As filed with the Securities and Exchange Commission on December 11, 2023.

Registration Statement No. 333-

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

Form S-1

REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933

Mustang Bio, Inc.

(Exact name of registrant as specified in its charter)

Delaware	**2834**	**47-3828760**
(State or Other Jurisdiction of Incorporation or Organization)	*(Primary Standard Industrial Classification Code Number)*	*(I.R.S. Employer Identification Number)*

377 Plantation Street
Worcester, Massachusetts 01605
(781) 652-4500
(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

Manuel Litchman, M.D.
President and Chief Executive Officer
377 Plantation Street
Worcester, Massachusetts 01605
(781) 652-4500
(Name, address, including zip code, and telephone number, including area code, of agent for service)

Copies to:

Rakesh Gopalan
Barlow Mann
McGuireWoods LLP
201 N. Tryon Street, Suite 3000
Charlotte, NC 28226

Approximate date of commencement of proposed sale to the public: From time to time after this registration statement becomes effective. If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933 check the following box: ☒

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, please check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

If this Form is a post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

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	☐	Accelerated filer	☐
Non-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. ☐

The Registrant hereby amends this registration statement on such date or dates as may be necessary to delay its effective date until the Registrant shall file a further amendment which specifically states that this registration statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act or until this registration statement shall become effective on such date as the Securities and Exchange Commission, acting pursuant to said Section 8(a), may determine.

The information in this preliminary prospectus is not complete and may be changed. These securities may not be sold until the registration statement filed with the Securities and Exchange Commission is effective. This preliminary prospectus is not an offer to sell these securities and is not soliciting an offer to buy these securities in any jurisdiction where the offer or sale is not permitted.

SUBJECT TO COMPLETION, DATED DECEMBER 11, 2023

Preliminary Prospectus

2,743,530 Shares of Common Stock

This prospectus relates to the resale by the selling stockholders (the "Selling Stockholders") identified in this prospectus under the section "*The Selling Stockholders*," of up to 2,743,530 shares of our Common Stock, par value $0.0001 per share (the "Common Stock"), issuable upon the exercise of certain warrants held by the Selling Stockholders (including shares that may be issued to the holder in lieu of fractional shares). We are registering the offer and sale of Common Stock on behalf of the Selling Stockholders to satisfy certain registration rights that we have granted to the Selling Stockholders.

The Selling Stockholders may resell or dispose of the Common Stock, or interests therein, at fixed prices, at prevailing market prices at the time of sale or at prices negotiated with purchasers, to or through underwriters, broker-dealers, agents, or through any other means described in the section of this prospectus titled "*Plan of Distribution*." The Selling Stockholders will bear commissions and discounts, if any, attributable to the sale or disposition of the Common Stock, or interests therein, held by the Selling Stockholders. We will bear all costs, expenses and fees in connection with the registration of the offer and sale of the Common Stock under the Securities Act of 1933, as amended (the "Securities Act"). We will not receive any of the proceeds from the sale of the Common Stock by the Selling Stockholders.

The Common Stock is listed on The Nasdaq Capital Market under the symbol "MBIO." On December 8, 2023, the last reported sale price of our Common Stock was $1.54 per share. You are urged to obtain current market quotations for our Common Stock.

Investing in our securities involves risks. You should review carefully the risks and uncertainties described under the heading "*Risk Factors*" contained in this prospectus and under similar headings in the other documents that are incorporated by reference into this prospectus, as described on page 9 of this prospectus.

Neither the Securities and Exchange Commission (the "SEC") nor any state securities commission has approved or disapproved of these securities or passed upon the accuracy or adequacy of this prospectus. Any representation to the contrary is a criminal offense.

The date of this prospectus is , 2023.

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ABOUT THIS PROSPECTUS

This prospectus provides you with a general description of the Common Stock that may be resold by the Selling Stockholders. In certain circumstances, we may provide a prospectus supplement that will contain specific information about the terms of a particular offering by the Selling Stockholders. We also may provide a prospectus supplement to add information to, or update or change information contained in, this prospectus. To the extent there is a conflict between the information contained in this prospectus and any prospectus supplement, you should rely on the information in the prospectus supplement, provided that if any statement in one of these documents is inconsistent with a statement in another document having a later date — for example, a document incorporated by reference in this prospectus or any prospectus supplement — the statement in the later-dated document modifies or supersedes the earlier statement.

