We provide market-competitive base salaries, performance-based cash bonus opportunities, long-term equity awards and other compensation components and benefits that are competitive with those companies that compete with us for available high caliber talent.
- **Pay Equitably:** We believe that it is important to apply generally consistent guidelines for all our employees. To deliver equitable pay for our NEOs, the Compensation Committee considers each NEO's title, role, breadth and complexity of responsibility, criticality of the role to the organization, experience, qualifications and performance, in both an individual and team context.

At-Risk and Long-Term Pay

To implement our compensation philosophy, the Compensation Committee has determined that the primary elements of our employees', including our NEOs', compensation should consist of base salary, annual performance-based cash bonuses and long-term equity incentive awards, which the Compensation Committee uses to create a pay mix designed to meet the goals of our compensation philosophy. The pay mix emphasizes "at-risk" compensation in the form of (1) long-term equity awards and (2) annual performance-based cash bonuses based on the achievement of (a) Board-approved Company-wide objectives weighted to reflect their relative importance to the achievement of our goals and (b) individual performance objectives, which include certain department, group and/or team objectives applicable to the participants, tailored to responsibilities of each of our employees, including our NEOs.

As a result, the majority of the 2121 compensation paid to each of our NEOs—70%, 57% and 56% for Dr. McHutchison, Mr. Okazaki and Dr. Delaney, respectively—consisted of "at-risk" compensation.

Role of the Compensation Committee; Oversight of Executive Compensation

The Compensation Committee develops and supervises the implementation of our compensation philosophy. The Compensation Committee also has direct responsibility for reviewing and approving the compensation of our CEO and each of our other executive officers, including our NEOs. To assist the Compensation Committee in determining compensation of our other executive officers, the CEO makes recommendations to the Compensation Committee as to the specific elements (i.e., base salary, annual performance-based cash bonus and long-term equity incentive awards) of compensation. The CEO does not make recommendations, and is not present for discussions regarding his own compensation.

We generally review our compensation practices on an annual basis over the course of several meetings of the Compensation Committee and the Board. The first step in the process is for the Compensation Committee, with the support of management and the Compensation Committee's independent outside compensation consultant, Aon's Human Capital Solutions practice, which is a part of Aon plc (Aon), to review trends in biotech compensation practices and to recommend the list of peer companies to be used as a reference point in this compensation review process. The peer group determination process is detailed below in "—Peer Group Process."

Our CEO, Chief Operating Officer and Chief Human Resources Officer, in addition to Aon representatives, regularly attend portions of the Compensation Committee meetings to provide analysis, information and recommendations regarding various human resources and compensation matters. Members of management generally do not participate in the Compensation Committee's executive sessions unless invited by the Compensation Committee to provide specific information during these closed sessions. The CEO is not present for any discussion of, deliberation on, or votes related to, his compensation.

The Compensation Consultant

The Compensation Committee initially retained Aon in 2015. Aon's fees are paid by the Company but approved by the Compensation Committee. In connection with its retention for the 2021 compensation cycle, Aon analyzed and provided advice on, among other things, the composition of our peer group, annual performance-based cash bonuses, long-term equity incentive awards as both a portion of annual compensation and as a retention tool, severance arrangements, compensation packages for executive officers being promoted, annual compensation for the

executive officers, compensation trends in the biotech industry and applicable public disclosures regarding our compensation programs.

Aon reports directly to the Compensation Committee, which retains sole authority to direct the work and employ Aon. The Compensation Committee regularly reviews the services that Aon provides.

The Compensation Committee assessed Aon's independence and determined that Aon's work did not raise any conflicts of interest in 2021. In making this assessment, the Compensation Committee considered the independence factors enumerated in Rule 10C-1(b) under the Exchange Act, including the following factors: (1) Aon does not provide any other services to us; (2) the level of fees received from us as a percentage of Aon's total revenue is less than 1%; (3) Aon's internal policies and procedures to prevent conflicts of interest and protect independence; (4) the Aon representatives that provide advice to the Compensation Committee neither own any of our stock nor have any business or personal relationships with members of the Compensation Committee or our executive officers; and (5) the Compensation Committee is unaware of any relationship that may exist between executive officers and Aon. The Compensation Committee continues to periodically monitor the Aon's independence.

Peer Group Process

As part of its analysis for 2021, Aon collected and analyzed compensation information from a peer group comprised of a comparative group of biotech companies approved by the Compensation Committee.

The list of peer companies is evaluated and approved annually by the Compensation Committee based upon input from Aon and management to ensure that our peer group (1) includes companies that are similar in terms of stages of development, headcount and market capitalization, (2) appropriately represents the type of companies competing with us to attract and retain talent and (3) reflects our current and future business objectives and strategy. In September 2020, with assistance from Aon and management, the Compensation Committee revised the peer group for reference in connection with making 2021 compensation decisions and approved a peer group consisting of biopharmaceutical companies with the following characteristics:

- Increased focus on companies in Phase 2 and Phase 3 clinical development, as we anticipated beginning Phase 3 trials in the first quarter of 2021 prior to our decision to focus on finite and curative therapies for HBV rather than developing a chronic suppressive treatment.
- 0.3 to 3.0x our headcount, with generally fewer than 400 employees, based upon our projected headcount going into 2021.
- 0.3 to 3.0x our market capitalization, with market capitalizations generally between \$250 million and \$2.2 billion, based upon our then-current market capitalization of approximately \$730 million.

Due to the above criteria, several companies were either added to or removed from the peer group due to M&A activity, out of scope market capitalization, headcount or stage of development. Achillion Pharmaceuticals Inc., ChemoCentryx, Inc., Chimerix Inc., Five Prime Therapeutics, Inc., Inovio Pharmaceuticals, Inc. and Principia Biopharma Inc. were each members of our 2020 Peer Group, but were removed from the 2021 Peer Group either due to the new size parameters or acquisition.

Based on these criteria, the Compensation Committee approved the revised peer group (the 2021 Peer Group) set forth below and used the 2021 Peer Group as one of multiple datapoints used in determining 2021 compensation.

89bio, Inc.*	Editas Medicine, Inc.	Rhythm Pharmaceuticals, Inc.
Aimunne Therapeutics, Inc.	Eiger Biopharmaceuticals, Inc.*	Sangamo Therapeutics, Inc.
Akero Therapeutics, Inc.*	Enanta Pharmaceuticals, Inc.*	Seres Therapeutics, Inc.
Atara Biotherapeutics, Inc.*	Epizyme, Inc.	Spero Therapeutics, Inc.
Calithera Biosciences, Inc.	Madrigal Pharmaceuticals, Inc.*	Syros Pharmaceuticals, Inc.
Concert Pharmaceuticals, Inc.	NGM Biopharmaceuticals, Inc.*	Viking Therapeutics, Inc.*
CymaBay Therapeutics, Inc.	Protagonist Therapeutics, Inc.	Wave Life Sciences Ltd.
CytomX Therapeutics, Inc.	Prothena Corporation plc	
Dicerna Pharmaceuticals, Inc.	REGENXBIO Inc.	

* Added to 2021 Peer Group.

As of September 2020, when the Compensation Consultant completed its work developing recommendations for the 2021 Peer Group, the 50th percentile of market capitalization and headcount of the 2021 Peer Group were \$733.6 million (based upon a 30-day average market capitalization) and 91 employees, respectively. Meanwhile, our market capitalization and headcount were \$728.3 million (based upon a 30-day average market capitalization) and 152 employees, respectively.

After the Compensation Committee approves the list of peer companies, management and Aon present the Compensation Committee with recommendations regarding proposed adjustments to compensation elements and a variety of supporting data, including comparative compensation information from the approved peer group. The Compensation Committee generally believes that to achieve our overall compensation-related goals, our compensation elements of base salary and annual performance-based bonus opportunities should target the 50th percentile of our peers and long-term equity incentive compensation should target the 50th to the 75th percentile of our peers. However, the Compensation Committee may, in its discretion, set an individual NEO's compensation, such as Dr. McHutchison and Mr. Okazaki, above or below this level, based on that individual's experience, criticality, amount of responsibility and either individual or Company-wide performance. Such recommendations are presented to the Compensation Committee individually for each NEO. The recommendations for the NEOs are discussed with and without our Chief Human Resources Officer and are also discussed with Aon. The CEO is not present for any discussion of, deliberation on, or votes related to, his compensation. The Compensation Committee then determines what, if any, adjustments to the compensation elements are appropriate for executive officers.

COVID-19 Pandemic

The COVID-19 pandemic created significant uncertainty regarding how we would protect our employees' health and welfare and continue to achieve 2021 goals and reach performance targets that were set notwithstanding the pandemic. While management and the Board recognized that meeting these goals may be more challenging than in years prior to the pandemic, management and the Board set aggressive corporate goals, determined to move us forward as a company and remain aligned with our stockholders' interests. Our Company-wide performance remained high despite challenges faced in 2021, and the Compensation Committee determined that the percentage achievement of our 2021 Company-wide goals was 97%. In addition, we successfully attracted and incentivized new talent, while retaining all our most critical talent despite challenges related to the pandemic, including the highly active 2021 talent market fueled by the U.S. economy's strong 2021 recovery. For more information regarding our 2021 achievements, see "—2021 Accomplishments," and for additional detail regarding the Company-wide goals set by the Board and our achievement of those goals, see "Summary Compensation Table—Narrative Disclosure to Summary Compensation Table—Annual Performance-Based Cash Bonus."

Elements of Executive Compensation

The three principal components of our executive compensation program are base salary, annual performance-based cash bonus and long-term equity incentive awards. Our Compensation Committee believes that each component of executive compensation must be evaluated and determined with reference to competitive market data, individual and Company-wide performance, our recruiting and retention goals, internal equity and consistency, and other

information it deems relevant. The Compensation Committee believes that in the biopharmaceutical/biotechnology industry, stock option and/or other equity awards are a primary motivator in attracting and retaining executives, in addition to salary and cash incentive bonuses.

In addition, significant portions of Mr. Okazaki and Dr. Delaney's 2020 compensation were the result of one-time sign-on bonuses and inducement equity grants as partial "make whole" compensation in connection with the leadership transitions that took place.

The primary components of our compensation packages are described in more detail below.

Summary Compensation Table

The following table shows the total compensation earned by the NEOs in the last two fiscal years.

Name and Principal Position	Year	Salary (\$)(1)	Bonus (\$)	Stock Awards (\$)(2)	Option Awards (\$)(2)	Non-Equity Incentive Plan Compensation (\$)(3)	All Other Compensation (\$)(4)	Total (\$)
John G. McHutchison, A.O., M.D.	2021	841,525	—	419,475	979,253	614,500	11,000	2,865,753
Chief Executive Officer and President	2020	817,500	—	722,500	1,028,163	615,000	11,400	3,194,563
Jason A. Okazaki	2021	532,521	—	184,488	252,413	297,800	11,000	1,278,222
Chief Operating Officer	2020	394,173 (5)	100,000 (6)	752,500	2,449,245	209,100	—	3,905,018
William E. Delaney IV, Ph.D.	2021	441,458	—	173,663	206,520	190,900	5,543	1,018,084
Chief Scientific Officer	2020	246,872 (7)	100,000 (8)	923,400	1,324,749	104,000	—	2,699,021

- (1) These amounts do not match the table under "Elements of Executive Compensation—Base Salary," because our NEOs' salary increases come into effect partway into the fiscal year.
- (2) The reported amounts represent the grant date fair value of the award, computed in accordance with FASB ASC Topic 718 disregarding any estimated forfeitures related to service-based vesting. Assumptions used in the calculation of these amounts are included in Note 9 of the consolidated financial statements included in our Annual Report on Form 10-K for the year ended December 31, 2021.
- (3) Non-equity incentive plan compensation represents amounts earned as annual performance-based cash bonuses based on the achievement of Company-wide and individual performance goals and other factors deemed relevant by the Compensation Committee for the year indicated. Annual performance-based cash bonuses are paid in the first quarter of the following year. Amounts for Mr. Okazaki and Dr. Delaney in 2020 reflect proration based on start date.
- (4) "All Other Compensation" represents 401(k) matching contributions made by the Company.
- (5) Reflects proration based on March 26, 2020 start date.
- (6) Represents a sign-on bonus paid in connection with Mr. Okazaki's acceptance of our offer of employment pursuant to the terms of his employment agreement.
- (7) Reflects proration based on May 27, 2020 start date.
- (8) Represents a sign-on bonus paid in connection with Dr. Delaney's acceptance of our offer of employment pursuant to the terms of his employment agreement.

Narrative Disclosure to Summary Compensation Table

The three principal components of our executive compensation program are base salary, annual performance-based cash bonus and long-term equity incentive awards. Our Compensation Committee believes that each component of executive compensation must be evaluated and determined with reference to competitive market data, individual and Company-wide performance, our recruiting and retention goals, internal equity and consistency, and other information deemed relevant by the Compensation Committee. The Compensation Committee believes that in the biopharmaceutical/biotech industry, stock option and/or other equity awards are among the primary motivators in attracting and retaining executives, in addition to salary and cash incentive bonuses.

The primary components of our compensation packages and the one-time compensation elements received by our newly hired NEOs are described in more detail below.

Base Salary

Base salaries provide financial stability and security to our NEOs by providing a fixed amount of cash for performing their job responsibilities. Our NEOs' base salaries are established based on each NEO's position, criticality and scope of responsibilities, prior experience and training, then-current compensation levels and competitive market-based compensation data we review for similar positions in our industry. Base salaries are reviewed periodically and may be increased for merit reasons based on the executive's performance, for retention reasons or if the base salary is not competitive with salaries paid by comparative companies for similar positions. Additionally, we may adjust base salaries throughout the year for promotions or other changes in the scope or breadth of an executive's role or responsibilities. The NEOs' annualized base salaries for 2020 and 2021, effective as of February 16 of each year or as otherwise noted, were as follows:

NEO	2020	2021	Percentage Increase
John G. McHutchison, A.O., M.D.	\$ 820,000	\$ 844,600	3.0%
Jason A. Okazaki	515,000 (1)	540,000 (2)	4.9%
William E. Delaney IV, Ph.D.(2)	415,000 (3)	470,000 (4)	13.3%

- (1) Mr. Okazaki became our Chief Legal and Business Officer effective March 26, 2020. For information regarding the prorated amount of this annualized total that Mr. Okazaki received in 2020, see "Summary Compensation Table."
- (2) On August 1, 2021, Mr. Okazaki's salary was increased from \$530,500 to \$540,000 in connection with his promotion to Chief Operating Officer.
- (3) Dr. Delaney became our Chief Scientific Officer, Virology effective May 27, 2020. For information regarding the prorated amount of this annualized total that Dr. Delaney received in 2020, see "Summary Compensation Table."
- (4) On September 1, 2021, Dr. Delaney's salary was increased from \$430,000 to \$470,000 to bring his base salary more in line with Chief Scientific Officers at comparable companies.

