

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION**

Washington, D.C. 20549

FORM S-8

REGISTRATION STATEMENT UNDER
THE SECURITIES ACT OF 1933

Assembly Biosciences, Inc.

(Exact name of registrant as specified in its charter)

Delaware

(State or other jurisdiction of
incorporation or organization)

20-8729264

(I.R.S. Employer
Identification No.)

**331 Oyster Point Blvd., Fourth Floor
South San Francisco, California**
(Address of Principal Executive Offices)

94080

(Zip Code)

**Assembly Biosciences, Inc. 2018 Stock Incentive Plan
Assembly Biosciences, Inc. Amended and Restated 2018 Employee Stock Purchase Plan**
(Full title of the plan)

**Jason A. Okazaki
Chief Operating Officer
Assembly Biosciences, Inc.
331 Oyster Point Blvd., Fourth Floor
South San Francisco, California 94080**
(Name and address of agent for service)

(833) 509-4583

(Telephone number, including area code, of agent for service)

Copies to:

**P. Michelle Gasaway, Esq.
Skadden, Arps, Slate, Meagher & Flom LLP
300 South Grand Avenue, Suite 3400
Los Angeles, California 90071
(213) 687-5000**

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, smaller reporting company or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer
Non-accelerated filer

Accelerated filer
Smaller reporting company
Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 7(a)(2)(B) of the Securities Act.

CALCULATION OF REGISTRATION FEE

Title of securities to be registered	Amount to be registered(1)	Proposed maximum offering price per share(2)	Proposed maximum aggregate offering price	Amount of registration fee
Common Stock, \$0.001 par value per share(2)	2,000,000	\$3.50	\$7,000,000	\$763.70
Common Stock, \$0.001 par value per share(3)	900,000	\$3.50	\$3,150,000	\$343.67
Total	2,900,000		\$10,150,000	\$1,107.37

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- (1) Represents (a) 2,000,000 additional shares of common stock, par value \$0.001 per share (the Common Stock), reserved for issuance under the Assembly Biosciences, Inc. 2018 Stock Incentive Plan (the 2018 Plan) and (b) 900,000 shares of Common Stock, reserved for issuance under the Assembly Biosciences, Inc. 2018 Employee Stock Purchase Plan (the 2018 ESPP). Pursuant to Rule 416 under the Securities Act of 1933, as amended (the Securities Act), this Registration Statement shall also register an indeterminate number of shares that may become issuable under the 2018 Plan or the 2018 ESPP, in each case, by reason of any stock dividend, stock split or similar transaction effected without the receipt of consideration that results in an increase in the number of the outstanding shares of Common Stock.
- (2) Estimated solely for the purpose of calculating the registration fee in accordance with Rule 457(h) of the Securities Act. The proposed maximum aggregate offering price is calculated pursuant to Rule 457(c) and Rule 457(h) under the Securities Act based on the average of the high and low sale prices of the Registrant's common stock as reported by The Nasdaq Global Select Market on August 2, 2021.
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EXPLANATORY NOTE

Pursuant to General Instruction E to Form S-8 under the Securities Act, this Registration Statement is being filed by Assembly Biosciences, Inc. (the Company or the Registrant) for the purpose of registering additional shares of the Company's Common Stock under (1) the 2018 Plan and (2) the 2018 ESPP. On April 7, 2021, the Company filed with the Securities and Exchange Commission (the Commission) a definitive proxy statement that included proposals to, among other things, increase the number of shares available for issuance (a) under the 2018 Plan by 2,000,000 shares of Common Stock and (b) under the 2018 ESPP by 900,000 shares of Common Stock, each of which was approved by the Company's stockholders on May 20, 2021. This Registration Statement registers (1) the 2,000,000 additional shares of Common Stock available for issuance under the 2018 Plan and (2) the 900,000 additional shares of Common Stock available for issuance under the 2018 ESPP.

Prior Registration Statements

The 2018 Plan

The 2,000,000 additional shares of Common Stock available for issuance under the 2018 Plan registered pursuant to this Registration Statement are of the same class of securities as the shares of Common Stock registered for issuance under the 2018 Plan pursuant to the following currently effective registration statements: (1) the Registration Statement on Form S-8 (Registration No. 333-226703) filed on August 8, 2018 (the Original 2018 Plan Registration Statement"), (2) the Registration Statement on Form S-8 (Registration No. 333-233030) filed on August 5, 2019 (the Second 2018 Plan Registration Statement) and (3) the Registration Statement on Form S-8 (Registration No. 333-248476) filed on August 28, 2020 (the Third 2018 Plan Registration Statement). The contents of the Original 2018 Plan Registration Statement, the Second 2018 Plan Registration Statement and the Third 2018 Plan Registration Statement, including any amendments thereto or filings incorporated therein, are incorporated herein by reference. Any items in the Original 2018 Plan Registration Statement, the Second 2018 Plan Registration Statement and the Third 2018 Plan Registration Statement not expressly changed by this Registration Statement shall be set forth in the Original 2018 Plan Registration Statement, the Second 2018 Plan Registration Statement and the Third 2018 Plan Registration Statement, as applicable.