This prospectus and the documents incorporated by reference into this prospectus include important information about us, the securities being offered and other information you should know before investing in our securities. You should not assume that the information contained in this prospectus is accurate on any date subsequent to the date set forth on the front cover of this prospectus or that any information we have incorporated by reference is correct on any date subsequent to the date of the document incorporated by reference, even though this prospectus is delivered or securities are sold or otherwise disposed of on a later date. It is important for you to read and consider all information contained in this prospectus, including the documents incorporated by reference therein, in making your investment decision. You should also read and consider the information in the documents to which we have referred you under "*Where You Can Find More Information*" and "*Incorporation of Certain Information by Reference*" in this prospectus.

We have not authorized anyone to give any information or to make any representation to you other than those contained or incorporated by reference in this prospectus. We take no responsibility for, and can provide no assurances as the reliability of, any other information that others may give to you. This prospectus does not constitute an offer to sell or the solicitation of an offer to buy securities in any jurisdiction to any person to whom it is unlawful to make such offer or solicitation in such jurisdiction.

For investors outside the United States: we have not done anything that would permit this offering or possession or distribution of this prospectus in any jurisdiction where action for that purpose is required, other than in the United States. Persons outside the United States who come into possession of this prospectus must inform themselves about, and observe any restrictions relating to, the offering of our securities and the distribution of this prospectus outside the United States.

This prospectus contains summaries of certain provisions contained in some of the documents described herein, but reference is made to the actual documents for complete information. All of the summaries are qualified in their entirety by the actual documents. Copies of the documents referred to herein have been filed, will be filed or will be incorporated by reference as exhibits to the registration statement of which this prospectus is a part, and you may obtain copies of those documents as described in this prospectus under "*Where You Can Find More Information.*"

PROSPECTUS SUMMARY

This summary highlights selected information from this prospectus and does not contain all of the information that may be important to you in making an investment decision. This summary is qualified in its entirety by the more detailed information included elsewhere in this prospectus and/or incorporated by reference herein. Before making your investment decision with respect to our securities, you should carefully read this entire prospectus, including the information in our filings with the SEC incorporated by reference into this prospectus.

References in this prospectus to the "Company," "we," "us," "our" and similar words refer to Mustang Bio, Inc.

Our Business

Overview and Product Candidate Development

We are a clinical-stage biopharmaceutical company focused on translating today's medical breakthroughs in cell and gene therapies into potential cures for hematologic cancers, solid tumors and rare genetic diseases. We have acquired rights to these technologies by licensing or otherwise acquiring an ownership interest in the technologies, funding their research and development and eventually will seek either to out-license or bring the technologies to market.

Our pipeline is currently focused in three core areas: chimeric antigen receptor ("CAR") engineered T cell ("CAR T") therapies for hematologic malignancies, CAR T therapies for solid tumors, and gene therapies for rare genetic disorders. For our CAR T therapies, we have partnered with the City of Hope National Medical Center ("COH"), Fred Hutchinson Cancer Center ("Fred Hutch"), Nationwide Children's Hospital ("Nationwide") and the Mayo Clinic ("Mayo Clinic"). For our gene therapies, we have partnered with St. Jude Children's Research Hospital ("St. Jude") in the development of a first-in-class *ex vivo* lentiviral ("LV") gene therapy treatment of X-linked severe combined immunodeficiency ("XSCID") and with Leiden University Medical Center ("LUMC") in the development of a first-in-class *ex vivo* LV gene therapy treatment of RAG1-SCID.

CAR T Therapies

Our pipeline of CAR T therapies is being developed under exclusive licenses from several world class research institutions. Our strategy is to license these technologies, support preclinical and clinical research activities by our academic partners and transfer the underlying technology to our contract manufacturer's cell processing facility, in order to conduct our own clinical trials. We are developing CAR T therapies for hematologic malignancies in partnership with Fred Hutch targeting CD20 (MB-106).