The Compensation Committee approved modest 2021 merit-based base salary increases of 3.0% for each of Dr. McHutchison and Mr. Okazaki and 3.5% for Dr. Delaney, in recognition of our strong overall performance in 2020, notwithstanding the COVID-19 pandemic, including, among other accomplishments: completing our senior leadership transition, entering into collaborations with (1) BeiGene, Ltd., related to clinical development of our core inhibitors in the People's Republic of China, Hong Kong, Taiwan and Macau, (2) Arbutus Biopharma Corporation to evaluate VBR + AB-720 + NrtI, and (3) Door Pharmaceuticals, LLC focused on developing a novel class of cccDNA disruptors to complement our current portfolio; completing a Phase 1a trial of 3733; and initiating a Phase 2 study of 2158.

In addition to his merit-based salary increase, Dr. Delaney's salary was increased an additional 9.3% effective September 1, 2021 to bring his base salary more in line with Chief Scientific Officers at comparable companies, including members of our 2021 Peer Group, following a periodic market check conducted by Aon and our Human Resources team.

Annual Performance-Based Cash Bonus

Our employees, including our NEOs, are eligible to earn annual performance-based cash bonuses to reward strong performance and encourage retention in a competitive labor market. We pay these bonuses to motivate and reward our employees for achieving or exceeding our shorter-term corporate goals, which are each designed to be measured over a calendar year.

Annual performance-based cash bonuses are earned based on the achievement of significant pre-set, objective Company-wide goals weighted to reflect their relative importance to the achievement of our goals, with specific goals tailored to the NEOs' areas of responsibility. These performance goals are pre-set by our Compensation Committee in the first quarter of the applicable calendar year and approved by the Board. Actual bonus amounts earned are determined in the first quarter of the following year based on achievement of the pre-set Company-wide goals and, for employees other than our CEO, individual performance objectives set by our employees, including our NEOs other than the CEO, in consultation with their managers, which may include certain department, group or team objectives applicable to these employees. The Compensation Committee may increase or decrease an NEO's bonus payment (above or below the target percentage) based on its assessment of our performance and that NEO's individual performance during a given year. For 2021, annual bonuses were based on achievement of a broad variety of goals and included specific goals related to clinical development, research, manufacturing, financial operations,

business development and human resources. The selected goals were designed such that high rates of achievement overall required strong performances by all of our internal teams. Our 2021 corporate objectives, a statement regarding achievement, relative weight and achievement of each as of December 31, 2021 were as follows:

2021 Corporate Objectives				
Functions	Goals	Achievement	Weight	Achieved
Development	Complete enrollment of 2158 Phase 2 study and evaluate interim data to determine safety and efficacy of 2158 compared to VBR.	Enrollment completed in August 2021; study discontinued due to toxicity	25%	100%
	Initiate and complete enrollment of (1) Study 203 and (2) Study 204	Delays experienced due to COVID-related issues; approximately 75% enrolled, enrollment completed in first quarter of 2022 with no anticipated delay on data readouts	20%	75%
Research	Nominate a fourth core inhibitor development candidate	Nominated in August 2021	10%	100%
	Identify and initiate at least three new additional priority research programs	Three programs initiated	10%	100%
Manufacturing	Develop and implement a manufacturing strategy to support clinical development of HBV assets with focus on optimizing processes and formulations, while reducing costs	Significant progress toward greatly reducing costs of goods sold	10%	110%
Finance	Raise additional funds through capital markets, potential non-dilutive funding opportunities or strategic partnerships to fund operations into 2023	Cash runway extended into 2023	10%	100%
Business Development	Identify and close at least one external collaboration or other strategic transaction	Antios collaboration announced; additional sale of certain microbiome assets completed	10%	105%
Human Resources	Retain critical talent throughout the organization	Turnover rate below industry average	5%	105%
Total	97%			

We performed very strongly in 2021. Although our Development team fell short of achieving full enrollment of Study 203 and Study 204, this was largely due to COVID-19 pandemic-related patient screening delays, travel restrictions and hesitancy of patients to travel to study sites. In addition, certain of our Development team's vendors were also impacted, as central laboratories were unable to meet contractual obligations, and other vendors experienced staffing constraints and supply chain challenges as they sought to obtain lab kits, reagents and other items necessary to enroll patients in Study 203 and Study 204.

Despite the Development team's enrollment delays in 2021, after receiving and considering management's analysis and recommendations, the Compensation Committee determined that the percentage achievement of the 2021 Company-wide performance goals was 97%. This determination of achievement for our 2021 corporate objectives despite the enrollment challenges experienced was supported by the strong performance of our Manufacturing, Business Development and Human Resources teams, which far exceeded the 2021 goals.

Our Manufacturing team's performance resulted in greatly reduced costs to manufacture VBR and a more potent new formulation of 3733, which we plan to use in an upcoming Phase 1b study. Our Business Development team exceeded its target by completing a second strategic transaction, completing a sale of certain of our Microbiome

team's assets, raising \$3.0 million with a subsequent potential milestone payment. In addition to retaining all the critical talent throughout our organization, our management team, with significant support from Human Resources, kept our turnover rate below average for our industry.

In determining individual performance-based cash bonus payouts, the NEOs' potential performance-based cash bonuses were weighted differently, depending on their respective areas of responsibility and contributions to our Company-wide goals.

Dr. McHutchison's performance-based cash bonus was based exclusively on achievement of the Company-wide goals, which we outlined above. Our other NEOs' performance-based cash bonuses were weighted 75% on achievement of the Company-wide goals and 25% on individual performance.

Mr. Okazaki's individual performance was evaluated based on (1) his efforts in connection with the negotiation and execution of two business development transactions and (2) his performance overseeing our general and administrative functions of our business, including our investor relations, business development, legal and information technology teams.

Dr. Delaney's individual performance was evaluated based on his efforts in connection with restructuring, building out and expanding the capacity and capabilities of our research organization.

Each of our employees, including our NEOs, is eligible for a target bonus, which is set as a percentage of annualized base salary. The Compensation Committee determines these target bonus percentages based on the range of target bonus percentages for similar positions in our peer group, and our Compensation Committee periodically reviews and evaluates our NEOs' target bonus percentages as compared to our peers. None of the NEOs' target bonus percentages, which are set forth in the table below, were changed between 2020 and 2021; however, effective August 1, 2021, Mr. Okazaki's target bonus percentage was increased to 55% in connection with his promotion to Chief Operating Officer. The following table sets forth our NEOs' 2021 target performance-based cash bonus amounts and actual performance-based cash bonuses earned.

NEO	2021 Target Bonus		2021 Actual Bonus	
	Percentage of Base Salary	Amount	Amount	Percentage of Target Bonus
John G. McHutchison, A.O., M.D.	75%	\$ 633,450	\$ 614,500	97%
Jason A. Okazaki	55% ⁽¹⁾	297,000	297,800	100%
William E. Delaney IV, Ph.D.	40%	188,000	190,900	102%

(1) Mr. Okazaki's target bonus percentage was increased to 55% effective August 1, 2021 in connection with his promotion to Chief Operating Officer.

Long-term Equity Incentive Awards

Our equity-based long-term incentive program is designed to align our employees', including our NEOs', long-term incentives with those of our stockholders. In approving equity awards, the Compensation Committee's and the Board's guiding principles are to create a program that is designed to:

- Motivate management to generate significant total stockholder return, as measured by sustained increases in our stock price,
- Incentivize and reward our NEOs for achieving multiyear strategic goals, and
- Attract, motivate and retain skilled employees.

We believe that participation by our employees, including our NEOs, in our long-term equity incentive program is a critical factor in the achievement of long-term Company-wide goals and business objectives. In furtherance of these objectives, equity awards granted to NEOs and other employees are a critical component of our compensation practices.

Annual Equity Grants

In 2021, our annual equity incentive awards consisted of a mix of stock options and time-based restricted stock units (RSUs), which is a common practice among the companies in our 2021 Peer Group. We believe stock options provide meaningful incentives to employees to achieve increases in the value of our stock over time, because employees profit from stock options only if our stock price increases relative to the stock option's exercise price. We believe that RSU grants are also effective tools to retain and motivate our employees, including our NEOs, to achieve longer-term financial goals that we expect to lead to increased value to our stockholders while resulting in less dilution to our stockholders than stock options. In each case the interests of our employees and our stockholders are aligned; as our stock price increases, both our employees and our stockholders benefit.

Our Compensation Committee has previously discussed incorporating performance elements to our regular annual equity incentive program, however, based on discussions with Aon and the practices of our peer companies, the Compensation Committee decided that it is premature to introduce performance-based awards into our annual equity incentive program. We are a research and clinical stage biotechnology company that does not yet generate product revenues and satisfying the regulatory requirements of the U.S. Food and Drug Administration typically takes many years. Given our size, scope, the volatility of stock prices in our industry, as evidenced by the recent sustained downturn in the biotech market, and the long-term nature of our ultimate goals, Aon believes, and our Compensation Committee agrees, that time-based equity awards with meaningful time-based vesting periods have the same effect that performance-based awards have for differently situated companies. Inclusion of performance elements to our annual equity incentive program may not accurately reflect or reward our employees' performance, including that of our NEOs. The Compensation Committee believes that the structure of our current long-term equity incentive program best aligns the interests of both our management and stockholders. Although the Compensation Committee thinks that it is premature to introduce performance-based awards into our regular annual equity incentive program, in 2021, the Compensation Committee implemented a broad-based supplemental equity award plan aimed at retaining our employees, which, for our NEOs, consisted of 100% performance-based RSUs. For more information, see "—Performance-Based Retention Equity Grants."

Although the Compensation Committee has historically believed that in our industry, time-based vesting periods have the same effect that performance-based awards have for differently situated companies, the Compensation Committee has decided to use a mix of time- and performance-based RSUs in connection with our NEOs' 2022 annual equity grants.

Grants of annual equity awards made to our executive officers, other than those to our CEO, are recommended by the CEO, considering input from Aon, and approved by the Compensation Committee. Grants of equity awards made to our CEO are discussed and determined by the Compensation Committee, in consultation with Aon, without the CEO present at any time.

The Compensation Committee considers the value of existing long-term equity incentive awards, internal pay equity considerations and individual and Company-wide performance when determining the size of annual equity grants. Annual stock option and RSU awards vest over four years, subject to continued service. In each case, we believe the applicable vesting schedule encourages long-term employment, while allowing our NEOs to realize compensation in line with the value that they have created for our stockholders. After considering these factors, in March 2021, our Compensation Committee approved the annual grants to our NEOs summarized in the table below.

NEO	Options to Purchase Common Stock		Restricted Stock Units	
	Number of Shares	Grant Date Fair Value(1)	Number of Shares	Grant Date Fair Value(1)
John G. McHutchison, A.O., M.D.	305,000	\$ 979,253	—	\$ —
Jason A. Okazaki	82,500	252,413	13,750	59,538
William E. Delaney IV, Ph.D.	67,500	206,520	11,250	48,713

(1) The reported amounts represent the grant date fair value of the award, computed in accordance with FASB ASC Topic 718 disregarding any estimated forfeitures related to service-based vesting. Assumptions used in the calculation of these amounts are included in Note 9 of the consolidated financial statements included in the Annual Report on Form 10-K for the year ended December 31, 2021.

Performance-Based Retention Equity Grants

As stated above, among the primary purposes of our equity-based long-term incentive program is to serve as a retention vehicle for our employees by motivating them to create long-term value that is shared by our stockholders.

In the first quarter of 2021, the Compensation Committee requested that Aon conduct an analysis of the retention value of our new-hire and annual equity awards granted over the previous several years. Aon’s analysis was performed using our stock price and outstanding stock options as of April 16, 2021. Due to the steep decline of our stock price in 2020 and 2021, our then-current 30-day average stock price of \$4.49 per share, the average exercise price of our then-outstanding stock options was \$13.63 per share. As a result, our outstanding stock options provided little to no retention value as of early 2021. This negligible retention value, coupled with the highly active 2021 talent market fueled by the U.S. economy’s strong recovery from the COVID-19 pandemic, were the driving factors behind the Compensation Committee’s consideration of a broad-based supplemental equity award program.

Following a series of discussions with management and Aon regarding the proposed supplemental equity award program, the Committee recommended, and the Board approved, a framework as follows:

- *Guiding Principles:*
 - **Meaningful Retention Value** – provide significant potential value to employees in alignment with our Company-wide goals to maximize retention over the next two-plus years
 - **Unifying** – Incorporation of performance-based RSUs that vest based on two significant clinical and research goals that are critical to the scientific and commercial success of the entire Company:
 - Receipt of 48-week data for either Study 203 or Study 204
 - Initiation of a Phase 1 clinical study for 4334 or another mechanism of action discovered internally, acquired or licensed by the Company
 - **Simple** – Easy to communicate, aimed at resonating with all employees
- *Award Composition:* Mix of time-based and performance-based RSUs
 - C-Level, including NEOs: 100% performance-based
 - SVPs: 50% performance-based; 50% time-based
 - VPs and below: 25% performance-based; 75% time-based

Sizes of individual supplemental equity awards were determined based on the criticality of the employee to receive the award and were targeted based on multiples of our annual equity award targets. C-Level awards, including those made to the NEOs, did not exceed 1.00x of our annual grant targets. As with our annual equity awards, grants of retention equity awards made to our CEO were discussed and determined by the Compensation Committee, in consultation with Aon, without the CEO present at any time.

The performance-based RSU awards vest in two installments: (1) 50% vest upon the later of (a) the first anniversary of the grant date and (b) the date on which the Compensation Committee determines that both performance milestones have been met (Milestone Vesting Date) and (2) 50% upon the first anniversary of the Milestone Vesting Date. The time-based supplemental equity awards vest in two installments, on the first and second anniversaries of the grant.

In July 2021, our Compensation Committee approved the supplemental equity awards to our NEOs summarized in the table below.

NEO	Performance-based Restricted Stock Units	
	Number of Shares	Grant Date Fair Value(1)
John G. McHutchison, A.O., M.D.	117,500	\$ 419,475
Jason A. Okazaki	35,000	124,950
William E. Delaney IV, Ph.D.	35,000	124,950

- (1) The reported amounts represent the grant date fair value of the award, computed in accordance with FASB ASC Topic 718 disregarding any estimated forfeitures related to service-based vesting. Assumptions used in the calculation of these amounts are included in Note 9 of the consolidated financial statements included in the Annual Report on Form 10-K for the year ended December 31, 2021.

Other Compensation

In 2021, we maintained broad-based benefits and perquisites that are provided to all eligible employees on the same terms, including 401(k) match, health insurance, life and disability insurance, dental insurance, sick leave and non-accrual vacation time.

Other Executive Compensation Policies

Sections 280G and 4999 of the Code

Sections 280G and 4999 of the Code provide that executive officers and directors who hold significant equity interests and certain other service providers may be subject to significant additional taxes if they receive payments or benefits in connection with a change in control that exceeds certain prescribed limits, and that we (or a successor) may forfeit a deduction on the amounts subject to this additional tax. We have not agreed to provide any executive officer with a “gross-up” or other reimbursement payment for any tax liability that the executive officer might owe because of the application of Sections 280G or 4999 of the Code.