The 2018 ESPP

The 900,000 additional shares of Common Stock available for issuance under the 2018 ESPP registered pursuant to this Registration Statement are of the same class of securities as the shares of Common Stock registered for issuance under the 2018 ESPP pursuant to the currently effective Registration Statement on Form S-8 (Registration No. 333-226703) filed on August 8, 2018 (the Original 2018 ESPP Registration Statement). The contents of the Original 2018 ESPP Registration Statement, including any amendments thereto or filings incorporated therein, are incorporated herein by reference. Any items in the Original 2018 ESPP Registration Statement not expressly changed by this Registration Statement shall be set forth in the Original 2018 ESPP Registration Statement.

PART I

INFORMATION REQUIRED IN THE SECTION 10(a) PROSPECTUS

The documents containing the information specified in Part I will be delivered in accordance with Form S-8 and Rule 428(b) under the Securities Act. Such documents are not required to be, and are not, filed with the Commission, either as part of this Registration Statement or as prospectuses or prospectus supplements pursuant to Rule 424 under the Securities Act. These documents, and the documents incorporated by reference in this Registration Statement pursuant to Item 3 of Part II of this Form S-8, taken together, constitute a prospectus that meets the requirements of Section 10(a) of the Securities Act.

PART II

INFORMATION REQUIRED IN THE REGISTRATION STATEMENT

Item 3. Incorporation of Documents by Reference.

The following documents, which have been filed with the Commission by the Company pursuant to the Securities Act and the Securities Exchange Act of 1934, as amended (the Exchange Act), as applicable, are hereby incorporated by reference in, and shall be deemed to be a part of, this Registration Statement:

- the Company's Annual Report on Form 10-K for the year ended December 31, 2020, filed with the Commission on February 25, 2021 (including, for the avoidance of doubt, the information specifically incorporated by reference in the Company's Form 10-K from the Company's Definitive Proxy Statement for the 2021 Annual Meeting of Stockholders, filed with the Commission on April 7, 2021);
- the Company's Quarterly Reports on Form 10-Q for the quarters ended March 31, 2020 and June 30, 2021, filed with the Commission on May 6, 2021 and August 5, 2021, respectively;
- our Current Reports on Form 8-K filed with the SEC on January 27, 2021, February 17, 2021, February 25, 2021 (solely with respect to Item 8.01), February 26, 2021, May 25, 2021, June 1, 2021, July 20, 2021 and August 3, 2021; and
- the description of the Company's common stock in the Company's Registration Statement on Form 8-A (File No. 001-35005) filed with the Commission on December 10, 2010, including any amendment or report filed by the Company for the purpose of updating such description, including Exhibit 4.3 to the Company's Annual Report on Form 10-K for the year ended December 31, 2020, filed with the Commission on February 25, 2021.

All documents subsequently filed by the Company pursuant to Section 13(a), 13(c), 14 or 15(d) of the Exchange Act prior to the filing of a post-effective amendment to this Registration Statement that indicates that all of the shares of common stock registered hereunder have been sold or that deregisters all of such shares then remaining unsold, shall be deemed to be incorporated by reference into this Registration Statement and to be a part hereof from the respective dates of filing of such documents, except as to any portion of any future annual or quarterly report to stockholders or document or current report furnished under current Item 2.02 or 7.01 or any related Item 9.01 of Form 8-K that is not deemed filed under such provisions.

Any statement contained in a document incorporated or deemed to be incorporated by reference herein shall be deemed to be modified or superseded for purposes of this Registration Statement to the extent that a statement contained herein, or in any other subsequently filed document that also is or is deemed to be incorporated by reference herein, modifies or supersedes such earlier statement. Any such statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this Registration Statement.

You may request a copy of these filings, at no cost, by writing or telephoning the Company at:

331 Oyster Point Blvd., Fourth Floor
South San Francisco, California 94080
Telephone: (833) 509-4583
Attn: Corporate Secretary

You should rely only on the information provided or incorporated by reference in this Registration Statement or any related prospectus. The Company has not authorized anyone to provide you with different information. You should not assume that the information in this Registration Statement or any related prospectus is accurate as of any date other than the date on the front of the document.