MB-106 (CD20-targeted CAR T cell therapy for Non-Hodgkin Lymphoma and Chronic Lymphocytic Leukemia)

MB-106 continues to generate promising preliminary safety and efficacy data in patients with B-cell malignancies, and the product profile of this autologous CD20-directed CAR T suggests a favorable profile to date compared to the currently-approved autologous CD19-directed CAR Ts.

In June 2023, the Company announced that updated data from the ongoing Phase 1/2 Fred Hutch-sponsored clinical trial of MB-106 were presented at the European Hematology Association 2023 Hybrid Congress and such data showed a favorable safety and efficacy profile in patients with Waldenstrom macroglobulinemia ("WM"), a rare form of blood cancer for which the U.S. Food and Drug Administration (the "FDA") has granted MB-106 Orphan Drug Designation. All six patients in the study had been previously treated with Bruton's tyrosine kinase inhibitors ("BTKi"), and their disease had continued to progress while on BTKi's. Overall, 83% (5/6) of the patients treated with MB-106 responded to treatment, including 2 complete responses, 1 very good partial response, 1 partial response, and 1 minor response. In addition, 1 patient experienced stable disease. One of the patients who achieved a complete response was in ongoing remission at 22 months, with an immunoglobulin M ("IgM") level that had decreased rapidly to the normal range after treatment with MB-106 and remained normal since. No patient had started additional anti-WM treatment after being treated with MB-106. From a safety perspective, cytokine release syndrome ("CRS") occurred in five patients: two patients with grade 1 and three patients with grade 2. One patient experienced grade 1 immune effector cell-associated neurotoxicity syndrome ("ICANS"). No grade 3 or 4 CRS or grade 2, 3 or 4 ICANS was observed.

Also in June 2023, Mustang Bio announced that updated data from the same Phase 1/2 Fred Hutch-sponsored clinical trial of MB-106 were presented at the 17th International Conference on Malignant Lymphoma and showed a favorable safety and efficacy profile in patients with follicular lymphoma (FL). A total of 20 patients with relapsed FL with confirmed CD20 expression participated in the study and had day 28 assessment. The median age of the patients was 63 years (ranging from 44 – 81), and the median prior lines of treatment was 4 (ranging from 1 – 12). High-risk features included patients with progression of disease within 24 months of first-line chemoimmunotherapy (n=15, 75%), history of histologic transformation (n=4, 20%), and prior treatment with a CD19-directed target CAR T (n=1, 5%). The overall response rate ("ORR") was 95% (19/20), and the complete response ("CR") rate was 80% (16/20). Patients who received higher dose levels (3.3×10^6 and 1.0×10^7 cells/kg) had an ORR of 100% and a CR rate of 91%. Ten patients were in remission over one year, seven of whom were over two years. One patient, previously treated with a CD19-targeted CAR T-cell therapy, achieved a CR and remained in remission after 18 months. From a safety profile perspective, all CRS events were grade 1 (n=5; 25%) or grade 2 (n=1; 5%), with no grade ≥ 3 CRS events. There was no occurrence of ICANS of any grade.

In October 2022, Mustang Bio announced that the first patient had been treated in its multicenter, open-label, non-randomized Phase 1/2 clinical trial evaluating the safety and efficacy of MB-106 for the treatment of relapsed or refractory B-cell non-Hodgkin lymphomas ("B-NHL") and chronic lymphocytic leukemia ("CLL"). This six-center Phase 1/2 clinical trial is a three-arm study targeting CLL, indolent B-NHL including FL and WM, and aggressive lymphoma including diffuse large B-cell lymphoma and mantle cell lymphoma. Included in the eligibility criteria for the trial are patients who have relapsed after treatment with CD19-directed CAR-T cell therapy. Since the Mustang-sponsored multicenter clinical trial is using the same lentiviral vector as the Company's Fred Hutch-sponsored single-center trial, the FDA allowed dose escalation to begin at a higher dose than the starting dose in the Fred Hutch trial.

