As filed with the Securities and Exchange Commission on November 5, 2026

Registration No. 333-

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

FORM S-8

REGISTRATION STATEMENT UNDER THE SECURITIES ACT OF 1933

MUSTANG BIO, INC.
(Exact name of registrant as specified in its charter)

Delaware	**47-3828760**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
95 Sawyer Road, Suite 110 **Waltham, MA**	**02453**
(Address of Principal Executive Offices)	(Zip Code)

Mustang Bio, Inc. 2019 Employee Stock Purchase Plan, as amended
Mustang Bio, Inc. 2016 Incentive Plan, as amended
(Full title of the plan)

Manuel Litchman, M.D.
President, Chief Executive Officer and Interim Chief Financial Officer
95 Sawyer Road, Suite 110
Waltham, MA 02453
(781) 652-4500
(Name, address, and telephone number of agent for service)

Copy to:
Rakesh Gopalan
David S. Wolpa
Alexander T. Yarbrough
Troutman Pepper Locke LLP
301 S. College Street, 3400
Charlotte, NC 28202
(704) 998-4050

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a 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	¨	Accelerated filer	¨
Non-accelerated filer	x	Smaller reporting company	x
		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. ¨

STATEMENT OF INCORPORATION BY REFERENCE
OF CONTENTS OF REGISTRATION STATEMENT ON FORM S-8

This Registration Statement on Form S-8 is being filed by Mustang Bio, Inc. (the "Registrant") with the Securities and Exchange Commission (the "Commission") for the purpose of registering (i) an additional 250,000 shares of common stock, $0.0001 par value per share (the "Common Stock") that are issuable pursuant to the Registrant's 2019 Employee Stock Purchase Plan, as amended (the "ESPP") and (ii) an additional 2,500,000 shares of Common Stock that are issuable pursuant to the Registrant's 2016 Incentive Plan, as amended (the "EIP"). These additional shares of Common Stock are securities of the same class as other securities for which a Registration Statement on Form S-8 of the Registrant relating to the ESPP and EIP is effective. The Registrant previously registered common shares for issuance under the ESPP under a Registration Statement on Form S-8 filed with the Commission on April 2, 2021 (File No. 333-255007), as amended by Registration Statements on Form S-8, filed with the Commission on July 30, 2021 (File No. 333-258311), and July 31, 2023 (File No. 333-273549). The Registrant previously registered common shares for issuance under the EIP under a Registration Statement on Form S-8 filed with the Commission on November 30, 2017 (File No. 333-221819), as amended by Registration Statements on Form S-8, filed with the Commission on July 30, 2021 (File No. 333-258310), and July 15, 2022 (File No. 333-266176). Pursuant to General Instruction E to Form S-8, this Registration Statement hereby incorporates by reference the contents of the Registration Statements referenced above.

PART II
INFORMATION REQUIRED IN THE REGISTRATION STATEMENT

Item 8. Exhibits

The following exhibits are filed as part of this registration statement:

Number	Description
4.1	Mustang Bio, Inc. 2019 Employee Stock Purchase Plan (incorporated by reference to Exhibit 10.1 of the Registrant's Quarterly Report on Form 10-Q (file No. 001-38191) filed with the Commission on August 9, 2019).
4.2	Amendment to the Mustang Bio, Inc. 2019 Employee Stock Purchase Plan (incorporated by reference to Exhibit 10.2 of the Registrant's Current Report on Form 8-K (file No. 001-38191) filed with the Commission on June 22, 2021).
4.3	Amendment No. 2 to the Mustang Bio, Inc. 2019 Employee Stock Purchase Plan (incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K (file No. 001-38191) filed with the Commission on June 23, 2023).
4.4	Amendment No. 3 to the Mustang Bio, Inc. 2019 Employee Stock Purchase Plan (incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K (file No. 001-38191) filed with the Commission on December 23, 2025).
4.5	Mustang Bio, Inc. 2016 Incentive Plan (incorporated by reference to Exhibit 10.8 of the Registrant's Form 10-12G (file No. 000-55668) filed with the Commission on July 28, 2016).
4.6	Amendment to the Mustang Bio, Inc. 2016 Incentive Plan (incorporated by reference to the Registrant's 2018 Proxy Statement on Schedule 14A (file No. 001-38191) filed with the Commission on April 30, 2018).
4.7	Second Amendment to the Mustang Bio, Inc. 2016 Incentive Plan (incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K (file No. 001-38191) filed with the Commission on June 22, 2021).
4.8	Third Amendment to the Mustang Bio, Inc. 2016 Incentive Plan (incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K (file No. 001-38191) filed with the Commission on June 24, 2022).
4.9	Fourth Amendment to the Mustang Bio, Inc. 2016 Incentive Plan (incorporated by reference to Exhibit 10.2 of the Registrant's Current Report on Form 8-K (file No. 001-38191) filed with the Commission on December 23, 2025).
5.1*	Opinion of Troutman Pepper Locke LLP
23.1*	Consent of Troutman Pepper Locke LLP (included in the Opinion filed as Exhibit 5.1)
23.2*	Consent of Independent Registered Public Accounting Firm, KPMG LLP, New York, New York.
24.1*	Powers of Attorney (included on the signature pages to this registration statement)
107*	Filing Fee Table