Item 4. Description of Securities.

Not applicable.

Item 5. Interests of Named Experts and Counsel.

Not applicable.

Item 6. Indemnification of Directors and Officers.

Not applicable.

Item 7. Exemption from Registration Claimed.

Not applicable.

Item 8. Exhibits.

See the Exhibit Index on the page immediately preceding the signatures to this Registration Statement for a list of exhibits filed as part of this Registration Statement, which Exhibit Index is incorporated herein by reference.

Item 9. Undertakings.

Not required to be filed with this Registration Statement pursuant to General Instruction E to Form S-8.

EXHIBIT INDEX

Exhibit No.	Description
4.1	<u>Fifth Amended and Restated Certificate of Incorporation of Assembly Biosciences, Inc. (incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed with the Commission on June 16, 2020).</u>
4.2	<u>Amended and Restated Bylaws of Assembly Biosciences, Inc., as amended on January 22, 2021 (incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed with the Commission on January 27, 2021).</u>
4.3	<u>Specimen Common Stock Certificate of Assembly Biosciences, Inc. (incorporated by reference to Exhibit 4.1 of the Registrant's Registration Statement on Form S-3 filed with the Commission on December 30, 2015).</u>
5.1	<u>Opinion of Skadden, Arps, Slate, Meagher & Flom LLP.</u>
23.1	<u>Consent of Skadden, Arps, Slate, Meagher & Flom LLP (included in Exhibit 5.1).</u>
23.2	<u>Consent of Independent Registered Public Accounting Firm.</u>
24.1	<u>Power of Attorney (included on the signature page of this Registration Statement).</u>
99.1	<u>Assembly Biosciences, Inc. 2018 Stock Incentive Plan (incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed with the Commission on June 1, 2018).</u>
99.2	<u>Amendment No. 1 to Assembly Biosciences, Inc. 2018 Stock Incentive Plan (incorporated by reference to Exhibit 10.2 of the Registrant's Current Report on Form 8-K filed with the Commission on May 21, 2019).</u>
99.3	<u>Omnibus Amendment to Assembly Biosciences, Inc. Stock Incentive Plans (incorporated by reference to Exhibit 10.2 of the Registrant's Quarterly Report on Form 10-Q filed with the Commission on May 7, 2020).</u>
99.4	<u>Amendment No. 3 to Assembly Biosciences, Inc. 2018 Stock Incentive Plan (incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed with the Commission on June 16, 2020).</u>
99.5	<u>Amendment No. 4 to Assembly Biosciences, Inc. 2018 Stock Incentive Plan (incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed on May 25, 2021).</u>
99.6	<u>Assembly Biosciences, Inc. Amended and Restated 2018 Employee Stock Purchase Plan (incorporated by reference to Exhibit 10.2 of the Registrant's Current Report on Form 8-K filed on May 25, 2021).</u>

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-8 and has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of South San Francisco, State of California, on August 5, 2021.

Assembly Biosciences, Inc.

By: /s/ John G. McHutchison, A.O., M.D.
John G. McHutchison, A.O., M.D.
Chief Executive Officer and President

POWER OF ATTORNEY AND SIGNATURES

We, the undersigned officers and directors of Assembly Biosciences, Inc., hereby severally constitute and appoint John G. McHutchison, A.O., M.D. and Jason A. Okazaki, and each of them singly (with full power to each of them to act alone), our true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution in each of them for him/her and in his/her name, place and stead, and in any and all capacities, to sign for us and in our names in the capacities indicated below any and all amendments (including post-effective amendments) to this registration statement on Form S-8, and to file the same, with all exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite or necessary to be done in and about the premises, as full to all intents and purposes as he/she might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents or any of them, or their or his/her substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1933, this registration statement has been signed by the following persons on August 5, 2021 in the capacities indicated.

<u>Signature</u>	<u>Title</u>
<u>/s/ John G. McHutchison, A.O., M.D.</u> John G. McHutchison, A.O., M.D.	Director, Chief Executive Officer and President (Principal Executive Officer)
<u>/s/ Michael P. Samar</u> Michael P. Samar	Chief Financial Officer (Principal Financial Officer and Principal Accounting Officer)
<u>/s/ William R. Ringo, Jr.</u> William R. Ringo, Jr.	Chairman of the Board
<u>/s/ Anthony E. Altig</u> Anthony E. Altig	Director
<u>/s/ Gina Consylman</u> Gina Consylman	Director
<u>/s/ Richard D. DiMarchi, Ph.D.</u> Richard D. DiMarchi, Ph.D.	Director
<u>/s/ Myron Z. Holubiak</u> Myron Z. Holubiak	Director
<u>/s/ Michael Houghton, Ph.D.</u> Michael Houghton, Ph.D.	Director
<u>/s/ Lisa R. Johnson-Pratt, M.D.</u> Lisa R. Johnson-Pratt, M.D.	Director
<u>/s/ Susan Mahony, Ph.D.</u> Susan Mahony, Ph.D.	Director