Hedging and Pledging Policy

Under our Insider Trading Policy, all persons subject to the policy, including executive officers, directors, employees, consultants and contractors, are prohibited from engaging in the following transactions related to our securities:

- Short sales;
- Publicly traded options, including put options, call options or other derivative securities;
- Hedging and monetization transactions, including through the use of financial instruments such as prepaid variable forwards, equity swaps, collars and exchange funds; and
- Margin accounts and pledged securities.

Our Insider Trading Policy prohibits these types of transactions because there is both a heightened legal risk and the appearance of improper conduct if covered persons take part in transactions of this sort.

Compensation Risk Assessment

We believe that our executive compensation policies and programs do not encourage excessive or unnecessary risk taking. This is primarily because our compensation programs are designed to encourage our executive officers and other employees to focus on both short-term and long-term strategic goals. As a result, we do not believe that our compensation programs are reasonably likely to have a material adverse effect on us.

Clawback

The Compensation Committee has considered implementing a clawback policy several times. To date, we have no approved products on the market and have generated no product sales. As a result, our compensation-related goals are not tied to financial metrics and would not be affected by a restatement of our consolidated financial statements. However, given that the SEC reopened the comment period for the clawback rule contained in the Dodd-Frank Wall Street Reform and Consumer Protection Act, we expect that the SEC will issue final regulations soon, at which time we will implement an SEC-compliant clawback policy.

Stock Ownership Guidelines

The Compensation Committee most recently discussed the implementation of stock ownership guidelines in March 2022. The Compensation Committee noted the volatile nature of the biotech market, as evidenced by the recent steep declines of our stock price, and the well documented, sector-wide weakness in the biotech market that began in early 2021 and accelerated near the end of 2021. The Compensation Committee determined that the large number of shares that our executive officers would need to own to comply with any meaningful set of stock ownership guidelines makes it impracticable to implement stock ownership guidelines at that time. The Compensation Committee intends to review implementation of stock ownership guidelines and the impact that such guidelines may have periodically in the future.

Employment Arrangements

As of December 31, 2021, all our NEOs served pursuant to employment agreements. These agreements all share the following characteristics:

- Upon a change of control, double-trigger severance and equity acceleration rights;
- No guaranteed bonuses;
- No excise tax gross-ups; and
- No special health or welfare benefits.

John G. McHutchison, A.O., M.D.

In August 2019, we entered into an employment agreement with Dr. McHutchison. The employment agreement provides for an at-will employment arrangement. Dr. McHutchison's base salary in 2020 was \$820,000 and his target bonus opportunity was 75% of his base salary. Effective February 16, 2021, Dr. McHutchison's annualized base salary was increased to \$844,600, and his target bonus opportunity remained unchanged.

We agreed to use our best efforts to cause Dr. McHutchison to be elected as a voting member of the Board throughout his employment and include him in the slate for election as a director at every stockholders' meeting. Dr. McHutchison agreed to accept such election and to serve as a member of the Board without any additional compensation while he serves as our Chief Executive Officer.

If Dr. McHutchison's employment is terminated due to his death other than during the period from one month prior to and through 12 months following, a change in control (as defined in his employment agreement), then we will pay to his estate his then-current base salary for a period of 12 months following such termination. However, if at the time of the Dr. McHutchison's death, we provide or cause to be provided life insurance benefits for Dr. McHutchison at our sole expense, our obligation under the preceding sentence will be reduced to the extent of such life insurance coverage and will be fully satisfied if we maintain life insurance benefits for Dr. McHutchison equal to or greater than his then-current annualized base salary.

If Dr. McHutchison's employment is terminated by us due to his disability (as defined in his employment agreement) or without cause (as defined in his employment agreement) or by Dr. McHutchison for good reason (as defined in his employment agreement) or as a result of his death, in each case during the period from one month prior to and through 12 months following, a change of control (as defined in his employment agreement), and subject to Dr. McHutchison's execution and non-revocation of a general release of claims, we will provide Dr. McHutchison the following benefits: (1) a lump sum payment equal to 18 months of his then-current base salary; (2) an amount equal to 1.5 times his full target annual bonus for the year in which the termination occurred; (3) immediate vesting in full of all equity awards (including equity awards that vest based on performance but only to the extent accelerated vesting is provided in the agreements governing such equity awards); provided, however that (a) in the event that such termination occurs during the one month prior to a change of control, any equity-based compensation outstanding as of the termination will not accelerate but will remain outstanding and eligible to vest immediately prior to the consummation of the change of control and (b) in the event that such termination occurs prior to a change of control and such change of control is not consummated on or prior to the date one month after such termination, no vesting will occur and any equity awards outstanding as of the termination will vest, if at all, and terminate in accordance with, and to the extent provided in the non-change of control separation provisions and the equity award agreements; (4) extension of the exercise period for all vested stock options held by Dr. McHutchison to the end of their term; and (5) if Dr. McHutchison properly elects COBRA, reimbursement for the portion of the COBRA premiums that we would have paid had he remained employed for 18 months following termination or the end of his COBRA continuation period, whichever is earlier.

If Dr. McHutchison's employment is terminated by us as a result of his disability, by us without cause or by Dr. McHutchison for good reason, and such termination does not occur during the one month prior to or within 12 months following, a change of control, and subject to Dr. McHutchison's execution and non-revocation of a general release of claims, we will provide him the following benefits: (1) continued payment of his then-current base salary for 12 months following date of termination of employment; (2) his annual performance bonus, if any, for the year in which termination occurs in an amount equal to the amount Dr. McHutchison would have earned based on our

performance if he was employed for the full year, pro-rated based on the number of days employed for the year of termination; (3) all equity awards that would have time vested during the 12 months following the termination date shall accelerate and vest; (4) extension of the exercise period for all vested stock options held by Dr. McHutchison as of the termination date until the earlier of the first anniversary of the employment termination date and the termination date of the vested stock options; and (5) if Dr. McHutchison properly elects COBRA, reimbursement for the portion of the COBRA premiums that we would have paid had he remained employed for 12 months following termination or the end of his COBRA continuation period, whichever is earlier. The benefits described in this paragraph are in lieu of, and not in addition to, the benefits described in the prior preceding paragraph.

If the payments or benefits payable to Dr. McHutchison in connection with a change in control would be subject to the excise tax on golden parachutes imposed under Section 4999 of the Code, then those payments or benefits will be reduced if such reduction would result in a higher net after-tax benefit to Dr. McHutchison.

Jason A. Okazaki

In July 2021, we entered into an amended and restated agreement with Mr. Okazaki in connection with his promotion to Chief Operating Officer. Mr. Okazaki's employment agreement provides for an initial annualized base salary of \$540,000 and an annual performance-based incentive cash bonus in an amount initially targeted at 55% of Mr. Okazaki's base salary.

If Mr. Okazaki's employment is terminated by us as a result of his disability or without cause or by Mr. Okazaki for good reason within 12 months immediately following a change of control (as defined in his employment agreement), provided that Mr. Okazaki signs and does not revoke a general release of claims against us, we will provide him the following benefits: (1) a lump sum payment equal to 15 months of his then-current base salary; (2) an amount equal to his full target annual bonus for the year in which the termination occurred; (3) immediate vesting in full of all equity awards held by Mr. Okazaki that are subject to time-based vesting; and (4) if Mr. Okazaki properly elects COBRA, reimbursement of the portion of the COBRA premiums that we would have paid had he remained employed for 15 months following termination or the end of his COBRA continuation period, whichever is earlier; provided, however, our obligation to pay such premiums will terminate earlier if he becomes eligible for insurance benefits from another employer during such period.

If Mr. Okazaki's employment is terminated as a result of his disability, by us without cause or by Mr. Okazaki for good reason, and such termination does not occur within 12 months following a change of control and provided that Mr. Okazaki signs and does not revoke a general release of claims against us, we will provide him the following benefits: (1) continued payment of his then-current base salary for 12 months following date of termination of employment, and (2) if Mr. Okazaki properly elects COBRA, reimbursement of the portion of the COBRA premiums that we would have paid had he remained employed for 12 months following termination or the end of his COBRA continuation period, whichever is earlier; provided, however, our obligation to pay such premiums will terminate earlier if he becomes eligible for insurance benefits from another employer during such period. Such benefits are in lieu of, and not in addition to, the benefits described in the preceding paragraph.

If the payments or benefits payable to Mr. Okazaki in connection with a change in control would be subject to the excise tax on golden parachutes imposed under Section 4999 of the Code, then those payments or benefits will be reduced if such reduction would result in a higher net after-tax benefit to Mr. Okazaki.

For a description of Mr. Okazaki's severance entitlements under his employment agreement, see "—Severance and Change in Control Provisions" below.

William E. Delaney IV, Ph.D.

In May 2020, we entered into an employment agreement with Dr. Delaney. Dr. Delaney's base salary in 2020 was \$415,000 and his target bonus opportunity was 40% of his base salary. Effective February 16, 2021, Dr. Delaney's annualized base salary was increased to \$430,000, and his target bonus opportunity remained unchanged. Effective February 16, 2021, Dr. Delaney's annualized base salary was increased to \$470,000 to bring his base salary more in line with Chief Scientific Officers at comparable companies, and his target bonus opportunity remained unchanged.

If Dr. Delaney's employment is terminated by us as a result of his disability or without cause or by Dr. Delaney for good reason within 12 months immediately following a change of control (as defined in his employment agreement),

provided that Dr. Delaney signs and does not revoke a general release of claims against us, we will provide him the following benefits: (1) a lump sum payment equal to 12 months of his then-current base salary; (2) an amount equal to his full target annual bonus for the year in which the termination occurred; (3) immediate vesting in full of all equity awards held by Dr. Delaney that are subject to time-based vesting; and (4) if Dr. Delaney properly elects COBRA, reimbursement of the portion of the COBRA premiums that we would have paid had he remained employed for 12 months following termination or the end of his COBRA continuation period, whichever is earlier; provided, however, our obligation to pay such premiums will terminate earlier if he becomes eligible for insurance benefits from another employer during such period.

If Dr. Delaney's employment is terminated as a result of his disability, by us without cause or by Dr. Delaney for good reason, and such termination does not occur within 12 months following a change of control and provided that Dr. Delaney signs and does not revoke a general release of claims against us, we will provide him the following benefits: (1) continued payment of his then-current base salary for 12 months following date of termination of employment, and (2) if Dr. Delaney properly elects COBRA, reimbursement of the portion of the COBRA premiums that we would have paid had he remained employed for 12 months following termination or the end of his COBRA continuation period, whichever is earlier; provided, however, our obligation to pay such premiums will terminate earlier if he becomes eligible for insurance benefits from another employer during such period. Such benefits are in lieu of, and not in addition to, the benefits described in the preceding paragraph.

If the payments or benefits payable to Dr. Delaney in connection with a change in control would be subject to the excise tax on golden parachutes imposed under Section 4999 of the Code, then those payments or benefits will be reduced if such reduction would result in a higher net after-tax benefit to the NEO.

Outstanding Equity Awards at December 31, 2021

The following table contains certain information concerning outstanding equity awards held by the NEOs as of December 31, 2021.

Name	Option 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 (\$)	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 (\$)	
John G. McHutchison, A.O., M.D.	388,889	111,111 (1)	11.86	08/06/2029	—	—	—	—	
	43,750	56,250 (2)	14.45	03/27/2030	—	—	—	—	
	—	305,000 (2)	4.33	03/29/2031	—	—	—	—	
	—	—	—	—	33,334 (3)	77,668	—	—	
	—	—	—	—	37,500 (4)	87,375	—	—	
	—	—	—	—	—	50,000 (5)	116,500		
	—	—	—	—	—	117,500 (6)	273,775		
Jason A. Okazaki	109,375	140,625 (2)	15.05	03/26/2030	—	—	—	—	
	—	82,500 (2)	4.33	03/29/2031	—	—	—	—	
	—	—	—	—	37,500 (7)	87,375	—	—	
	—	—	—	—	13,750 (8)	32,038	—	—	
	—	—	—	—	—	35,000 (6)	81,550		
William E. Delaney IV, Ph.D.	39,583	60,417 (2)	20.52	05/27/2030	—	—	—	—	
	—	67,500 (2)	4.33	03/29/2031	—	—	—	—	
	—	—	—	—	33,750 (9)	78,638	—	—	
	—	—	—	—	11,250 (8)	26,213	—	—	
	—	—	—	—	—	35,000 (6)	81,550		

(1) These options vest and become exercisable one-third on the first anniversary of the grant date and the remainder over the next 24 months in approximately equal monthly installments, provided the executive officer continues to be employed with us through the applicable vesting date.

- (2) These options vest and become exercisable 25% on the first anniversary of the grant date and the remainder over the next 36 months in approximately equal monthly installments, provided the executive officer continues to be employed with us through the applicable vesting date.
- (3) These RSUs vest in three approximately equal installments on August 6, 2020, August 6, 2021 and August 6, 2022 provided the executive officer continues to be employed with us through the applicable vesting date.
- (4) These RSUs vest in four approximately equal installments on March 29, 2021, March 29, 2022, March 29, 2023 and March 29, 2024, provided the executive officer continues to be employed with us through the applicable vesting date.
- (5) Reflects performance-based RSUs granted on September 28, 2019 that vest only upon the occurrence of certain milestones related to our HBV program and our Microbiome program and if certain market-based performance metrics are met. As of December 31, 2020, none of these performance-based RSUs have vested.
- (6) Reflects performance-based RSUs granted on July 22, 2021 that vest only upon the occurrence of certain milestones related to our HBV Cure program. As of December 31, 2021, none of these performance-based RSUs have vested.
- (7) These RSUs vest in four approximately equal installments on March 26, 2021, March 26, 2022, March 26, 2023 and March 26, 2024, provided the executive officer continues to be employed with us through the applicable vesting date.
- (8) These RSUs vest in four approximately equal installments on March 29, 2022, March 29, 2023, March 29, 2024 and March 29, 2025, provided the executive officer continues to be employed with us through the applicable vesting date.
- (9) These RSUs vest in four approximately equal installments on May 27, 2021, May 27, 2022, May 27, 2023 and May 27, 2024, provided the executive officer continues to be employed with us through the applicable vesting date.

CERTAIN RELATIONSHIPS AND RELATED PARTY TRANSACTIONS

The written charter of our Audit Committee authorizes our Audit Committee to review and approve related party transactions. In reviewing related party transactions, our Audit Committee applies the basic standard that transactions with affiliates should be made on terms no less favorable to us than could have been obtained from unaffiliated parties. Therefore, the Audit Committee reviews the benefits of the transactions, terms of the transactions and the terms available from unrelated third parties, as applicable. All transactions other than compensatory arrangements between us and our officers, directors, principal stockholders and their affiliates will be approved or ratified by our Audit Committee or a majority of the disinterested directors only on terms no less favorable to us than could be obtained from unaffiliated third parties.