In August 2023, Mustang Bio announced the first data from the indolent lymphoma cohort of this Mustang-sponsored multicenter clinical trial, demonstrating clinical responses as well as safety and efficacy consistent with the ongoing Phase 1/2 Fred Hutch-sponsored clinical trial. The multicenter study data showed clinical responses in four of four patients with relapsed or refractory indolent NHL at the starting dose of 3.3×10^6 CAR-T cells/kg, a dose comparable to that employed for the majority of the indolent lymphoma patients in the Fred Hutch trial. The multicenter data also showed persistence of CAR-T cells at 6+ months and favorable safety data, with only Grade 1 CRS reported to date. Two patients with follicular lymphoma had CR by both PET-CT and bone marrow, one of whom had been previously treated with a CD19-directed CAR-T. A third patient, with a diagnosis of WM, who had nine prior treatments and high disease burden, achieved complete metabolic response by PET-CT, morphologic clearance of lymphoma in bone marrow, and resolution of the IgM monoclonal protein. The fourth patient, with a diagnosis of hairy cell leukemia variant, who had been heavily transfusion dependent, continued to have stable disease with decreased disease in his bone marrow and achieved complete transfusion independence, which was ongoing at six plus months. Following treatment of these four indolent NHL patients, the Safety Review Committee unanimously approved dose escalation to 1.0×10^7 CAR-T cells/kg.

On November 2, 2023, the Company announced that interim Phase 1/2 data from its multicenter clinical trial have been selected for presentation at the 65th American Society of Hematology Annual Meeting taking place December 8 through 12, 2023. This presentation will summarize results from all patients enrolled in the indolent lymphoma cohort treated at the starting dose level, as well as all patients in that cohort treated at the second and final dose level who have had their initial 28-day follow-up evaluation for safety and efficacy.

In the first quarter of 2024, the Company expects to receive FDA feedback in an End-of-Phase 1 Meeting on its strategy to conduct a non-randomized registrational multicenter trial in relapsed or refractory WM. In mid-2024, the Company expects to treat the first patient in that trial, with top-line data anticipated in 2026. In 2025, the Company expects to initiate a non-randomized registrational multicenter trial in patients with diffuse large B-cell lymphoma who have relapsed from previous treatment with a CD19-directed CAR-T.

MB-109 (Combination of MB-101 CAR T Therapy with MB-108 Oncolytic Virus Therapy for Malignant Brain Tumors)

In April 2022, in association with a poster presentation by COH at the American Association for Cancer Research Annual Meeting, Mustang announced interim data from two ongoing investigator-sponsored Phase 1 clinical trials evaluating two clinical candidates, MB-101 (IL13Rα2-targeted CAR T cell therapy licensed from COH) and MB-108 (herpes simplex virus type 1 oncolytic virus licensed from Nationwide) for the treatment of recurrent glioblastoma. At that time, Mustang noted that the two patients on the MB-101 Phase 1 trial with the highest levels of intratumoral CD3+ T cells pre-therapy had achieved the only 2 CRs observed among the 65 heavily pretreated patients who had been enrolled. These CRs lasted 7.5 and over 31 months, respectively. Preclinical data also presented at that time supported the safety of administering these two therapies sequentially in a combination regimen designated as MB-109. At the present time, all IND-enabling preclinical and manufacturing activities requested by the FDA to support the start of a Phase 1 trial of MB-109 have been completed.

On October 26, 2023 the Company announced the FDA's acceptance of its IND application for MB-109. The Company intends to initiate a Phase 1 multicenter clinical trial at COH and the University of Alabama at Birmingham to assess the safety, tolerability and efficacy of MB-109 in adult patients with recurrent glioblastoma and high-grade astrocytomas.

In Vivo CAR T Platform Technology

Mustang is collaborating with the Mayo Clinic to develop a novel technology that may be able to transform the administration of CAR T therapies and potentially be used as an off-the-shelf therapy. In 2023, the Mayo Clinic expects to publish *in vivo* proof-of-concept data in a mouse model of cancer in a major scientific journal, and Mustang plans to file an IND application for a multicenter Phase 1 clinical trial once a lead construct has been identified.

