

**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.)

**Two Tower Place, 7th Floor
South San Francisco, California**

(Address of Principal Executive Offices)

94080

(Zip Code)

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

Jason A. Okazaki

**Chief Executive Officer and President
Assembly Biosciences, Inc.**

**Two Tower Place, 7th 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.

PART I
INFORMATION REQUIRED IN THE SECTION 10(a) PROSPECTUS

Item 1. Plan Information.

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 of 1933, as amended (the "Securities Act"). Such documents are not required to be, and are not, filed with the Securities and Exchange Commission (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.

Item 2. Registrant Information and Employee Plan Annual Information.

The written statement required by Item 2 of Part I is included in documents delivered to participants in the plans covered by this Registration Statement pursuant to Rule 428(b) 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 Registrant 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 Registrant’s [Annual Report on Form 10-K for the year ended December 31, 2023](#), filed with the Commission on March 28, 2024 (including, for the avoidance of doubt, the information specifically incorporated by reference in the Registrant’s Form 10-K from the Registrant’s [Definitive Proxy Statement for the 2024 Annual Meeting of Stockholders](#), filed with the Commission on April 17, 2024);
- the Registrant’s Quarterly Reports on Form 10-Q for the quarters ended [March 31, 2024](#) and [June 30, 2024](#), filed with the Commission on May 8, 2024 and August 8, 2024, respectively;
- our Current Reports on Form 8-K filed with the SEC on [January 17, 2024](#), [February 2, 2024](#), [February 13, 2024](#), [March 15, 2024](#), [June 3, 2024](#) and [June 18, 2024](#); and
- the description of the Registrant’s common stock in the Registrant’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 Registrant for the purpose of updating such description, including [Exhibit 4.2](#) to the Registrant’s Annual Report on Form 10-K for the year ended December 31, 2023, filed with the Commission on March 28, 2024.

All documents subsequently filed by the Registrant 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 Registrant at:

Two Tower Place, 7th 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 Registrant 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.

None.

Item 6. Indemnification of Directors and Officers.

The Registrant is a Delaware corporation. Reference is made to Section 102(b)(7) of the Delaware General Corporation Law (the “DGCL”), which enables a corporation in its certificate of incorporation to eliminate or limit the personal liability of directors or officers of a corporation to the corporation or its stockholders for monetary damages for a breach of fiduciary duty as a director or officer, except:

- for any breach of the director’s or officer’s duty of loyalty to the corporation or its stockholders;
- for acts or omissions by a director or officer not in good faith or which involve intentional misconduct or a knowing violation of law;
- by a director pursuant to Section 174 of the DGCL (providing for liability of directors for unlawful payment of dividends or unlawful stock purchases or redemptions);
- for any transaction from which a director or officer derived an improper personal benefit; or
- for an officer in any action or in the right of the corporation.

The Registrant’s Sixth Amended and Restated Certificate of Incorporation, as amended, limits the personal liability of a director to the Registrant and its stockholders for monetary damages for a breach of fiduciary duty as a director to the fullest extent permitted by the DGCL.

Reference is also made to Section 145 of the DGCL, which provides that a corporation may indemnify any persons, including directors and officers, who are, or are threatened to be made, parties to any threatened, pending or completed legal action, suit or proceeding, whether civil, criminal, administrative or investigative (other than an action by or in the right of such corporation), by reason of the fact that such person is or was a director, officer, employee or agent of such corporation or is or was serving at the request of such corporation as a director, officer, employee or agent of another corporation or enterprise. The indemnity may include expenses (including attorneys’ fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by such person in connection with such action, suit or proceeding, provided such director, officer, employee or agent acted in good faith and in a manner the person reasonably believed to be in or not opposed to the best interests of the corporation and, with respect to any criminal action or proceeding, had no reasonable cause to believe that the person’s conduct was unlawful. A Delaware corporation may indemnify directors and officers in an action by or in the right of the corporation under the same conditions, except that no indemnification is permitted without judicial approval if the director or officer is adjudged to be liable to the corporation. Where a director or officer is successful on the merits or otherwise in the defense of any action referred to above, the corporation must indemnify him or her against the expenses that such director or officer actually and reasonably incurred. The indemnification permitted under the DGCL is not exclusive, and a corporation is empowered to purchase and maintain insurance against liabilities whether or not indemnification would be permitted by statute.

The Registrant’s Sixth Amended and Restated Certificate of Incorporation, as amended, and Amended and Restated Bylaws provide for indemnification of its directors and officers to the fullest extent currently permitted by the DGCL. The Registrant also has indemnification agreements with its directors and officers. In addition, the Registrant maintains liability insurance for its directors and officers.

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.