In September 2019, we retained Colin Watanabe as a consultant to provide critical bioinformatic support for intellectual property filings made by our Microbiome program, which was wound down in January 2021. Dr. Watanabe shares a common household with, and is the significant other of, Jacqueline Papkoff, our former Chief Scientific Officer – Microbiome. Dr. Watanabe retired in March 2019 following a 40-year career building a bioinformatics programming infrastructure at a large pharmaceutical company, and we retained him in connection with the resignation of our then-only bioinformatics employee. Dr. Watanabe initially backfilled the role of the departed employee and participated in the screening of bioinformatics candidates. Upon the completion of the restaffing of the bioinformatics team, Dr. Watanabe dedicated his time to rebuilding our bioinformatics infrastructure and workflows, as well as building new databases that enabled new types of bioinformatics sequence analyses that greatly improved taxonomic classification, which was critical to our Microbiome program’s intellectual property efforts. Since Dr. Watanabe is retired, he was not seeking full-time employment and worked only ten hours per week between September 2019 and the end of his engagement in December 2020. In 2020, we paid Dr. Watanabe approximately \$135,000, which includes a 17.5% markup paid to a third-party management company.

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

STOCK OWNERSHIP INFORMATION

Security Ownership of Certain Beneficial Owners

The following table sets forth certain information regarding the ownership of shares of our common stock based on 48,120,437 shares outstanding as of March 28, 2022, the record date for the Annual Meeting, by (1) each person known by us to beneficially own more than 5% of the outstanding shares of common stock, (2) each of our directors and (3) each of our NEOs and (4) all of our directors and current executive officers as a group.

This table is based upon information supplied by our directors and NEOs and from Schedules 13G filed with the SEC by our 5% stockholder. Unless otherwise indicated in the footnotes to this table and subject to community property laws where applicable, each of the stockholders named in this table has sole voting and investment power with respect to the shares indicated as beneficially owned by them. Share ownership in each case includes (1) shares issuable upon exercise of options and warrants that may be exercised within 60 days after the record date and (2) RSUs held by the individual that are scheduled to vest and settle within 60 days after the record date for purposes of computing the percentage of common stock owned by such person, but not for purposes of computing the percentage owned by any other person. Unless otherwise noted, the address for each person listed below is c/o Assembly Biosciences, Inc., 331 Oyster Point Blvd., Fourth Floor, South San Francisco, California 94080. Applicable percentages are based on 48,120,437 shares outstanding on the record date.

There are no arrangements known to us, including any pledge by any person of our securities, the operation of which may at a subsequent date result in a change in control of Assembly.

Name of Beneficial Owner	Shares Beneficially Owned	Percentage Owned (%)
5% Stockholders:		
Deep Track Capital, LP ⁽¹⁾	3,000,000	6.2%
Directors, Named Executive Officers and Executive Officers:		
Anthony E. Altig ⁽²⁾	142,000	*
Gina Consylman ⁽³⁾	21,666	*
Richard D. DiMarchi, Ph.D. ⁽⁴⁾	453,240	*
Myron Z. Holubiak ⁽³⁾	134,000	*
Sir Michael Houghton, Ph.D.	—	—
Lisa R. Johnson-Pratt ⁽³⁾	10,000	*
Susan Mahony, Ph.D. ⁽³⁾	62,500	*
William R. Ringo, Jr. ⁽⁵⁾	136,465	*
John G. McHutchison, A.O., M.D. ⁽⁶⁾	660,379	1.4%
Jason A. Okazaki ⁽⁷⁾	187,079	*
William E. Delaney IV, Ph.D. ⁽⁸⁾	91,464	*
All directors and executive officers as a group (13 persons)	2,041,470	4.2%

* Less than 1%.

(1) Based on the information contained in the Schedule 13G/A filed with the SEC on February 14, 2022. Consists of 3,000,000 shares of common stock. Voting and dispositive power for these shares is shared by Deep Track Capital, LP, Deep Track Biotechnology Master Fund, Ltd. and David Kroin. The address for Deep Track Capital, LP is 200 Greenwich Ave., 3rd Floor, Greenwich, CT 06830. The address for Deep Track Biotechnology Master Fund, Ltd. is c/o Walkers Corporate Limited, 190 Elgin Ave, George Town, KY1-9001, Cayman Islands. The address for David Kroin is c/o Deep Track Capital, LP, 200 Greenwich Ave, 3rd Floor, Greenwich, CT 06830.

(2) Includes 8,000 shares of common stock and 134,000 shares of common stock that Mr. Altig has the right to acquire from us within 60 days after the record date pursuant to the exercise of stock options.

(3) Includes shares of common stock that the individual has the right to acquire from us within 60 days after the record date pursuant to the exercise of stock options.

- (4) Includes 319,240 shares of common stock and 134,000 shares of common stock that Dr. DiMarchi has the right to acquire from us within 60 days after the record date pursuant to the exercise of stock options.
- (5) Includes 17,465 shares of common stock and 119,000 shares of common stock that Mr. Ringo has the right to acquire from us within 60 days after the record date pursuant to the exercise of stock options.
- (6) Includes 54,859 shares of common stock, 12,500 RSUs scheduled to vest within 60 days of the record date and 593,020 shares of common stock that Dr. McHutchison has the right to acquire from us within 60 days after the record date pursuant to the exercise of stock options.
- (7) Includes 23,383 shares of common stock, 3,437 RSUs scheduled to vest within 60 days of the record date and 157,759 shares of common stock that Mr. Okazaki has the right to acquire from us within 60 days after the record date pursuant to the exercise of stock options.
- (8) Includes 9,121 shares of common stock, 14,062 RSUs scheduled to vest within 60 days of the record date and 68,281 shares of common stock that Dr. Delaney has the right to acquire from us within 60 days after the record date pursuant to the exercise of stock options.

Delinquent Section 16(a) Reports

Section 16(a) of the Exchange Act, requires our executive officers, directors, and “beneficial owners” of more than 10% of our common stock to file stock ownership reports and reports of changes in ownership with the SEC. Based on a review of those reports and written representations from the reporting persons, we believe that during fiscal 2021, all transactions were reported on a timely basis except that, due to an administrative oversight, a Form 4 by Dr. McHutchison reporting an annual equity grant and Form 4s by Mr. Okazaki, Dr. Delaney, Luisa M. Stamm, M.D., Ph.D. and Thomas J. Russo, our former Chief Financial Officer, each reporting two annual equity grants that were due on March 31, 2021 were filed on April 2, 2021.

DEADLINE FOR STOCKHOLDER PROPOSALS FOR THE 2023 ANNUAL MEETING OF STOCKHOLDERS

Any stockholder who meets the requirements of the proxy rules under the Exchange Act may submit proposals to the Board to be included in next year's proxy statement and on our proxy card for the 2023 Annual Meeting of Stockholders. Such proposals must comply with the requirements of Rule 14a-8 under the Exchange Act. To be considered for inclusion in next year's proxy materials, any proposals must be submitted in writing by December 13, 2022, to our Corporate Secretary at 331 Oyster Point Blvd., Fourth Floor, South San Francisco, California 94080; provided, however, that if our 2023 Annual Meeting of Stockholders is held before April 25, 2023 or after June 24, 2023, then the deadline is a reasonable amount of time prior to the date we begin to print and send our proxy statement for the 2023 Annual Meeting of Stockholders.

Subject to compliance with applicable requirements of state law and the Exchange Act, our Amended and Restated Bylaws also provide for separate notice procedures to propose business to be considered by stockholders at a meeting. Such proposals must comply with the requirements, including without limitation, the separate notice procedures, of our Amended and Restated Bylaws. If you wish to submit such a proposal, written notice must be received by the Corporate Secretary no later than the close of business not more than 90 days before or less than 60 days before the date of the meeting, in the case of the 2023 Annual Meeting of Stockholders or any other annual meeting, or by the tenth business day following the day on which public announcement of the date of the meeting is first made, in the case of a special meeting.

Our Amended and Restated Bylaws permit a stockholder, or a group of up to 20 eligible stockholders, that has owned at least 3% of our outstanding common stock for at least three years to nominate and include in our proxy statement candidates for the Board, subject to certain requirements. Any such nomination must be received at the address above no earlier than the close of business on November 13, 2022 and no later than the close of business on December 13, 2022; provided, however, that if our 2023 Annual Meeting of Stockholders is held before April 25, 2023 or after June 24, 2023, then the deadline is the later of close of business on the date that is 180 days prior to the 2023 Annual Meeting of Stockholders and the tenth day following the date that the 2023 Annual Meeting of Stockholders is first publicly disclosed. Any such notice must meet the other requirements set forth in our Amended and Restated Bylaws, which are publicly available on the SEC's website.

Our Amended and Restated Bylaws also provide for separate notice procedures to nominate a person as a director, provided that such nominee would not be included in next year's proxy materials. Such proposals must comply with the requirements, including without limitation, the separate notice procedures, of our Amended and Restated Bylaws. If you wish to nominate a director, written notice must be received by the Corporate Secretary no later than the close of business not more than 90 days before or less than 60 days before the date of the annual meeting, in the case of the 2023 Annual Meeting of Stockholders or any other annual meeting, or not later than the tenth day following the day on which public announcement of the date of the meeting is first made in the event that less than 70 days' notice or prior public disclosure of the date of the annual meeting is given or made to stockholders.

DELIVERY OF DOCUMENTS TO STOCKHOLDERS SHARING AN ADDRESS

The SEC has adopted rules that permit companies to deliver a single Proxy Availability Notice or a single copy of proxy materials to multiple stockholders sharing an address unless a company has received contrary instructions from one or more of the stockholders at that address. Upon request, we will promptly deliver a separate Proxy Availability Notice or separate copy of proxy materials to one or more stockholders at a shared address to which a single Proxy Availability Notice or a single copy of proxy materials was delivered. Stockholders may request a separate Proxy Availability Notice or separate copy of proxy materials by contacting our Corporate Secretary either by calling +1.833.509.4583 or by mailing a request to 331 Oyster Point Blvd., Fourth Floor, South San Francisco, California 94080. Stockholders at a shared address who receive multiple Proxy Availability Notices or multiple copies of proxy materials may request to receive a single Proxy Availability Notice or a single copy of proxy materials in the future in the same manner as described above.

OTHER MATTERS

The Board knows of no business to be brought before the meeting other than the proposals identified in this proxy statement. If any other matters properly come before the stockholders at the Annual Meeting, it is the intention of the persons named on the proxy to vote the shares represented thereby in accordance with their best judgment.

Proposed Amendment No. 5 to Assembly Biosciences, Inc. 2018 Stock Incentive Plan

AMENDMENT NO. 5

TO

**ASSEMBLY BIOSCIENCES, INC.
2018 STOCK INCENTIVE PLAN**

Assembly Biosciences, Inc., a Delaware corporation (the “Company”) adopted the 2018 Stock Incentive Plan on May 30, 2018, which was amended by Amendment No. 1 to Assembly Biosciences, Inc. 2018 Stock Incentive Plan effective as of May 17, 2019, by Omnibus Amendment to Assembly Biosciences, Inc. Stock Plans effective as of March 11, 2020, by Amendment No. 3 effective as of June 11, 2020 and by Amendment No. 4 effective as of May 20, 2021 (as amended from time to time, the “Plan”).

Prior to this Amendment No. 5 to the Plan, the number of shares of Common Stock, par value \$0.001 per share, reserved under the Plan was 6,600,000.

The Board of Directors of the Company (the “Board”) may, with stockholder approval, amend the Plan to increase the number of authorized shares reserved for issuance under the Plan.

The Board has determined that it is advantageous to the Company and necessary to attract and retain the best available personnel to amend the Plan to increase the number of shares reserved for issuance under the Plan.

Now, therefore, the Plan is hereby amended as follows:

1. Section 3(a) of the Plan shall be amended as follows:

“(a) Subject to the provisions of Sections 3(b) and 12 below, the maximum aggregate number of Shares which may be issued pursuant to all Awards (including Incentive Stock Options) is Eight Million Six Hundred Thousand (8,600,000) Shares. The Shares granted under the Plan may be authorized, but unissued, or reacquired Common Stock.”

Except as expressly set forth in this Amendment No. 5, all other terms and conditions set forth in the Plan shall remain in full force and effect. Each capitalized term used and not defined herein shall have the meaning set forth in the Plan.

Subject to approval of the stockholders, this Amendment No. 5 has been adopted by the Board of Directors of the Company as of March 10, 2022.

This Amendment No. 5 will be submitted to the stockholders of the Company for approval at the annual stockholders meeting to be held on May 25, 2022 and will become effective upon receipt of approval by the stockholders.

Assembly Biosciences, Inc. 2018 Stock Incentive Plan, Incorporating Proposed Amendment

ASSEMBLY BIOSCIENCES, INC.

2018 STOCK INCENTIVE PLAN

1. Purposes of the Plan. The purposes of this Plan are to attract and retain the best available personnel, to provide additional incentives to Employees, Directors and Consultants and to promote the success of the Company's business.

2. Definitions. The following definitions shall apply as used herein and in the individual Award Agreements except as defined otherwise in an individual Award Agreement. In the event a term is separately defined in an individual Award Agreement, such definition shall supersede the definition contained in this Section 2.

(a) "**Administrator**" means the Board or any of the Committees appointed to administer the Plan.

(b) "**Affiliate**" and "**Associate**" shall have the respective meanings ascribed to such terms in Rule 12b-2 promulgated under the Exchange Act.

(c) "**Applicable Laws**" means the legal requirements relating to the Plan and the Awards under applicable provisions of federal and state securities laws, the corporate laws of California and, to the extent other than California, the corporate law of the state of the Company's incorporation, the Code, the rules of any applicable stock exchange or national market system, and the rules of any non-U.S. jurisdiction applicable to Awards granted to residents therein.

(d) "**Assumed**" means that pursuant to a Corporate Transaction either (i) the Award is expressly affirmed by the Company or (ii) the contractual obligations represented by the Award are expressly assumed (and not simply by operation of law) by the successor entity or its Parent in connection with the Corporate Transaction with appropriate adjustments to the number and type of securities of the successor entity or its Parent subject to the Award and the exercise or purchase price thereof which at least preserves the compensation element of the Award existing at the time of the Corporate Transaction as determined in accordance with the instruments evidencing the agreement to assume the Award.

(e) "**Award**" means the grant of an Option, SAR, Dividend Equivalent Right, Restricted Stock, Restricted Stock Unit, Unrestricted Stock or other right or benefit under the Plan.

(f) "**Award Agreement**" means the written agreement evidencing the grant of an Award executed by the Company and the Grantee, including any amendments thereto.

(g) "**Board**" means the Board of Directors of the Company.