* Filed herewith.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, as amended, 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 Waltham, State of Massachusetts, on November 5, 2026.

MUSTANG BIO, INC.

By: /s/ Manuel Litchman, M.D.
Name: Manuel Litchman, M.D.
Title: President, Chief Executive Officer and Interim Chief Financial Officer
(Principal Executive Officer, and Principal Financial and Accounting Officer)

POWERS OF ATTORNEY

Each person whose signature appears below constitutes and appoints Manuel Litchman, M.D., as his or her true and lawful attorney-in-fact and agent, with full power of substitution and resubstitution, for him or her and in his or her name, place and stead, in any and all capacities, to sign any and all amendments (including post-effective amendments) to this Registration Statement, and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorney-in-fact and agent full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully to all intents and purposes as he or she might or could do in person, hereby ratifying and confirming all said attorney-in-fact and agent, or his or her substitute or substitutes, may lawfully do or cause to be done by virtue thereof.

Pursuant to the requirements of the Securities Act of 1933, as amended, this registration statement has been signed below by the following persons in the capacities indicated on November 5, 2026.

Signature	Capacity
/s/ Manuel Litchman, M.D. Manuel Litchman, M.D.	President, Chief Executive Officer, Interim Chief Financial Officer and Director (Principal Executive Officer, and Principal Financial and Accounting Officer)
/s/ Michael S. Weiss Michael S. Weiss	Chairman of the Board of Directors and Executive Chairman
/s/ Adam Chill Adam Chill	Director
/s/ Neil Herskowitz Neil Herskowitz	Director
/s/ David Jin David Jin	Director
/s/ Lindsay A. Rosenwald Lindsay A. Rosenwald, M.D.	Director
/s/ Michael Zelefsky, M.D. Michael Zelefsky, M.D.	Director

Exhibit 5.1

Troutman Pepper Locke LLP
301 S College Street, Suite 3400
Charlotte, NC 28202

troutman.com

November 5, 2026

Mustang Bio, Inc.
95 Sawyer Road, Suite 110
Waltham, MA 02453

Re: Registration Statement on Form S-8: Additional 250,000 Shares of Common Stock issuable under the Mustang Bio, Inc. 2019 Employee Stock Purchase Plan and additional 2,500,000 shares of Common Stock issuable under the Mustang Bio, Inc. 2016 Incentive Plan

Ladies and Gentlemen:

We have acted as counsel to Mustang Bio, Inc., a Delaware corporation (the "Company"), in connection with the Company's registration statement on Form S-8 (the "Registration Statement"), filed on the date hereof, with the U.S. Securities and Exchange Commission (the "Commission"), under the Securities Act of 1933, as amended (the "Securities Act"). The Registration Statement relates to the registration of the offer, sale and issuance of shares (the "Shares"), consisting of (i) an additional 250,000 Shares of common stock, $0.0001 par value per share (the "Common Stock") that are issuable from time to time pursuant to the Company's 2019 Employee Stock Purchase Plan, as amended (the "ESPP") and (ii) an additional 2,500,000 Shares of Common Stock that are issuable from time to time pursuant to the Company's 2016 Incentive Plan, as amended (the "EIP" and, together with the ESPP, the "Plans").

This opinion letter is being furnished in accordance with the requirements of Item 8 of Form S-8 and Item 601(b)(5)(i) of Regulation S-K promulgated under the Securities Act. Capitalized terms used and not defined herein shall have the meanings assigned to them in the Registration Statement.