(a) The undersigned registrant hereby undertakes:

- (1) To file, during any period in which offers or sales are being made, a post-effective amendment to this Registration Statement:

(i) To include any prospectus required by Section 10(a)(3) of the Securities Act;

(ii) To reflect in the prospectus any facts or events arising after the effective date of the Registration Statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in the Registration Statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the Commission pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than 20% change in the maximum aggregate offering price set forth in the "Calculation of Registration Fee" table in the effective Registration Statement; and

(iii) To include any material information with respect to the plan of distribution not previously disclosed in the Registration Statement or any material change to such information in the Registration Statement;

provided, however, that paragraphs (a)(1)(i) and (a)(1)(ii) do not apply if the information required to be included in a post-effective amendment by those paragraphs is contained in reports filed with or furnished to the Commission by the Registrant pursuant to Section 13 or Section 15(d) of the Exchange Act that are incorporated by reference in the Registration Statement.

(2) That, for the purpose of determining any liability under the Securities Act, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

(3) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.

(b) The undersigned Registrant hereby undertakes that, for purposes of determining any liability under the Securities Act, each filing of the Registrant's annual report pursuant to Section 13(a) or 15(d) of the Exchange Act (and, where applicable, each filing of an employee benefit plan's annual report pursuant to Section 15(d) of the Exchange Act) that is incorporated by reference in this Registration Statement shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

(c) Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the Registrant pursuant to the foregoing provisions, or otherwise, the Registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the Registrant of expenses incurred or paid by a director, officer or controlling person of the Registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the Registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Securities Act and will be governed by the final adjudication of such issue.

EXHIBIT INDEX

Exhibit No.	Description
4.1	<u>Sixth 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 May 27, 2022).</u>
4.2	<u>Certificate of Amendment to Sixth Amended and Restated Certificate of Incorporation, dated February 9, 2024 (incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed with the Commission on February 13, 2024).</u>
4.3	<u>Amended and Restated Bylaws of Assembly Biosciences, Inc., as amended through December 7, 2022 (incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed with the Commission on December 12, 2022).</u>
4.4	<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. Amended and Restated 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 3, 2024).</u>
99.2	<u>Assembly Biosciences, Inc. Second 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 with the Commission on June 3, 2024).</u>
107	<u>Filing Fees.</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 8, 2024.

Assembly Biosciences, Inc.

By: /s/ Jason A. Okazaki
Jason A. Okazaki
Chief Executive Officer and President

POWER OF ATTORNEY

We, the undersigned officers and directors of Assembly Biosciences, Inc., hereby severally constitute and appoint Jason A. Okazaki and John O. Gunderson, 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 8, 2024 in the capacities indicated.

Signature	Title
<u>/s/ Jason A. Okazaki</u> Jason A. Okazaki	Director, Chief Executive Officer and President (Principal Executive Officer and Principal Financial Officer)
<u>/s/ Jeanette M. Bjorkquist</u> Jeanette M. Bjorkquist	Executive Director, Accounting and Treasury (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/ Tomas Cihlar, Ph.D.</u> Tomas Cihlar, Ph.D.	Director
<u>/s/ Gina Consylman</u> Gina Consylman	Director
<u>/s/ Robert D. Cook II</u> Robert D. Cook II	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
<u>/s/ John G. McHutchison, A.O., M.D.</u> John G. McHutchison, A.O., M.D.	Director

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

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TOKYO
TORONTO

August 8, 2024

Assembly Biosciences, Inc.
Two Tower Place, 7th 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 an aggregate of (i) 220,000 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 the 2018 Original Plan, effective as of May 17, 2019 (the “2018 Plan Amendment No. 1”), as further amended by the Omnibus Amendment to the 2018 Original Plan, effective as of March 11, 2020 (the “Omnibus Amendment”), as further amended by Amendment No. 3 to the 2018 Original Plan, effective as of June 11, 2020 (the “2018 Plan Amendment No. 3”), as further amended by Amendment No. 4 to the 2018 Original Plan, effective as of May 20, 2021 (the “2018 Plan Amendment No. 4”), as further amended by Amendment No. 5 to the 2018 Original Plan, effective as of May 25, 2022 (the “2018 Plan Amendment No. 5”), as further amended by Amendment No. 6 to the 2018 Original Plan, effective as of May 25, 2023 (the “2018 Plan Amendment No. 6”), and as further amended by Amendment No. 7 to the 2018 Original Plan, effective as of May 29, 2024 (the “2018 Plan Amendment No. 7”); and the 2018 Original Plan, as amended by the 2018 Plan Amendment No.