(h) "**Cause**" means, with respect to the termination by the Company or a Related Entity of the Grantee's Continuous Service, that such termination is for "Cause" as such term (or word of like import) is expressly defined in a then-effective written agreement between the Grantee and the Company or such Related Entity, or in the absence of such then-effective written agreement and definition, is based on, in the determination of the Administrator, the Grantee's: (i) performance of any act or failure to perform any act in bad faith and to the detriment of the Company or a Related Entity; (ii) dishonesty, intentional misconduct or material breach of any agreement with the Company or a Related Entity; or (iii) commission of a crime involving dishonesty, breach of trust, or physical or emotional harm to any person; provided, however, that with regard to any agreement that defines "Cause" on the occurrence of or in connection with a Corporate Transaction, such definition of "Cause" shall not apply until a Corporate Transaction actually occurs.

(i) "**Code**" means the Internal Revenue Code of 1986, as amended, or any successor statute.

(j) "**Committee**" means any committee composed of members of the Board appointed by the Board to administer the Plan.

(k) “**Common Stock**” means the Company’s Common Stock, par value \$0.001 per share.

(l) “**Company**” means Assembly Biosciences, Inc., a Delaware corporation, formerly known as Ventrus Biosciences, Inc., or any successor entity that adopts the Plan in connection with a Corporate Transaction.

(m) “**Consultant**” means any natural person (other than an Employee or a Director, solely with respect to rendering services in such person’s capacity as a Director) who provides bona fide services to the Company or any Related Entity, within the meaning of Form S-8 promulgated under the Securities Act of 1933, as amended, and provided, further, that a Consultant will include only those persons to whom the issuance of Shares may be registered under Form S-8 promulgated under the Securities Act of 1933, as amended.

(n) “**Continuous Service**” means that the provision of services to the Company or a Related Entity in any capacity of Employee, Director or Consultant is not interrupted or terminated. In jurisdictions requiring notice in advance of an effective termination as an Employee, Director or Consultant, Continuous Service shall be deemed terminated upon the actual cessation of providing services to the Company or a Related Entity notwithstanding any required notice period that must be fulfilled before a termination as an Employee, Director or Consultant can be effective under Applicable Laws. A Grantee’s Continuous Service shall be deemed to have terminated either upon an actual termination of Continuous Service or upon the entity for which the Grantee provides services ceasing to be a Related Entity. Continuous Service shall not be considered interrupted in the case of (i) any approved leave of absence, (ii) transfers among the Company, any Related Entity, or any successor in any capacity of Employee, Director or Consultant, or (iii) any change in status as long as the individual remains in the service of the Company or a Related Entity in any capacity of Employee, Director or Consultant (except as otherwise provided in the Award Agreement). An approved leave of absence shall include sick leave, military leave, or any other authorized personal leave. For purposes of each Incentive Stock Option granted under the Plan, if such leave exceeds three (3) months, and reemployment upon expiration of such leave is not guaranteed by statute or contract, then the Incentive Stock Option shall be treated as a Non-Qualified Stock Option on the day three (3) months and one (1) day following the expiration of such three (3) month period.

(o) “**Corporate Transaction**” means any of the following transactions, provided, however, that the Administrator shall determine under parts (iv) and (v) whether multiple transactions are related, and its determination shall be final, binding and conclusive:

(i) a merger or consolidation in which the Company is not the surviving entity, except for a transaction the principal purpose of which is to change the state in which the Company is incorporated;

(ii) the sale, transfer or other disposition of all or substantially all of the assets of the Company;

(iii) the complete liquidation or dissolution of the Company;

(iv) any reverse merger or series of related transactions culminating in a reverse merger (including, but not limited to, a tender offer followed by a reverse merger) in which the Company is the surviving entity but (A) the shares of Common Stock outstanding immediately prior to such merger are converted or exchanged by virtue of the merger into other property, whether in the form of securities, cash or otherwise, or (B) in which securities possessing more than fifty percent (50%) of the total combined voting power of the Company’s outstanding securities are transferred to a person or persons different from those who held such securities immediately prior to such merger or the initial transaction culminating in such merger; or

(v) acquisition in a single or series of related transactions by any person or related group of persons (other than the Company or by a Company-sponsored employee benefit plan) of beneficial ownership (within the meaning of Rule 13d-3 of the Exchange Act) of securities possessing more than fifty percent (50%) of the total combined voting power of the Company’s outstanding securities.

(q) “**Director**” means a member of the Board or the board of directors of any Related Entity.

(r) “**Disability**” shall have the meaning set forth in the long-term disability policy of the Company or the Related Entity to which the Grantee provides services regardless of whether the Grantee is covered by such policy. If the Company or the Related Entity to which the Grantee provides service does not have a long-term disability plan in place, “Disability” means that a Grantee is unable to carry out the responsibilities and functions of the position held by the Grantee by reason of any medically determinable physical or mental impairment for a period of not less than ninety (90) consecutive days. A Grantee will not be considered to have incurred a Disability unless he or she furnishes proof of such impairment sufficient to satisfy the Administrator in its discretion.

(s) “**Disqualifying Disposition**” means any disposition (including any sale) of Common Stock received upon exercise of an Incentive Stock Option before either (i) two (2) years after the date the Employee was granted the Incentive Stock Option, or (ii) one (1) year after the date the Employee acquired Common Stock by exercising the Incentive Stock Option. If the Employee has died before such stock is sold, these holding period requirements do not apply and no Disqualifying Disposition can occur thereafter.

(t) “**Dividend Equivalent Right**” means a right entitling the Grantee to compensation measured by dividends paid with respect to Common Stock.

(u) “**Employee**” means any person, including an Officer or Director, who is in the employ of the Company or any Related Entity, subject to the control and direction of the Company or any Related Entity as to both the work to be performed and the manner and method of performance. The payment of a director’s fee by the Company or a Related Entity shall not be sufficient to constitute “employment” by the Company.

(v) “**Exchange Act**” means the Securities Exchange Act of 1934, as amended.

(w) “**Fair Market Value**” means, as of any date, the value of Common Stock determined as follows.

(i) If the Common Stock is listed on one or more established stock exchanges or national market systems, including without limitation The NASDAQ Global Select Market, The NASDAQ Global Market or The NASDAQ Capital Market of The NASDAQ Stock Market LLC, its Fair Market Value shall be the closing sales price for such stock (or the closing bid, if no sales were reported) as quoted on the principal exchange or system on which the Common Stock is listed (as determined by the Administrator) on the date of determination (or, if no closing sales price or closing bid was reported on that date, as applicable, on the last trading date such closing sales price or closing bid was reported), as reported in The Wall Street Journal or such other source as the Administrator deems reliable;

(ii) If the Common Stock is regularly quoted on an automated quotation system (including the OTC Bulletin Board) or by a recognized securities dealer, its Fair Market Value shall be the closing sales price for such stock as quoted on such system or by such securities dealer on the date of determination, but if selling prices are not reported, the Fair Market Value of a share of Common Stock shall be the mean between the high bid and low asked prices for the Common Stock on the date of determination (or, if no such prices were reported on that date, on the last date such prices were reported), as reported in The Wall Street Journal or such other source as the Administrator deems reliable; or

(iii) In the absence of an established market for the Common Stock of the type described in (i) and (ii), above, the Fair Market Value thereof shall be determined by the Administrator in a manner in compliance with Section 409A of the Code, and in the case of an Incentive Stock Option, in a manner in compliance with Section 422 of the Code.

(x) “**Grantee**” means an Employee, Director or Consultant who receives an Award under the Plan.

(y) “**Incentive Stock Option**” means an Option designated and qualified as an incentive stock option within the meaning of Section 422 of the Code.

(z) “**Non-Qualified Stock Option**” means an Option that is not an Incentive Stock Option.

- (aa) “**Officer**” means a person who is an officer of the Company or a Related Entity within the meaning of Section 16 of the Exchange Act and the rules and regulations promulgated thereunder.
- (bb) “**Option**” means an option to purchase Shares pursuant to an Award Agreement granted under the Plan.
- (cc) “**Parent**” means a “parent corporation,” whether now or hereafter existing, as defined in Section 424(e) of the Code.
- (dd) “**Plan**” means this Assembly Biosciences, Inc. 2018 Stock Incentive Plan.
- (ee) “**Post-Termination Exercise Period**” means the period specified in the Award Agreement of not less than thirty (30) days commencing on the date of termination (other than termination by the Company or any Related Entity for Cause) of the Grantee’s Continuous Service, or such longer period as may be applicable upon death or Disability.
- (ff) “**Related Entity**” means any Parent or Subsidiary of the Company.
- (gg) “**Replaced**” means that pursuant to a Corporate Transaction the Award is replaced with a comparable stock award or a cash incentive program of the Company, the successor entity (if applicable) or Parent of either of them which preserves the compensation element of such Award existing at the time of the Corporate Transaction and provides for subsequent payout in accordance with the same (or a more favorable) vesting schedule applicable to such Award. The determination of Award comparability shall be made by the Administrator and its determination shall be final, binding and conclusive.
- (hh) “**Restricted Stock**” means Shares issued under the Plan to the Grantee for such consideration, if any, and subject to such restrictions on transfer, rights of first refusal, repurchase provisions, forfeiture provisions, and other terms and conditions as established by the Administrator.
- (ii) “**Restricted Stock Units**” means an Award which may be earned in whole or in part upon the passage of time or the attainment of performance criteria established by the Administrator and which may be settled for cash, Shares or other securities or a combination of cash, Shares or other securities as established by the Administrator.
- (jj) “**Rule 16b-3**” means Rule 16b-3 promulgated under the Exchange Act or any successor thereto.
- (kk) “**SAR**” means a stock appreciation right entitling the Grantee to Shares or cash compensation, as established by the Administrator, measured by appreciation in the value of Common Stock.
- (ll) “**Share**” means a share of the Common Stock.
- (mm) “**Subsidiary**” means a “subsidiary corporation,” whether now or hereafter existing, as defined in Section 424(f) of the Code.
- (nn) “**Unrestricted Stock**” means an award of Shares free from any risks of forfeiture.

3. Stock Subject to the Plan.

- (a) Subject to the provisions of Sections 3(b) and 12 below, the maximum aggregate number of Shares which may be issued pursuant to all Awards (including Incentive Stock Options) is ~~Six Million Six Hundred Thousand (4,600,000)~~ **Eight Million Six Hundred Thousand (8,600,000)** Shares. The Shares granted under the Plan may be authorized, but unissued, or reacquired Common Stock.

(b) Any Shares covered by an Award (or portion of an Award) which is forfeited, canceled or expires (whether voluntarily or involuntarily) shall be deemed not to have been issued for purposes of determining the maximum aggregate number of Shares which may be issued under the Plan, except that the maximum aggregate number of Shares which may be issued pursuant to the exercise of Incentive Stock Options shall not exceed the number specified in Section 3(a). Shares that actually have been issued under the Plan pursuant to an Award shall not be returned to the Plan and shall not become available for future issuance under the Plan, except that if Options or other Awards granted under this Plan are forfeited or repurchased by the Company, such Shares shall become available for future grant under the Plan. In the event any Option or other Award granted under the Plan is exercised through the tendering of shares of Common Stock (either actually or through attestation) or withholding shares of Common Stock, or in the event tax withholding obligations are satisfied by tendering or withholding shares of Common Stock, any shares of Common Stock so tendered or withheld shall not again be available for awards under the Plan. Shares of Common Stock subject to an SAR granted pursuant to Section 6(k) of this Plan that are not issued in connection with cash or stock settlement of the exercise of the SAR shall not again be available for award under the Plan. Shares of Common Stock reacquired by the Company on the open market or otherwise using cash proceeds from the exercise of Options shall not be available for awards under the Plan.

(c) Notwithstanding anything to the contrary in this Plan, the value of all Awards awarded under this Plan and all other cash compensation paid by the Company to any non-employee Director in any calendar year shall not exceed \$1,000,000. For the purpose of this limitation, the value of any Award shall be its grant date fair value, as determined in accordance with ASC 718 or successor provision but excluding the impact of estimated forfeitures related to service-based vesting provisions.

4. Administration of the Plan.

(a) Plan Administrator.

(i) Administration with Respect to Directors and Officers. With respect to grants of Awards to Directors or Employees who are also Officers or Directors of the Company, the Plan shall be administered by (A) the Board or (B) a Committee designated by the Board, which Committee shall be constituted in such a manner as to satisfy the Applicable Laws and to permit such grants and related transactions under the Plan to be exempt from Section 16(b) of the Exchange Act in accordance with Rule 16b-3. Once appointed, such Committee shall continue to serve in its designated capacity until otherwise directed by the Board.

(ii) Administration With Respect to Consultants and Other Employees. With respect to grants of Awards to Employees or Consultants who are neither Directors nor Officers of the Company, the Plan shall be administered by (A) the Board or (B) a Committee designated by the Board, which Committee shall be constituted in such a manner as to satisfy the Applicable Laws. Once appointed, such Committee shall continue to serve in its designated capacity until otherwise directed by the Board.

(b) Multiple Administrative Bodies. The Plan may be administered by different bodies with respect to Directors, Officers, Consultants, and Employees who are neither Directors nor Officers.

(c) Powers of the Administrator. Subject to Applicable Laws and the provisions of the Plan (including any other powers given to the Administrator hereunder), and except as otherwise provided by the Board, the Administrator shall have the authority, in its discretion:

- (i) to select the Employees, Directors and Consultants to whom Awards may be granted from time to time hereunder;
- (ii) to determine whether and to what extent Awards are granted hereunder;
- (iii) to determine the number of Shares or the amount of other consideration to be covered by each Award granted hereunder;
- (iv) to approve forms of Award Agreements for use under the Plan;
- (v) to determine the type, terms and conditions of any Award granted hereunder;

(vi) to establish additional terms, conditions, rules or procedures to accommodate the rules or laws of applicable non-U.S. jurisdictions and to afford Grantees favorable treatment under such rules or laws; provided, however, that no Award shall be granted under any such additional terms, conditions, rules or procedures with terms or conditions which are inconsistent with the provisions of the Plan;

(vii) to amend the terms of any outstanding Award granted under the Plan, provided that any amendment that would adversely affect the Grantee's rights under an outstanding Award shall not be made without the Grantee's written consent; provided, however, that an amendment or modification that may cause an Incentive Stock Option to become a Non-Qualified Stock Option shall not be treated as adversely affecting the rights of the Grantee;

(viii) to construe and interpret the terms of the Plan and Awards, including without limitation, any notice of award or Award Agreement, granted pursuant to the Plan;

(ix) to institute an option exchange program; and

(x) to take such other action, not inconsistent with the terms of the Plan, as the Administrator deems appropriate.

The express grant in the Plan of any specific power to the Administrator shall not be construed as limiting any power or authority of the Administrator; provided that the Administrator may not exercise any right or power reserved to the Board. Any decision made, or action taken, by the Administrator or in connection with the administration of this Plan shall be final, conclusive and binding on all persons having an interest in the Plan.