Gene Therapies

MB-117 (Ex vivo LV Gene Therapy for Newly Diagnosed X-linked Severe Combined Immunodeficiency (XSCID)) and MB-217 (Ex vivo LV Gene Therapy for Previously Transplanted XSCID)

In partnership with St. Jude, our XSCID gene therapy programs (MB-117 and MB-217) are being conducted under an exclusive license to develop a potentially curative treatment for XSCID, a rare genetic immune system condition in which affected patients do not live beyond infancy without treatment. This first-in-class *ex vivo* LV gene therapy has been utilized in two Phase 1/2 clinical trials involving two different autologous cell products produced via transduction of patients' hematopoietic stem cells using a predecessor LV vector. These cell products were designated MB-107 and MB-207, and the respective Phase 1/2 clinical trials were: a multicenter trial of the MB-107 product in newly diagnosed infants sponsored by St. Jude (LVXSCID-ND) and a single-center trial of the MB-207 product in previously transplanted patients sponsored by the National Institutes of Health ("NIH") (LVXSCID-OC).

Going forward, this predecessor LV vector will be replaced by a modified LV vector which will be used to produce the MB-117 and MB-217 cell products. In 2023, St Jude intends to initiate a new Phase 1 trial in newly diagnosed infants using MB-117, and the NIH intends to initiate a new Phase 1 trial in previously transplanted patients using MB-217.

LUMC License

MB-110, a first-in-class *ex vivo* treatment for RAG1 SCID, is currently being evaluated at LUMC in a Phase 1/2 multicenter clinical trial in Europe. In 2022 the first patient was treated without any complications, after which the patient developed a functioning immune system which responded well to the standard vaccinations for newborns. In 2023 we expect that additional centers will be added in Europe and that additional patients will be enrolled.

Private Placement of Warrants

On October 26, 2023, the Company entered into a Securities Purchase Agreement (the "Purchase Agreement") with Armistice Capital Master Fund Ltd. ("Armistice"), an institutional accredited investor, pursuant to which the Company agreed to issue and sell, in a registered direct offering priced at-the-market under the rules of The Nasdaq Stock Market (the "Registered Offering"), (i) 920,000 shares of Common Stock, at a price per Share of $1.70 and (ii) pre-funded warrants (the "Pre-Funded Warrants") to purchase up to 1,668,236 shares of its Common Stock, at a price per Pre-Funded Warrant equal to $1.699, the price per Share, less $0.001.

The Pre-Funded Warrants were sold, in lieu of shares of Common Stock,to Armistice whose purchase of shares of Common Stock in the Registered Offering would otherwise result in Armistice, together with its affiliates and certain related parties, beneficially owning more than 4.99% (or, at Armistice's option upon issuance, 9.99%) of the Company's outstanding Common Stock immediately following the consumption of the Registered Offering. The Pre-Funded Warrants have an exercise price of $0.001 per share, became exercisable upon issuance and remain exercisable until exercised in full.

The Registered Offering closed on October 30, 2023. The Company intends to use the net proceeds from the Registered Offering for general corporate purposes and working capital requirements, which may include, among other things, the advancement of its product candidates to obtain regulatory approval from the FDA.

In a concurrent private placement, pursuant to the terms of the Purchase Agreement, the Company also agreed to issue and sell to Armistice unregistered warrants (the "Private Placement Warrants") to purchase up to 2,588,236 shares of Common Stock, at an offering price of $0.125 per Private Placement Warrant to purchase one share of common stock (the "Private Placement" and, together with the Registered Offering, the "Offerings") (which offering price is included in the purchase price per Share or Pre-Funded Warrant). The Private Placement Warrants have an exercise price of $1.58 per share (subject to customary adjustments as set forth in the Private Placement Warrants), are exercisable upon issuance and will expire five and one-half years from the date of issuance. The Private Placement Warrants contain customary anti-dilution adjustments to the exercise price, including for share splits, share dividends, rights offering and pro rata distributions.