1, the Omnibus Amendment, the 2018 Plan Amendment No. 3, the 2018 Plan Amendment No. 4, the 2018 Plan Amendment No. 5, the 2018 Plan Amendment No. 6 and the 2018 Plan Amendment No. 7, the “2018 Plan”), and (ii) 118,065 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 as further amended by the Assembly Biosciences, Inc. Second Amended and Restated 2018 Employee Stock Purchase Plan (the “Second Amended and Restated 2018 ESPP” and collectively with the 2018 Original ESPP and the Amended and Restated 2018 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 John Gunderson, Vice President, General Counsel and 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, (iii) Fifth Amended and Restated Certificate of Incorporation, as in effect from June 11, 2020 to May 25, 2022, and certified pursuant to the Secretary’s Certificate, (iv) Sixth Amended and Restated Certificate of Incorporation, as in effect from May 25, 2022 to February 9, 2024 and certified pursuant to the Secretary’s Certificate, and (v) Sixth Amended and Restated Certificate of Incorporation, as amended, as in effect from February 9, 2024, certified by the Secretary of State of the State of Delaware as of the date hereof (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 January 24, 2018 and certified pursuant to the Secretary’s Certificate, (ii) Amended and Restated Bylaws as in effect to August 6, 2019 and certified pursuant to the Secretary’s Certificate, (iii) Amended and Restated Bylaws, as amended, as in effect to June 12, 2020 and certified pursuant to the Secretary’s Certificate, (iv) Amended and Restated Bylaws, as in effect to January 22, 2021 and certified pursuant to the Secretary’s Certificate, (v) Amended and Restated Bylaws, as in effect to December 7, 2022 and certified pursuant to the Secretary’s Certificate and (vi) Amended and Restated Bylaws, as in effect since December 7, 2022 and certified pursuant to the Secretary’s Certificate (the “Current Bylaws”);

(e) copies of certain resolutions 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 2016 Annual Meeting of the Stockholders of the Company, 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, the 2021 Annual Meeting of the Stockholders of the Company, the 2022 Annual Meeting of the Stockholders of the Company, the 2023 Annual Meeting of the Stockholders of the Company and the 2024 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 Plan Amendment No. 5, the 2018 Plan Amendment No. 6, the 2018 Plan Amendment No. 7, the 2018 Original ESPP, the Amended and Restated 2018 ESPP and the Second Amended and Restated 2018 ESPP, respectively, each certified pursuant to the Secretary's Certificate;

(g) copies of the 2018 Original Plan, the 2018 Plan Amendment No. 1, the Omnibus Amendment, the 2018 Plan Amendment No. 3, the 2018 Plan Amendment No. 4, the 2018 Plan Amendment No. 5, the 2018 Plan Amendment No. 6 and the 2018 Plan Amendment No. 7

(h) copies of the 2018 Original ESPP, the Amended and Restated 2018 ESPP and the Second Amended and Restated 2018 ESPP; and

(i) the forms of award agreements under each of 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 and the 2018 ESPP will be consistent with the 2018 Plan and

the 2018 ESPP, respectively, 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 and the 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 the 2018 ESPP, as applicable, and, in either case, the respective 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. Amended and Restated 2018 Stock Incentive Plan and the Assembly Biosciences, Inc. Second Amended and Restated 2018 Employee Stock Purchase Plan of our report dated March 28, 2024, with respect to the consolidated financial statements of Assembly Biosciences, Inc., included in its Annual Report (Form 10-K) for the year ended December 31, 2023, filed with the Securities and Exchange Commission.

/s/ Ernst & Young LLP

San Jose, California
August 8, 2024

Calculation of Filing Fee Tables

Form S-8
(Form Type)

Assembly Biosciences, Inc.
(Exact Name of Registrant as Specified in its Charter)

Table 1: Newly Registered Securities

	Security Type	Security Class Title	Fee Calculation	Amount Registered ⁽¹⁾	Proposed Maximum Offering Price Per Share ⁽²⁾	Maximum Aggregate Offering Price	Fee Rate	Amount of Registration Fee
Newly Registered Securities								
Fees to Be Paid	Equity	Common Stock, par value \$0.001 per share	Other ⁽²⁾	220,000	\$13.3325	\$2,933,150.00	\$147.60 per \$1,000,000	\$432.93
Fees to Be Paid	Equity	Common Stock, par value \$0.001 per share	Other ⁽²⁾	118,065	\$13.3325	\$1,574,101.61	\$147.60 per \$1,000,000	\$232.34
Total Offering Amounts						\$4,507,251.61		\$665.27
Total Fee Offsets								—
Net Fees Due								\$665.27

(1) Represents (a) 220,000 additional shares of common stock, par value \$0.001 per share of Assembly Biosciences, Inc. (the “Common Stock”), reserved for issuance under the Assembly Biosciences, Inc. Amended and Restated 2018 Stock Incentive Plan (the “2018 Plan”), and (b) 118,065 additional shares of Common Stock reserved for issuance under the Assembly Biosciences, Inc. Second Amended and Restated 2018 Employee Stock Purchase Plan. Pursuant to Rule 416(a) 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 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 per share 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 5, 2024.