(d) Indemnification. In addition to such other rights of indemnification as they may have as members of the Board or as Officers or Employees of the Company or a Related Entity, members of the Board and any Officers or Employees of the Company or a Related Entity to whom authority to act for the Board, the Administrator or the Company is delegated shall be defended and indemnified by the Company to the extent permitted by law on an after-tax basis against all reasonable expenses, including attorneys' fees, actually and necessarily incurred in connection with the defense of any claim, investigation, action, suit or proceeding, or in connection with any appeal therein, to which they or any of them may be a party by reason of any action taken or failure to act under or in connection with the Plan, or any Award granted hereunder, and against all amounts paid by them in settlement thereof (provided such settlement is approved by the Company) or paid by them in satisfaction of a judgment in any such claim, investigation, action, suit or proceeding, except in relation to matters as to which it shall be adjudged in such claim, investigation, action, suit or proceeding that such person is liable for gross negligence, bad faith or intentional misconduct; provided, however, that within thirty (30) days after the institution of such claim, investigation, action, suit or proceeding, such person shall offer to the Company, in writing, the opportunity at the Company's expense to defend the same.

5. Eligibility. Awards other than Incentive Stock Options may be granted to Employees, Directors and Consultants of the Company and any Related Entity. Incentive Stock Options may be granted only to Employees of the Company or a Parent or a Subsidiary of the Company. An Employee, Director or Consultant who has been granted an Award may, if otherwise eligible, be granted additional Awards. Awards may be granted to such Employees, Directors or Consultants who are residing in non-U.S. jurisdictions as the Administrator may determine from time to time.

6. Terms and Conditions of Awards.

(a) Types of Awards. The Administrator is authorized under the Plan to award any type of arrangement to an Employee, Director or Consultant that is not inconsistent with the provisions of the Plan and that by its terms involves or might involve the issuance of (i) Shares, (ii) cash or (iii) an Option, an SAR, or similar right with a fixed or variable price related to the Fair Market Value of the Shares and with an exercise or conversion privilege related to the passage of time, the occurrence of one or more events, or the satisfaction of performance criteria or other conditions. Such awards include, without limitation, Options, SARs, sales or bonuses of Restricted Stock, Restricted Stock Units, Unrestricted Stock or Dividend Equivalent Rights, and an Award may consist of one (1) such security or benefit, or two (2) or more of them in any combination or alternative. Unrestricted Stock may be granted in respect of past services or other valid consideration, or in lieu of cash compensation due to the grantee.

(b) Designation of Award. Each Award shall be designated in the Award Agreement. In the case of an Option, the Option shall be designated as either an Incentive Stock Option or a Non-Qualified Stock Option. However, notwithstanding such designation, an Option will qualify as an Incentive Stock Option under the Code only to the extent the \$100,000 dollar limitation of Section 422(d) of the Code is not exceeded. The \$100,000 limitation of Section 422(d) of the Code is calculated based on the aggregate Fair Market Value of the Shares subject to Options designated as Incentive Stock Options which become exercisable for the first time by a Grantee during any calendar year (under all plans of the Company or any Parent or Subsidiary of the Company). For purposes of this calculation, Incentive Stock Options shall be taken into account in the order in which they were granted, and the Fair Market Value of the Shares shall be determined as of the grant date of the relevant Option.

(c) Conditions of Award. Subject to the terms of the Plan, the Administrator shall determine the provisions, terms, and conditions of each Award including, but not limited to, the Award vesting schedule, repurchase provisions, rights of first refusal, forfeiture provisions, form of payment (cash, Shares, or other consideration) upon settlement of the Award, payment contingencies, and satisfaction of any performance criteria. The performance criteria established by the Administrator may be based on any one of, or combination of, increase in share price, earnings per share, total stockholder return, return on equity, return on assets, return on investment, net operating income, cash flow, revenue, economic value added, initiation or completion of clinical trials, results of clinical trials, regulatory approval, regulatory submissions, drug development or commercialization milestones, collaboration milestones or strategic partnerships. Partial achievement of the specified criteria may result in a payment or vesting corresponding to the degree of achievement as specified in the Award Agreement.

(d) Acquisitions and Other Transactions. The Administrator may issue Awards under the Plan in settlement, assumption or substitution for, outstanding awards or obligations to grant future awards in connection with the Company or a Related Entity acquiring another entity, an interest in another entity or an additional interest in a Related Entity whether by merger, stock purchase, asset purchase or other form of transaction.

(e) Deferral of Award Payment. The Administrator may establish one or more programs under the Plan to permit selected Grantees the opportunity to elect to defer receipt of consideration upon exercise of an Award, satisfaction of performance criteria, or other event that absent the election would entitle the Grantee to payment or receipt of Shares or other consideration under an Award. The Administrator may establish the election procedures, the timing of such elections, the mechanisms for payments of, and accrual of interest or other earnings, if any, on amounts, Shares or other consideration so deferred, and such other terms, conditions, rules and procedures that the Administrator deems advisable for the administration of any such deferral program.

(f) Separate Programs. The Administrator may establish one or more separate programs under the Plan for the purpose of issuing particular forms of Awards to one or more classes of Grantees on such terms and conditions as determined by the Administrator from time to time.

(g) Early Exercise. The Award Agreement may, but need not, include a provision whereby the Grantee may elect at any time while an Employee, Director or Consultant to exercise any part or all of the Award prior to full vesting of the Award. Any unvested Shares received pursuant to such exercise may be subject to a repurchase right in favor of the Company or a Related Entity or to any other restriction the Administrator determines to be appropriate.

(h) Term of Option or SAR. The term of each Option or SAR shall be the term stated in the Award Agreement, provided, however, that the term shall be no more than ten (10) years from the date of grant thereof. However, in the case of an Incentive Stock Option granted to a Grantee who, at the time the Option is granted, owns stock representing more than ten percent (10%) of the voting power of all classes of stock of the Company or any Parent or Subsidiary of the Company, the term of the Incentive Stock Option shall be five (5) years from the date of grant thereof or such shorter term as may be provided in the Award Agreement.

(i) Transferability of Awards. Unless the Administrator provides otherwise, in its sole discretion, no Award may be sold, pledged, assigned, hypothecated, transferred, or disposed of in any manner other than by will or by the laws of descent or distribution and may be exercised, during the lifetime of the Grantee, only by the Grantee. Notwithstanding the foregoing, the Grantee may designate one or more beneficiaries of the Grantee's Award in the event of the Grantee's death on a beneficiary designation form provided by the Administrator.

(j) Time of Granting Awards. The date of grant of an Award shall for all purposes be the date on which the Administrator makes the determination to grant such Award, or such other later date as is determined by the Administrator.

(k) Stock Appreciation Rights. An SAR may be granted (i) with respect to any Option granted under this Plan, either concurrently with the grant of such Option or at such later time as determined by the Administrator (as to all or any portion of the shares of Common Stock subject to the Option), or (ii) alone, without reference to any related Option. Each SAR granted by the Administrator under this Plan shall be subject to the following terms and conditions. Each SAR granted to any participant shall relate to such number of shares of Common Stock as shall be determined by the Administrator, subject to adjustment as provided in Section 12. In the case of an SAR granted with respect to an Option, the number of shares of Common Stock to which the SAR pertains shall be reduced in the same proportion that the holder of the Option exercises the related Option. The exercise price of an SAR will be determined by the Administrator, in its discretion, at the date of grant but may not be less than one hundred percent (100%) of the Fair Market Value of the shares of Common Stock subject thereto on the date of grant. Subject to the right of the Administrator to deliver cash in lieu of shares of Common Stock (which, as it pertains to Officers and Directors of the Company, shall comply with all requirements of the Exchange Act), the number of shares of Common Stock which shall be issuable upon the exercise of an SAR shall be determined by dividing:

(i) the number of shares of Common Stock as to which the SAR is exercised multiplied by the amount of the appreciation in such shares (for this purpose, the “appreciation” shall be the amount by which the Fair Market Value of the shares of Common Stock subject to the SAR on the exercise date exceeds (1) in the case of an SAR related to an Option, the exercise price of the shares of Common Stock under the Option or (2) in the case of an SAR granted alone, without reference to a related Option, an amount which shall be determined by the Administrator at the time of grant, subject to adjustment under Section 12); by

(ii) the Fair Market Value of a share of Common Stock on the exercise date.

In lieu of issuing shares of Common Stock upon the exercise of an SAR, the Administrator may elect to pay the holder of the SAR cash equal to the Fair Market Value on the exercise date of any or all of the shares which would otherwise be issuable. No fractional shares of Common Stock shall be issued upon the exercise of an SAR; instead, the holder of the SAR shall be entitled to receive a cash adjustment equal to the same fraction of the Fair Market Value of a share of Common Stock on the exercise date or to purchase the portion necessary to make a whole share at its Fair Market Value on the date of exercise. The exercise of an SAR related to an Option shall be permitted only to the extent that the Option is exercisable under Section 10 on the date of surrender. Any Incentive Stock Option surrendered pursuant to the provisions of this Section 6(k) shall be deemed to have been converted into a Non-Qualified Stock Option immediately prior to such surrender.

(l) Compliance with Section 409A of the Code. Notwithstanding anything to the contrary set forth herein, any Award that is not exempt from the requirements of Section 409A of the Code shall contain such provisions so that such Award will comply with the requirements of Section 409A of the Code. Such restrictions, if any, shall be determined by the Administrator and contained in the Award Agreement evidencing such Award.

(m) Minimum Vesting. Awards granted to Employees under the Plan that are subject to time vesting shall not vest or become exercisable until at least one year after the date of grant, except in the case of death, Disability, retirement, separation of service or a Corporate Transaction. Awards granted to Directors under the Plan that are subject to time vesting shall not vest or become exercisable until at least the earlier of (i) one year after the date of grant or (ii) the next annual meeting of stockholders, except in the case of death, Disability or a Corporate Transaction.

7. Award Exercise or Purchase Price, Consideration and Taxes.

(a) Exercise or Purchase Price. The exercise or purchase price, if any, for an Award shall be as follows.

(i) In the case of an Incentive Stock Option:

(1) granted to an Employee who, at the time of the grant of such Incentive Stock Option owns stock representing more than ten percent (10%) of the voting power of all classes of stock of the Company or any Parent or Subsidiary of the Company, the per Share exercise price shall be not less than one hundred ten percent (110%) of the Fair Market Value per Share on the date of grant; or

(2) granted to any Employee other than an Employee described in the preceding paragraph, the per Share exercise price shall be not less than one hundred percent (100%) of the Fair Market Value per Share on the date of grant.

(ii) In the case of a Non-Qualified Stock Option, the per Share exercise price shall be not less than one-hundred percent (100%) of the Fair Market Value per Share on the date of grant.

(iii) In the case of other Awards, such price as is determined by the Administrator.

(iv) Notwithstanding the foregoing provisions of this Section 7(a), in the case of an Award issued pursuant to Section 6(d), above, the exercise or purchase price for the Award shall be determined in accordance with the provisions of the relevant instrument evidencing the agreement to issue such Award.

(b) Consideration. Subject to Applicable Laws, the consideration to be paid for the Shares to be issued upon exercise or purchase of an Option or upon the issuance of another Award, including the method of payment, shall be determined by the Administrator. In addition to any other types of consideration the Administrator may determine, the Administrator is authorized to accept as consideration for Shares issued under the Plan the following:

(i) cash;

(ii) check;

(iii) delivery of Grantee's promissory note with such recourse, interest, security, and redemption provisions as the Administrator determines as appropriate (but only to the extent that the acceptance or terms of the promissory note would not violate an Applicable Law); provided, however, that interest shall compound at least annually and shall be charged at the minimum rate of interest necessary to avoid (i) the imputation of interest income to the Company and compensation income to the Grantee under any applicable provisions of the Code, and (B) the classification of the Award as a liability for financial accounting purposes;

(iv) surrender of Shares or delivery of a properly executed form of attestation of ownership of Shares as the Administrator may require which have a Fair Market Value on the date of surrender or attestation equal to the aggregate exercise price of the Shares as to which said Award shall be exercised;

(v) payment through a broker-dealer sale and remittance procedure pursuant to which the Grantee (A) shall provide written instructions to a Company designated brokerage firm to effect the immediate sale of some or all of the purchased Shares and remit to the Company sufficient funds to cover the aggregate exercise price payable for the purchased Shares and (B) shall provide written directives to the Company to deliver the certificates (or other evidence satisfactory to the Company to the extent that the Shares are uncertificated) for the purchased Shares directly to such brokerage firm in order to complete the sale transaction;

(vi) with respect to Non-Qualified Options, payment through a "net exercise" such that, without the payment of any funds, the Grantee may exercise the Option and receive the net number of Shares equal to (i) the number of Shares as to which the Option is being exercised, multiplied by (ii) a fraction, the numerator of which is the Fair Market Value per Share (on such date as is determined by the Administrator) less the Exercise Price per Share, and the denominator of which is such Fair Market Value per Share; or

- (vii) past or future services actually or to be rendered to the Company or a Related Entity; or
- (viii) any combination of the foregoing methods of payment.

The Administrator may at any time or from time to time, by adoption of or by amendment to the standard forms of Award Agreement described in Section 4(c)(iv), or by other means, grant Awards which do not permit all of the foregoing forms of consideration to be used in payment for the Shares or which otherwise restrict one or more forms of consideration.

8. Notice to Company of Disqualifying Disposition. Each Employee who receives an Incentive Stock Option must agree to notify the Company in writing immediately after the Employee makes a Disqualifying Disposition of any Common Stock acquired pursuant to the exercise of an Incentive Stock Option.

9. Withholding of Additional Income Taxes.

(a) Upon the exercise of a Non-Qualified Stock Option or SAR, the grant of any other Award for less than the Fair Market Value of the Common Stock, the grant of Unrestricted Stock or the vesting of restricted Common Stock acquired on the exercise of an Award hereunder, the Company, in accordance with Section 3402(a) of the Code and any applicable state statute or regulation, may require the Grantee to pay to the Company additional withholding taxes in respect of the amount that is considered compensation includable in such person's gross income. With respect to (i) the exercise of an Option, (ii) the grant of Unrestricted Stock, (iii) the grant of any other Award for less than its Fair Market Value, (iv) the vesting of restricted Common Stock acquired by exercising an Award, or (v) the exercise of an SAR, the Committee in its discretion may condition such event on the payment by the Grantee of any such additional withholding taxes.

(b) At the sole and absolute discretion of the Administrator, the holder of Awards may pay all or any part of the total estimated federal and state income tax liability arising out of the exercise or receipt of such Awards or the vesting of restricted Common Stock acquired on the exercise of an Award hereunder (each of the foregoing, a "**Tax Event**") by tendering already-owned shares of Common Stock or by directing the Company to withhold shares of Common Stock otherwise to be transferred to the Grantee as a result of the exercise or receipt thereof in an amount equal to the estimated federal and state income tax liability arising out of such event, provided that no more Shares may be withheld than are necessary to satisfy the Grantee's withholding obligation with respect to the exercise of Awards; provided, however, that the amount withheld does not exceed the maximum statutory tax rate or such lesser amount as is necessary to avoid liability accounting treatment for Awards granted under the Plan. In such event, the Grantee must, however, notify the Administrator of his or her desire to pay all or any part of the total estimated federal and state income tax liability arising out of a Tax Event by tendering already-owned shares of Common Stock or having shares of Common Stock withheld prior to the date that the amount of federal or state income tax to be withheld is to be determined. For purposes of this Section 9, shares of Common Stock shall be valued at their Fair Market Value on the date that the amount of the tax withholdings is to be determined.