In connection with this opinion, we have reviewed the corporate proceedings taken by the Company with respect to the offer, sale and issuance of the Shares under the Plans, and the registration thereof under the Securities Act. We have also examined and relied upon originals or copies of such corporate records, documents, agreements or other instruments of the Company, and such certificates and records of public officials, and such other documents, as we have deemed necessary or appropriate in connection herewith, including, but not limited to, the Company's Amended and Restated Certificate of Incorporation, as amended, the Company's Amended and Restated Bylaws and the Plans pursuant to which the Shares are issuable. As to all matters of fact (including, without limitation, factual conclusions and characterizations and descriptions of purpose, intention or other state of mind) we have relied entirely upon a certificate of an officer of the Company, and have assumed, without independent inquiry, the accuracy of that certificate.

In rendering this opinion, we have assumed the genuineness and authenticity of all signatures on the original documents; the legal capacity of all natural persons; the authenticity of all documents submitted to us as originals; the conformity to originals of all documents submitted to us as certified or photocopies; the accuracy and completeness of all documents and records reviewed by us; the accuracy, completeness and authenticity of certificates issued by any governmental official, office or agency and the absence of change in the information contained therein from the effective date of any such certificate; and the due authorization, execution and delivery of all documents where authorization, execution and delivery are prerequisites to the effectiveness of such documents, except that we make no such assumption with respect to the Company.

Our opinion is expressed only with respect to the General Corporation Law of the State of Delaware. We are not opining as to the applicability thereto, or the effect thereon, of the laws of any other jurisdiction or, in the case of Delaware, any other laws, or as to matters of municipal law or the laws of any local agencies within any states (including "blue sky" or other state securities laws).

Based upon the foregoing, we are of the opinion that, as of the date hereof, the Shares have been duly authorized, and, when issued and paid for in accordance with the terms and conditions of the applicable Plan, will be validly issued, fully paid and non-assessable.

We assume no obligation to supplement this opinion if any applicable law changes after the date hereof or if we become aware of any fact that might change the opinion expressed herein after the date hereof.

We hereby consent to the filing of this opinion as Exhibit 5.1 to the Registration Statement. In giving such consent, we do not hereby admit that we are in the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations of the Commission. Except as otherwise set forth herein, this opinion may not be used, circulated, quoted or otherwise referred to for any purpose or relied upon by any other person without the express written permission of this firm.

Very truly yours,

/s/ Troutman Pepper Locke LLP

Troutman Pepper Locke LLP

Exhibit 23.2

Consent of Independent Registered Public Accounting Firm

We consent to the use of our report dated March 19, 2026, with respect to the financial statements of Mustang Bio, Inc., incorporated herein by reference.

/s/ KPMG LLP

New York, New York
November 5, 2026

Calculation of Filing Fee Tables

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MUSTANG BIO, INC.

Table 1: Newly Registered Securities

	Security Type	Security Class Title	Fee Calculation Rule	Amount Registered	Proposed Maximum Offering Price Per Unit	Maximum Aggregate Offering Price	Fee Rate	Amount of Registration Fee
1	Equity	Common Stock, par value $0.0001 per share	Other	2,750,000	$ 0.4151	$ 1,141,525.00	0.000087	$ 99.31
				Total Offering Amounts:		$ 1,141,525.00		$ 99.31
				Total Fee Offsets:				$ 0.00
				Net Fee Due:				$ 99.31

Offering Note

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(1) Pursuant to Rules 457(c) and 457(h) under the Securities Act, and solely for the purpose of calculating the registration fee, the proposed maximum offering price per share is the average of the high and low prices reported for the registrant's Common Stock quoted on The Nasdaq Capital Market LLC on November 4, 2026.

(2) Represents (i) 250,000 additional shares of Common Stock reserved for issuance under the Registrant's 2019 Employee Stock Purchase Plan, as amended (the "ESPP") and (ii) 2,500,000 additional shares of Common Stock reserved for issuance under the Registrant's 2016 Incentive Plan, as amended (the "EIP" and, together with the ESPP, the "Plans"). Pursuant to Rule 416(a) under the Securities Act, this registration statement also covers an indeterminate number of additional shares as may be necessary to account for adjustment provisions under the Plans as a result of stock splits, stock dividends or similar transactions.

Table 2: Fee Offset Claims and Sources ☑Not Applicable

		Registrant or Filer Name	Form or Filing Type	File Number	Initial Filing Date	Filing Date	Fee Offset Claimed	Security Type Associated with Fee Offset Claimed	Security Title Associated with Fee Offset Claimed	Unsold Securities Associated with Fee Offset Claimed	Unsold Aggregate Offering Amount Associated with Fee Offset Claimed	Fee Paid with Fee Offset Source
Rule 457(p)												
Fee Offset Claims												
Fee Offset Sources												