H.C. Wainwright & Co., LLC ("Wainwright" and together with Armistice, the "Selling Stockholders") acted as the exclusive placement agent in connection with the Offerings under an Engagement Letter, dated as of October 9, 2023, between the Company and Wainwright (the "Engagement Letter"). Pursuant to the Engagement Letter, Wainwright was paid a cash fee equal to 7.0% of the gross proceeds received by the Company in the Offerings, a management fee equal to 1.0% of the gross proceeds of the Offering, $75,000 for non-accountable expenses and a clearing fee of $15,950. In addition, under the terms of the Engagement Letter, the Company issued to Wainwright (or its designees) warrants to purchase up to 155,294 shares of Common Stock (the "Wainwright Warrants" and together with the Private Placement Warrants, the "2023 Warrants"). The Wainwright Warrants have substantially the same terms as the Private Placement Warrants, except that the Wainwright Warrants will expire five years from the commencement of the sales of the Offerings and have an exercise price of $2.125 per share (subject to customary adjustment as set forth in the Wainwright Warrants), representing 125% of the purchase price per Share in the Registered Offering.

Pursuant to the Purchase Agreement, the Company is required to file, by December 11, 2023, a registration statement on Form S-1 with the SEC providing for the resale by the Selling Stockholders of the shares of Common Stock issuable upon exercise of the 2023 Warrants to register the resale of the shares issuable upon exercise of the 2023 Warrants.

Summary Risk Factors

Our business is subject to risks of which you should be aware before making an investment decision. The risks described below are a summary of the principal risks associated with an investment in us and are not the only risks we face. You should carefully consider these risk factors, the risk factors described under the heading "*Risk Factors*", and the other reports and documents that we have filed with the SEC.

Risks Pertaining to Our Finance and Capital Requirements

- We have incurred significant losses since our inception and anticipate that we will incur continued losses for the foreseeable future
- There is substantial doubt regarding our ability to continue as a going concern. We will need to raise additional financing in upcoming periods, which may not be available on acceptable terms to the Company, or at all. Failure to obtain necessary capital when needed may force us to delay, limit or terminate our commercial readiness efforts, activities to support a potential commercial launch following any approval of our product candidates, or other operations.
- Our short operating history makes it difficult to evaluate our business and prospects.
- Our success is contingent upon raising additional capital, which efforts may fail. Even if successful, our future capital raising activities may dilute our current stockholders, restrict our operations, or cause us to relinquish proprietary rights.

Risks Pertaining to Our Business Strategy, Structure and Organization

- Our future growth and success depend on our ability to successfully develop and commercialize our product candidates, which we have yet to do.
- Our future success is highly dependent on the successful development of our chimeric antigen receptor ("CAR") engineered T cell ("CAR T") technology and gene therapy product candidates.

Risks Inherent in Drug Development and Commercialization

- Preclinical development is highly speculative and carries a high failure risk.
- We may not receive the required regulatory approvals for any of our product candidates on our projected timelines, if at all, which may result in increased costs and delay our ability to generate revenue.
- We may not obtain the desired labeling claims or intended uses for product promotion, or favorable scheduling classifications, to successfully promote our products.
- If a product candidate demonstrates adverse side effects, we may need to abandon or limit the development of such product candidate.
- Even if a product candidate is approved, it may be subject to various post-marketing requirements, including studies or clinical trials, and increased regulatory scrutiny.
- Our competitors may develop treatments for our products' target indications, which could limit our product candidates' commercial opportunity and profitability.
- If our products are not broadly accepted by the healthcare community, the revenues from any such product will likely be limited.
- Any successful products liability claim related to any of our current or future product candidates may cause us to incur substantial liability and limit the commercialization of such products.
- Our gene therapy product candidates are based on a novel technology, which makes it difficult to predict the time and cost of product candidate development and subsequently obtaining regulatory approval.