10. Exercise of Award.

(a) Procedure for Exercise; Rights as a Stockholder.

(i) Any Award granted hereunder shall be exercisable at such times and under such conditions as determined by the Administrator under the terms of the Plan and specified in the Award Agreement.

(ii) An Award shall be deemed to be exercised when written notice of such exercise has been given to the Company in accordance with the terms of the Award by the person entitled to exercise the Award and full payment for the Shares with respect to which the Award is exercised has been made, including, to the extent selected, use of the broker-dealer sale and remittance procedure to pay the purchase price as provided in Section 7(b)(v).

(b) Exercise of Award Following Termination of Continuous Service. In the event of termination of a Grantee's Continuous Service for any reason other than Disability or death (but not in the event of a Grantee's change of status from Employee to Consultant or from Consultant to Employee), such Grantee may, but only during the Post-Termination Exercise Period (but in no event later than the expiration date of the term of such Award as set forth in the Award Agreement), exercise the portion of the Grantee's Award that was vested at the date of such termination or such other portion of the Grantee's Award as may be determined by the Administrator. The Grantee's Award Agreement may provide that upon the termination of the Grantee's Continuous Service for Cause, the Grantee's right to exercise the Award shall terminate concurrently with the termination of Grantee's Continuous Service. In the event of a Grantee's change of status from Employee to Consultant, an Employee's Incentive Stock Option shall convert automatically to a Non-Qualified Stock Option on the day three (3) months and one (1) day following such change of status. To the extent that the Grantee's Award was unvested at the date of termination, or if the Grantee does not exercise the vested portion of the Grantee's Award within the Post-Termination Exercise Period, the Award shall terminate.

(c) Disability of Grantee. In the event of termination of a Grantee's Continuous Service as a result of his or her Disability, such Grantee may, but only within twelve (12) months from the date of such termination (or such longer period as specified in the Award Agreement but in no event later than the expiration date of the term of such Award as set forth in the Award Agreement), exercise the portion of the Grantee's Award that was vested at the date of such termination; provided, however, that if such Disability is not a "disability" as such term is defined in Section 22(e)(3) of the Code, in the case of an Incentive Stock Option such Incentive Stock Option shall automatically convert to a Non-Qualified Stock Option on the day three (3) months and one (1) day following such termination. To the extent that the Grantee's Award was unvested at the date of termination, or if Grantee does not exercise the vested portion of the Grantee's Award within the time specified herein, the Award shall terminate.

(d) Death of Grantee. In the event of a termination of the Grantee's Continuous Service as a result of his or her death, or in the event of the death of the Grantee during the Post-Termination Exercise Period or during the twelve (12) month period following the Grantee's termination of Continuous Service as a result of his or her Disability, the Grantee's estate or a person who acquired the right to exercise the Award by bequest or inheritance may exercise the portion of the Grantee's Award that was vested as of the date of termination, within twelve (12) months from the date of death (or such longer period as specified in the Award Agreement but in no event later than the expiration of the term of such Award as set forth in the Award Agreement). To the extent that, at the time of death, the Grantee's Award was unvested, or if the Grantee's estate or a person who acquired the right to exercise the Award by bequest or inheritance does not exercise the vested portion of the Grantee's Award within the time specified herein, the Award shall terminate.

(e) Extension if Exercise Prevented by Law. Notwithstanding the foregoing, if the exercise of an Award within the applicable time periods set forth in this Section 10 is prevented by the provisions of Section 11 below, the Award shall remain exercisable until one (1) month after the date the Grantee is notified by the Company that the Award is exercisable, but in any event no later than the expiration of the term of such Award as set forth in the Award Agreement.

11. Conditions Upon Issuance of Shares.

(a) If at any time the Administrator determines that the delivery of Shares pursuant to the exercise, vesting or any other provision of an Award is or may be unlawful under Applicable Laws, the vesting or right to exercise an Award or to otherwise receive Shares pursuant to the terms of an Award shall be suspended until the Administrator determines that such delivery is lawful and shall be further subject to the approval of counsel for the Company with respect to such compliance. The Company shall have no obligation to effect any registration or qualification of the Shares under federal or state laws.

(b) As a condition to the exercise of an Award, the Company may require the person exercising such Award to represent and warrant at the time of any such exercise that the Shares are being purchased only for investment and without any present intention to sell or distribute such Shares if, in the opinion of counsel for the Company, such a representation is required by any Applicable Laws.

12. Adjustments. Subject to any required action by the stockholders of the Company, the number of Shares covered by each outstanding Award, and the number of Shares which have been authorized for issuance under the Plan but as to which no Awards have yet been granted or which have been returned to the Plan, the exercise or purchase price of each such outstanding Award, as well as any other terms that the Administrator determines require adjustment shall be proportionately adjusted for (i) any increase or decrease in the number of issued Shares resulting from a stock split, reverse stock split, stock dividend, combination or reclassification of the Shares, or similar transaction affecting the Shares, (ii) any other increase or decrease in the number of issued Shares effected without receipt of consideration by the Company, or (iii) any other transaction with respect to the Company's Common Stock including a corporate merger, consolidation, acquisition of property or stock, separation (including a spin-off or other distribution of stock or property), reorganization, liquidation (whether partial or complete) or any similar transaction; provided, however that conversion of any convertible securities of the Company shall not be deemed to have been "effected without receipt of consideration." Such adjustment shall be made by the Administrator and its determination shall be final, binding and conclusive. Except as the Administrator determines, no issuance by the Company of shares of stock of any class, or securities convertible into shares of stock of any class, shall affect, and no adjustment by reason hereof shall be made with respect to, the number or price of Shares subject to an Award. No adjustments shall be made for dividends paid in cash or in property other than Common Stock of the Company, nor shall cash dividends or dividend equivalents accrue or be paid in respect of unexercised Options or unvested Awards hereunder.

13. Corporate Transactions.

(a) Treatment of Awards in Corporate Transaction. Except as the Administrator may otherwise specify with respect to particular Awards in the relevant Award Agreement, in the case of and subject to the consummation of a Corporate Transaction, the parties to the Corporate Transaction may cause the Awards to be Assumed or Replaced by the successor entity as such parties shall agree. To the extent the parties to such Corporate Transaction do not provide for the Awards to be Assumed or Replaced upon the effective time of the Corporate Transaction, the Plan and all outstanding Awards granted under the Plan shall terminate. In such case, except as may be otherwise expressly provided in the relevant Award Agreement, all Awards with solely time-based vesting that are not vested and/or exercisable immediately prior to the effective time of the Corporate Transaction shall become fully vested and exercisable as of immediately prior to the effective time of the Corporate Transaction and all Awards with conditions and restrictions relating to the attainment of performance goals shall be deemed to vest and become nonforfeitable as of the Corporate Transaction as provided in the relevant Award Agreement or if not provided for in the relevant Award Agreement shall be deemed to vest and become nonforfeitable as of the Corporate Transaction assuming the higher of (i) achievement of all relevant performance goals at the "target" level (prorated based upon the length of time within the performance period that has elapsed prior the Corporate Transaction or partial achievement of the performance goals), or (ii) actual achievement of all relevant performance goals as of the date of such Corporate Transaction. In the event of such termination of the Awards, the Company shall have the option (in its sole discretion) to (1) make or provide for a payment, in cash or in kind, to the Grantees holding Options and SARs, in exchange for the cancellation thereof, in an amount equal to the difference between (A) the Sale Price multiplied by the number of Shares subject to outstanding Options and SARs and (B) the aggregate exercise price of all such outstanding Options and SARs (provided that, in the case of an Option or SAR with an exercise price equal to or more than the Sale Price, such Option or SAR shall be cancelled for no consideration); or (2) permit each Grantee, within a specified period of time prior to the consummation of the Corporate Transaction as determined by the Administrator, to exercise all outstanding Options and SARs (to the extent then exercisable including due to acceleration as contemplated by this Section 13(a) if the Awards are not Assumed or Replaced) held by such Grantee as of immediately prior to the effective time of the Corporate Transaction. In the event of a termination of Awards pursuant to this Section 13(a), the Company shall also have the option (in its sole discretion) to make or provide for a payment, in cash or in kind, to the Grantees holding other Awards in an amount equal to the Sale Price multiplied by the number of vested Shares under such Awards. For purposes of this Section 13(a), "Sale Price" means the value as determined by the Administrator of the consideration payable, or otherwise to be received by stockholders, per Share pursuant to a Corporate Transaction.

(b) Acceleration of Award Upon Corporate Transaction. The Administrator shall have the authority, exercisable either in advance of any actual or anticipated Corporate Transaction or at the time of an actual Corporate Transaction and exercisable at the time of the grant of an Award under the Plan or any time while an Award remains outstanding, to provide for the full or partial automatic vesting and exercisability of one or more outstanding unvested Awards under the Plan and the release from restrictions on transfer and repurchase or forfeiture rights of such Awards in connection with a Corporate Transaction on such terms and conditions as the Administrator may specify. The Administrator also shall have the authority to condition any such Award vesting and exercisability or release from such limitations upon the subsequent termination of the Continuous Service of the Grantee within a specified period following the effective date of the Corporate Transaction. The Administrator may provide that any Awards so vested or released from such limitations in connection with a Corporate Transaction shall remain fully exercisable until the expiration or sooner termination of the Award.

(c) Effect of Acceleration on Incentive Stock Options. Any Incentive Stock Option accelerated under this Section 13 in connection with a Corporate Transaction shall remain exercisable as an Incentive Stock Option under the Code only to the extent the \$100,000 dollar limitation of Section 422(d) of the Code is not exceeded.

14. Effective Date and Term of Plan. The Plan shall become effective upon the earlier to occur of its adoption by the Board or its approval by the stockholders of the Company. It shall continue in effect for a term of ten (10) years from the date of stockholder approval unless sooner terminated, provided that no incentive stock options may be granted under the Plan after April 5, 2028. Subject to Applicable Laws, Awards may be granted under the Plan upon Board approval, contingent on stockholder approval.

15. Amendment, Suspension or Termination of the Plan.

(a) The Board may at any time amend, suspend or terminate the Plan in any respect, except that it may not, without the approval of the stockholders obtained within twelve (12) months before or after the Board adopts a resolution authorizing any of the following actions, do any of the following:

- (i) increase the total number of shares that may be issued under the Plan (except by adjustment pursuant to Section 12);
- (ii) modify the provisions of Section 6 regarding eligibility for grants of ISOs may not be modified;
- (iii) the provisions of Section 7(a) regarding the exercise price at which shares may be offered pursuant to Options may not be modified (except by adjustment pursuant to Section 12);
- (iv) extend the expiration date of the Plan; and
- (v) except as provided in Section 12 (including, without limitation, any stock dividend, stock split, extraordinary cash dividend, recapitalization, reorganization, merger, consolidation, split-up, spin-off, combination, or exchange of shares), the Company may not amend an Award granted under the Plan to reduce its exercise price per share, cancel and regrant new Awards with lower prices per share than the original prices per share of the cancelled Awards, or cancel any Awards in exchange for cash or the grant of replacement Awards with an exercise price that is less than the exercise price of the original Awards, essentially having the effect of a repricing, without approval by the Company's stockholders.

(b) No Award may be granted during any suspension of the Plan or after termination of the Plan.

(c) No suspension or termination of the Plan (including termination of the Plan under Section 15, above) shall adversely affect any rights under Awards already granted to a Grantee without his or her consent.

16. Reservation of Shares.

(a) The Company, during the term of the Plan, will at all times reserve and keep available such number of Shares as shall be sufficient to satisfy the requirements of the Plan.

(b) The inability of the Company to obtain authority from any regulatory body having jurisdiction, which authority is deemed by the Company's counsel to be necessary to the lawful issuance and sale of any Shares hereunder, shall relieve the Company of any liability in respect of the failure to issue or sell such Shares as to which such requisite authority shall not have been obtained.

17. No Effect on Terms of Employment/Consulting Relationship. The Plan shall not confer upon any Grantee any right with respect to the Grantee's Continuous Service, nor shall it interfere in any way with his or her right or the right of the Company or a Related Entity to terminate the Grantee's Continuous Service at any time, with or without Cause, and with or without notice. The ability of the Company or any Related Entity to terminate the employment of a Grantee who is employed at will is in no way affected by its determination that the Grantee's Continuous Service has been terminated for Cause for the purposes of this Plan.

18. No Effect on Retirement and Other Benefit Plans. Except as specifically provided in a retirement or other benefit plan of the Company or a Related Entity, Awards shall not be deemed compensation for purposes of computing benefits or contributions under any retirement plan of the Company or a Related Entity, and shall not affect any benefits under any other benefit plan of any kind or any benefit plan subsequently instituted under which the availability or amount of benefits is related to level of compensation. The Plan is not a "Retirement Plan" or "Welfare Plan" under the Employee Retirement Income Security Act of 1974, as amended.

19. Stockholder Approval. Continuance of the Plan shall be subject to approval by the stockholders of the Company within twelve (12) months before or after the date the Plan is adopted by the Board. Such stockholder approval shall be obtained in the degree and manner required under Applicable Laws. Any Award exercised before stockholder approval is obtained shall be rescinded if stockholder approval is not obtained within the time prescribed, and Shares issued on the exercise of any such Award shall not be counted in determining whether stockholder approval is obtained.

20. Electronic Delivery. The Administrator may, in its sole discretion, decide to deliver any documents related to any Award granted under the Plan through an online or electronic system established and maintained by the Company or another third party designated by the Company or to request a Grantee's consent to participate in the Plan by electronic means. Each Grantee hereunder consents to receive such documents by electronic delivery and agrees to participate in the Plan through an online or electronic system established and maintained by the Company or another third party designated by the Company, and such consent shall remain in effect throughout Grantee's term of employment or service with the Company and any Related Entity and thereafter until withdrawn in writing by Grantee.

21. Data Privacy. The Administrator may, in its sole discretion, decide to collect, use and transfer, in electronic or other form, personal data as described in this Plan or any Award for the exclusive purpose of implementing, administering and managing participation in the Plan. Each Grantee hereunder acknowledges that the Company holds certain personal information about Grantee, including, but not limited to, name, home address and telephone number, date of birth, social security number or other identification number, salary, nationality, job title, details of all Awards awarded, cancelled, exercised, vested or unvested, for the purpose of implementing, administering and managing the Plan (the "*Data*"). Each Grantee hereunder further acknowledges that Data may be transferred to any third parties assisting in the implementation, administration and management of the Plan and that these third parties may be located in jurisdictions that may have different data privacy laws and protections, and Grantee authorizes such third parties to receive, possess, use, retain and transfer the Data, in electronic or other form, for the purposes of implementing, administering and managing the Plan, including any requisite transfer of such Data as may be required to a broker or other third party with whom the recipient or the Company may elect to deposit any shares of Common Stock acquired upon any Award.