SKADDEN, ARPS, SLATE, MEAGHER & FLOM LLP
300 SOUTH GRAND AVENUE
LOS ANGELES, CALIFORNIA 90071-3144

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FIRM/AFFILIATE OFFICES

BOSTON
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WILMINGTON

August 5, 2021

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TOKYO
TORONTO

Assembly Biosciences, Inc.
331 Oyster Point Blvd., Fourth Floor
South San Francisco, California 94080

Re: Assembly Biosciences, Inc.
Registration Statement on Form S-8

Ladies and Gentlemen:

We have acted as special United States counsel to Assembly Biosciences, Inc., a Delaware corporation (the "Company"), in connection with its filing with the Securities and Exchange Commission (the "Commission") of a registration statement on Form S-8 (the "Registration Statement") under the Securities Act of 1933 (the "Securities Act") on the date hereof, relating to the registration by the Company of (i) an aggregate of 2,000,000 shares (the "2018 Plan Shares") of common stock of the Company, par value \$0.001 per share (the "Common Stock"), for issuance pursuant to the Assembly Biosciences, Inc. 2018 Stock Incentive Plan, effective as of May 30, 2018 (the "2018 Original Plan"), as amended by Amendment No. 1 to Assembly Biosciences, Inc. 2018 Stock Incentive Plan, effective as of May 17, 2019 (the "2018 Plan Amendment No. 1"), as further amended by the Omnibus Amendment to Assembly Biosciences, Inc. Stock Plans, effective as of March 11, 2020 (the "Omnibus Amendment"), as further amended by Amendment No. 3 to the Assembly Biosciences, Inc. 2018 Stock Incentive Plan, effective as of June 11, 2020 (the "2018 Plan Amendment No. 3") and as further amended by Amendment No. 4 to the Assembly Biosciences, Inc. 2018 Stock Incentive Plan, effective as of May 20, 2021 (the "2018 Plan Amendment No. 4" and the 2018 Original

Plan, as amended by the 2018 Plan Amendment No. 1, the Omnibus Amendment, the 2018 Plan Amendment No. 3 and the 2018 Plan Amendment No. 4, the “2018 Plan”), and (ii) an aggregate of 900,000 shares (the “2018 ESPP Shares,” and, together with the 2018 Plan Shares, the “Plan Shares”) of Common Stock, for issuance pursuant to the Assembly Biosciences, Inc. 2018 Employee Stock Purchase Plan (the “2018 Original ESPP”) as amended by the Assembly Biosciences, Inc. Amended and Restated 2018 Employee Stock Purchase Plan (the “Amended and Restated 2018 ESPP” and together with the 2018 Original ESPP, the “2018 ESPP”).

This opinion is being furnished in accordance with the requirements of Item 601(b)(5) of Regulation S-K under the Securities Act.

In rendering the opinions stated herein, we have examined and relied upon the following:

- (a) the Registration Statement;
 - (b) an executed copy of a certificate, dated the date hereof, of Jason Okazaki, Corporate Secretary of the Company (the “Secretary’s Certificate”);
 - (c) copies of the Company’s (i) Third Amended and Restated Certificate of Incorporation, as amended, as in effect to May 31, 2018 and certified pursuant to the Secretary’s Certificate, (ii) Fourth Amended and Restated Certificate of Incorporation, as in effect from May 31, 2018 to June 11, 2020 and certified pursuant to the Secretary’s Certificate and (iii) Fifth Amended and Restated Certificate of Incorporation, as in effect from June 11, 2020, certified by the Secretary of State of the State of Delaware as of July 27, 2021 (the “Current Charter”), and certified pursuant to the Secretary’s Certificate;
 - (d) a copy of the Company’s (i) Amended and Restated Bylaws as in effect to August 6, 2019 and certified pursuant to the Secretary’s Certificate, (ii) Amended and Restated Bylaws as in effect to June 12, 2020 and certified pursuant to the Secretary’s Certificate, (iii) Amended and Restated Bylaws, as in effect to January 22, 2021 and (iv) Amended and Restated Bylaws as in effect since January 22, 2021 and certified pursuant to the Secretary’s Certificate and as in effect as of the date hereof (the “Current Bylaws”) and certified pursuant to the Secretary’s Certificate;
 - (e) copies of certain resolutions of the Board of Directors of the Company, and of the Compensation Committee of the Board of Directors of the Company, certified pursuant to the Secretary’s Certificate;
 - (f) the report of the inspector of elections of each of the 2018 Annual Meeting of the Stockholders of the Company, the 2019 Annual Meeting of Stockholders of the Company, the 2020 Annual Meeting of the Stockholders of the Company and the 2021 Annual Meeting of the Stockholders of the Company, as applicable, reflecting approval of the 2018 Original Plan, the 2018 Plan Amendment No. 1, the 2018 Plan Amendment No. 3, the 2018 Plan Amendment No. 4, the 2018 Original ESPP and the Amended and Restated 2018 ESPP, respectively, each certified pursuant to the Secretary’s Certificate;
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- (g) copies of the 2018 Original Plan, the 2018 Plan Amendment No. 1, the Omnibus Amendment, the 2018 Plan Amendment No. 3 and the 2018 Plan Amendment No. 4;
- (h) copies of the 2018 Original ESPP and the Amended and Restated 2018 ESPP; and
- (i) the forms of award agreements under the 2018 Plan and the 2018 ESPP.