~~FIFTH~~**SIXTH** AMENDED AND RESTATED
CERTIFICATE OF INCORPORATION
OF
ASSEMBLY BIOSCIENCES, INC.

(Pursuant to Sections 242 and 245 of the General Corporation Law of the State of Delaware)

Assembly Biosciences, Inc., a corporation organized and existing under and by virtue of the provisions of the General Corporation Law of the State of Delaware (the “DGCL”), certifies that:

- A. The name of the corporation is “Assembly Biosciences, Inc.” (the “Corporation”).
- B. The Corporation’s original Certificate of Incorporation was filed with the Secretary of State of the State of Delaware on October 7, 2005, under the name South Island Biosciences, Inc., an Amended and Restated Certificate of Incorporation was filed with the Secretary of State of the State of Delaware on October 24, 2005, a second Amended and Restated Certificate of Incorporation, which included a provision to change the Corporation’s name to Ventrus Biosciences, Inc., was filed with the Secretary of State of the State of Delaware on April 5, 2007 (the “Second Amended and Restated Certificate of Incorporation”), a third Amended and Restated Certificate of Incorporation was filed with the Secretary of the State of Delaware on November 10, 2010 (the “Third Amended and Restated Certificate of Incorporation”) and a Certificate of Amendment of the Third Amended and Restated Certificate of Incorporation was filed with the Secretary of State of Delaware on July 10, 2014, which included a provision to change the Corporation’s name to Assembly Biosciences, Inc., a Fourth Amended and Restated Certificate of Incorporation was filed with the Secretary of the State of Delaware on May 31, 2018, a Fifth Amended and Restated Certificate of Incorporation was filed with the Secretary of State of the State of Delaware on June 12, 2020.
- C. This ~~Fifth~~**Sixth** Amended and Restated Certificate of Incorporation (the “Certificate of Incorporation”) was duly adopted in accordance with Sections 242 and 245 of the DGCL, and hereby amends and restates in its entirety the ~~Fourth~~**Fifth** Amended and Restated Certificate of Incorporation, ~~as amended~~, as follows.

Article I

The name of the corporation is “Assembly Biosciences, Inc.” (the “Corporation”).

Article II

The registered office of the Corporation in the State of Delaware is 251 Little Falls Drive, in the City of Wilmington, County of New Castle 19808. The name of the registered agent of the Corporation at such address is Corporation Service Company.

Article III

The nature of the business or purposes to be conducted or promoted is to engage in any lawful act or activity for which corporations may be organized under the DGCL.

Article IV

The total number of shares that the Corporation shall have authority to issue, is ~~405~~**155**,000,000 (one hundred ~~forty~~**fifty**-five million), consisting of (i) ~~400~~**150**,000,000 (one ~~forty~~**fifty**-million) shares of common stock, \$0.001 par value per share, and (ii) 5,000,000 (five million) shares of preferred stock, \$0.001 par value per share.

The board of directors is authorized to issue the preferred stock, subject to limitations prescribed by law and the provisions of this Certificate of Incorporation, as shares of preferred stock in one or more series, and is authorized, by filing a certificate of designation pursuant to the applicable law of the State of Delaware, to establish from time to time the number of shares to be included in each such series, and to fix the designation, powers, preferences and rights of the shares of each such series and qualifications, limitations or restrictions thereof. The authority of the board of directors with respect to each series shall include, but not be limited to, determination of the following:

- (i) the number of shares constituting that series and the distinctive designation of that series;
- (ii) the dividend rate, if any, on the shares of that series, whether dividends shall be cumulative, and, if so, from which date or dates, and the relative rights of priority, if any, of payment of dividends on shares of that series;
- (iii) whether that series shall have voting rights or powers, in addition to the voting rights and powers provided by law, and, if so, the terms of such rights;
- (iv) whether that series shall have conversion rights, and, if so, the terms and conditions of such conversion, including provisions for adjustment of the conversion rate in such events as the board of directors shall determine;
- (v) whether or not the shares of that series shall be redeemable, and, if so, the terms and conditions of such redemption, including the dates or dates upon or after which they shall be redeemable, and the amount per share payable in case of redemption, which amount may vary under different conditions and at different redemption dates;
- (vi) whether that series shall have a sinking fund for the redemption or purchase of shares of that series, and, if so, the terms and amounts of such sinking fund;
- (vii) the rights of the shares of that series in the event of voluntary or involuntary liquidation, dissolution or winding up of the Corporation, and the relative rights of priority, if any, of payment of shares of that series; and
- (viii) any other rights, preferences and limitations of that series.

The board of directors, within the limits and restrictions stated in any resolution or resolutions of the board of directors originally fixing the number of shares constituting any series, may increase or decrease (but not below the number of shares of such series then outstanding) the number of shares of any series subsequent to the issue of shares of that series.

Article V

Subject to all the rights, powers and preferences of the preferred stock and except as otherwise required by law or provided in this Certificate of Incorporation (including in any certificate of designations of any series of preferred stock):

- (a) the holders of the common stock shall have the exclusive right to vote for the election of directors of the Corporation and on all other matters requiring stockholder action, each outstanding share entitling the holder thereof to one vote on each matter properly submitted to the stockholders of the Corporation for their vote;
- (b) dividends may be declared and paid or set apart for payment upon the common stock out of any assets or funds of the Corporation legally available for the payment of dividends, but only when and as declared by the board of directors or any authorized committee thereof; and
- (c) upon the voluntary or involuntary liquidation, dissolution or winding up of the Corporation, the net assets of the Corporation shall be distributed pro rata to the holders of the common stock.

Article VI

Any action required or permitted to be taken by the stockholders of the Corporation must be effected at a duly called annual or special meeting of the stockholders of the Corporation and may not be effected by any consent in writing by such stockholders.

Article VII

Except as otherwise required by statute and subject to the rights, if any, of the holders of any series of preferred stock, special meetings of the stockholders of the Corporation may be called, at any time for any purpose or purposes as is proper for stockholder action under the DGCL by (1) the board of directors acting pursuant to a resolution duly adopted by a majority of the board of directors then in office, (2) the Chairperson of the board of directors, (3) the Chief Executive Officer, or (4) the Chief Executive Officer or secretary of the Corporation upon the written request of stockholder(s) owning (as defined below) at least 25% (in the aggregate) of the then voting power of all shares of the Corporation entitled to vote on the matters to be brought before the proposed special meeting, in each case subject to any procedures, terms and conditions as may be further set forth in the bylaws of the Corporation from time to time. Only those matters set forth in the notice of the special meeting or brought by or at the direction of the board of directors may be considered or acted upon at a special meeting of stockholders. In the case of a special meeting of stockholders called pursuant to the foregoing clause (4), the requesting holder(s) must (i) continue to own (for the holding period set forth in the bylaws of the Corporation as in effect from time to time) shares representing at least 25% (in the aggregate) of the then voting power of all shares of the Corporation entitled to vote on the matters to be brought before the proposed special meeting, (ii) provide information in writing regarding such stockholder(s), their stock ownership and the matters that they request to bring before the proposed special meeting and (iii) comply with procedures and other terms and conditions relating to special meetings as set forth in the bylaws of the Corporation from time to time. For purposes of this Article VII, a holder shall be deemed to “own” only those shares for which it possesses both (x) full voting and investment rights pertaining to such shares, and (y) a full economic interest in (including the opportunity for profit from and the risk of loss on) such shares, which term may be further defined in the bylaws of the Corporation from time to time.

Article VIII

8.1 General. The business and affairs of the Corporation shall be managed by or under the direction of the board of directors except as otherwise provided herein or required by law.

8.2 Election of directors. Unless and except that the bylaws of the Corporation shall so require, the election of directors need not be by written ballot.

8.3 Vacancies. Any director may resign at any time upon notice given in writing or electronic transmission to the Corporation. When one or more directors so resigns and the resignation is effective at a future date, a majority of the directors then in office, including those who have so resigned, shall have power to fill such vacancy or vacancies, the vote thereon to take effect when such resignation or resignations shall become effective, and each director so chosen shall hold office as provided in this paragraph in the filling of other vacancies.

Vacancies and newly created directorships resulting from any increase in the authorized number of directors elected by all of the stockholders having the right to vote as a single class may be filled by a majority of the directors then in office, although less than a quorum, or by a sole remaining director.

Whenever the holders of any class or classes of stock or series thereof are entitled to elect one or more directors by the provisions of this Certificate of Incorporation, vacancies and newly created directorships of such class or classes or series may be filled by a majority of the directors elected by such class or classes or series thereof then in office, or by a sole remaining director so elected.

Any director appointed in accordance with this Section 8.3 shall hold office for the remainder of the full term of the director in which the new directorship was created or the vacancy occurred and until such director’s successor shall have been duly elected and qualified or until his or her earlier resignation, death or removal.

Article IX

To the fullest extent permitted by the DGCL as the same exists or as may hereafter be amended, no present or former director of the Corporation shall be personally liable to the Corporation or its stockholders for monetary damages for breach of fiduciary duty as a director except for liability (a) for any breach of the director's duty of loyalty to the Corporation or its stockholders, (b) for acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law, (c) unlawful payments of dividends or unlawful stock repurchases or redemptions under Section 174 of the DGCL or (d) for any transaction from which the director derived an improper personal benefit. If the DGCL is amended after the effective date of this Certificate of Incorporation to authorize corporate action further eliminating or limiting the personal liability of directors, then the liability of a director of the Corporation shall be eliminated or limited to the fullest extent permitted by the DGCL, as so amended. Neither any amendment nor repeal of this Article, nor the adoption of any provision of this Certificate of Incorporation inconsistent with this Article, shall eliminate or reduce the effect of this Article in respect of any matter occurring, or any cause of action, suit or claim that, but for this Article, would accrue or arise, prior to such amendment, repeal or adoption of an inconsistent provision.

Article X

The Corporation shall have the power to indemnify any person who was or is a party or is threatened to be made a party to, or testifies in, any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative in nature, by reason of the fact such person is or was a director, officer or employee or agent of the Corporation, or is or was serving at the request of the Corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, employee benefit plan, trust or other enterprise against expenses (including attorney's fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by such person in connection with such action, suit or proceeding to the full extent permitted by law, and the Corporation may adopt bylaws or enter into agreements with any such person for the purpose of providing for such indemnification.

Article XI

The Corporation reserves the right at any time, and from time to time, to amend, alter, change or repeal any provision contained in this Certificate of Incorporation, and other provisions authorized by the laws of the State of Delaware at the time in force may be added or inserted, in the manner now or hereafter prescribed by law; and all rights, preferences, powers and privileges of whatsoever nature conferred upon stockholders, directors or any other persons whomsoever by and pursuant to this Certificate of Incorporation in its present form or as hereafter amended are granted subject to the rights reserved in this article.

Article XII

In furtherance and not in limitation of the powers conferred by the laws of the State of Delaware, the board of directors of the Corporation is expressly authorized to make, alter and repeal the bylaws of the Corporation.

IN WITNESS WHEREOF, the undersigned has signed this ~~Fifth~~**Sixth** Amended and Restated Certificate of Incorporation this ~~31st~~ day of ~~May~~ **2018**, **202**.

By: _____

John G. McHutchison, A.O., M.D.
Chief Executive Officer and President



www.assemblybio.com



ASSEMBLY BIOSCIENCES, INC.
331 OYSTER POINT BLVD., FOURTH FLOOR
SOUTH SAN FRANCISCO, CA 94080



VOTE BY INTERNET
Before The Meeting - Go to 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. EDT on May 24, 2022 for common stock held directly and by 11:59 P.M. EDT on May 22, 2022 for common stock held in a Company-sponsored Plan. Have your proxy card in hand when you access the website and follow the instructions to obtain your records and to create an electronic voting instruction form.

During The Meeting - Go to www.virtualshareholdermeeting.com/ASMB2022

You may attend the meeting via the Internet and vote during the meeting. Have the information that is printed in the box marked by the arrow available and follow the instructions.

VOTE BY PHONE - 1-800-690-6903

Use any touch-tone telephone to transmit your voting instructions. Vote by 11:59 P.M. EDT on May 24, 2022 for common stock held directly and by 11:59 P.M. EDT on May 22, 2022 for common stock held in a Company-sponsored Plan. 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.

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

D73789-P66587

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

THIS PROXY CARD IS VALID ONLY WHEN SIGNED AND DATED.

ASSEMBLY BIOSCIENCES, INC.

The Board of Directors recommends you vote FOR the following eight nominees.

1. Election of Directors

Nominees:

	For	Against	Abstain
1a. William R. Ringo, Jr.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1b. Anthony E. Altig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1c. Gina Consylman	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1d. Richard D. DiMarchi, Ph.D.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1e. Sir Michael Houghton, Ph.D.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1f. Lisa R. Johnson-Pratt, M.D.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1g. Susan Mahony, Ph.D.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1h. John G. McHutchison, A.O., M.D.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The Board of Directors recommends you vote FOR proposals 2, 3, 4, 5 and 6.

	For	Against	Abstain
2. Approval, on a non-binding advisory basis, of our named executive officers' compensation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Ratification of the selection of Ernst & Young LLP as our independent registered public accounting firm for the fiscal year ending December 31, 2022.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Approval of an amendment to our 2018 Stock Incentive Plan to increase the number of shares reserved for issuance thereunder by 2,000,000 shares.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Approval of an amendment and restatement of our Fifth Amended and Restated Certificate of Incorporation to increase the authorized number of shares of common stock from 100,000,000 to 150,000,000.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Approval of a stock option exchange program for non-executive employees.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

NOTE: Your proxy holder will also vote in their discretion upon such other matters that may properly come before the meeting and any adjournment or postponement thereof.

Please sign exactly as your name(s) appear(s) 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 Stockholder Meeting:
The Notice of Assembly Biosciences, Inc.'s 2022 Annual Meeting of Stockholders and Proxy Statement and Annual Report for the fiscal year ended December 31, 2021 are available at www.proxyvote.com.

D73790-P66587

**ASSEMBLY BIOSCIENCES, INC.
Annual Meeting of Stockholders
May 25, 2022 8:00 A.M. PDT
This proxy is solicited by the Board of Directors**

The Stockholder(s) hereby appoint(s) John G. McHutchison, A.O., M.D. and Jason A. Okazaki, or either of them, as proxies, each with the power to appoint his substitute, and hereby authorize(s) either of them to represent and to vote, as designated on the reverse side of this ballot, all of the shares of common stock of ASSEMBLY BIOSCIENCES, INC. that the Stockholder(s) is/are entitled to vote at the Annual Meeting of Stockholders to be held at 8:00 A.M. PDT on May 25, 2022 at www.virtualshareholdermeeting.com/ASMB2022.

This proxy, when properly executed, will be voted in the manner directed herein. If no such direction is made, this proxy will be voted in accordance with the Board of Directors' recommendations.

Continued and to be signed on reverse side.