We have also examined originals or copies, certified or otherwise identified to our satisfaction, of such records of the Company and such agreements, certificates and receipts of public officials, certificates of officers or other representatives of the Company and others, and such other documents as we have deemed necessary or appropriate as a basis for the opinions set forth herein.

In our examination, we have assumed the genuineness of all signatures, including electronic signatures, the legal capacity and competency of all natural persons, the authenticity of all documents submitted to us as originals, the conformity to original documents of all documents submitted to us as facsimile, electronic, certified or photocopied copies, and the authenticity of the originals of such copies. As to any facts relevant to the opinions stated herein that we did not independently establish or verify, we have relied upon statements and representations of officers and other representatives of the Company and others and of public officials, including the facts and conclusions set forth in the Secretary's Certificate.

In rendering the opinions stated herein, we have also assumed that: (i) an appropriate account statement evidencing the Plan Shares credited to a recipient's account maintained with the Company's transfer agent has been or will be issued by the Company's transfer agent, (ii) the issuance of the Plan Shares has been properly recorded in the books and records of the Company; (iii) each award agreement pursuant to which rights to acquire Plan Shares or other awards are granted pursuant to the 2018 Plan or the 2018 ESPP, as applicable, will be consistent with the Plan and will be duly authorized, executed and delivered by the parties thereto and (iv) the consideration received by the Company for each of the Plan Shares delivered pursuant to the 2018 Plan or 2018 ESPP shall not be less than the per share par value of the Plan Shares.

We do not express any opinion with respect to the laws of any jurisdiction other than the General Corporation Law of the State of Delaware (the "DGCL").

Based upon the foregoing and subject to the qualifications and assumptions stated herein, we are of the opinion that the Plan Shares have been duly authorized by all requisite corporate action on the part of the Company under the DGCL and, when issued, delivered and paid for in accordance with the terms of the 2018 Plan or 2018 ESPP and the applicable award agreement, the Plan Shares will be validly issued, fully paid and nonassessable.

In addition, in rendering the foregoing opinion we have assumed that the issuance of the Plan Shares does not and will not constitute a violation of, or a default under, any lease, indenture, agreement or other instrument to which the Company or its property is subject (except that we do not make this assumption with respect to the Current Charter or Current Bylaws).

We hereby consent to the filing of this opinion with the Commission as Exhibit 5.1 to the Registration Statement. In giving this consent, we do not thereby admit that we are included in the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations of the Commission promulgated thereunder. This opinion is expressed as of the date hereof unless otherwise expressly stated, and we disclaim any undertaking to advise you of any subsequent changes in the facts stated or assumed herein or of any subsequent changes in applicable laws.

Very truly yours,

/s/ Skadden, Arps, Slate, Meagher & Flom LLP

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the Registration Statement (Form S-8) pertaining to the Assembly Biosciences, Inc. 2018 Stock Incentive Plan and Assembly Biosciences, Inc. Amended and Restated 2018 Employee Stock Purchase Plan of our reports dated February 25, 2021, with respect to the consolidated financial statements and related notes of Assembly Biosciences, Inc. and the effectiveness of internal control over financial reporting of Assembly Biosciences, Inc. included in its Annual Report (Form 10-K) for the year ended December 31, 2020, filed with the Securities and Exchange Commission.

/s/ Ernst & Young LLP

Redwood City, California

August 5, 2021