Risks Related to Reliance on Third Parties

- We rely, and expect to continue to rely, on third parties to conduct our preclinical studies and clinical trials, and those third parties may not perform satisfactorily, including failing to meet deadlines for the completion of such trials or complying with applicable regulatory requirements.
- We contract with third parties for the manufacture of our product candidates for preclinical and clinical testing and may also do so for commercialization, if and when our product candidates are approved.
- We rely on clinical data and results obtained by third parties, which may prove inaccurate or unreliable.
- We may need to license certain intellectual property from third parties, and such licenses may not be available or may not be available on commercially reasonable terms.

Risks Relating to Legislation and Regulation Affecting the Biopharmaceutical and Other Industries

- We operate in a heavily regulated industry, and we cannot predict the impact that any future legislation or administrative or executive action may have on our operations.
- We may be subject to anti-kickback, fraud and abuse, false claims, transparency, health information privacy and security and other healthcare laws and regulations, which could expose us to criminal sanctions, civil penalties, contractual damages, reputational harm, administrative burdens and diminished profits and future earnings.
- We are subject to numerous environmental, health and safety laws and regulations and could become subject to fines or penalties or incur costs that could harm our business.

Risks Pertaining to Intellectual Property and Potential Disputes Thereof

- If we are unable to obtain and maintain sufficient patent protection for our technology and products, our competitors could develop and commercialize products similar or identical to ours and our ability to successfully commercialize our technology and products could be impaired.
- We depend on our licensors to maintain and enforce the intellectual property covering certain of our product candidates.
- We or our licensors may be subject to costly and time-consuming litigation for infringement of third-party intellectual property rights or to enforce our or our licensors' patents.
- Any dispute with our licensors may affect our ability to develop or commercialize our product candidates.

Risks Relating to Our Control by Fortress

- Fortress controls a voting majority of our Common Stock and has the right to receive significant share grants annually, which will result in dilution of our other stockholders and could reduce the value of our common stock.
- We have entered into certain agreements with Fortress and may have received better terms from unaffiliated third parties.

Risks Related to Conflicts of Interest

- We share certain directors with Fortress, which could create conflicts of interest between us and Fortress.

Risks Related to the Sale of the Company's Manufacturing Facility

The following discussion of risks relate to the sale of the Company's leasehold interest in its cell processing facility located in Worcester, Massachusetts

(the "Facility") and associated assets relating to the manufacturing and production of cell and gene therapies at the Facility to uBriGene (Boston) Biosciences, Inc. (the "Transaction") and should be read together with the description of the Transaction set forth in the Company's Quarterly Report on Form 10-Q for the period ended September 30, 2023, filed with the SEC on November 14, 2023, in the sections titled "Management's Discussion and Analysis of Financial Condition and Results of Operations – Recent Developments" and "Risk Factors – Risks Relating to the Sale of the Company's Manufacturing Facility."

- We may be unable to complete the transaction as contemplated if the Committee on Foreign Investment in the United States determines to implement mitigation measures, including the potential divestment of some or all of the transferred assets by the buyer, which may limit our ability to realize the anticipated cost savings of the sale of the facility and may have a material adverse effect on our financial condition.
- Our receipt of the contingent portion of the consideration for the sale of the manufacturing facility is subject to receipt of the consent of the landlord of the facility to the transfer of such lease to the buyer and our ability to raise additional capital.
- If the landlord does not consent to the transfer of the lease within 120 days of the closing date of the transaction and the lease of the facility is not transferred to the buyer, we may be obligated to negotiate the repurchase of the facility from the buyer. The buyer may provide us with notice of its intentions to enter into negotiations for our repurchase of the facility if the lease of the facility is not transferred to the buyer within 120 days of the closing date, and we may be unable to successfully negotiate such repurchase.
- The landlord may object to certain aspects of the transaction which could result in expensive and time-consuming litigation and could prevent us from realizing the intended benefits of the transaction.
- If the sale of the facility is fully consummated, we will rely on the buyer for the manufacture of our lead product candidates which may subject us to additional manufacturing risks.
- We may incur substantial expenses related to the transaction and the consummation of the sale of the facility.
- Certain key personnel may depart the Company upon the completion of the sale of the facility which may adversely affect our ability to realize the anticipated benefits of the transaction.
- Our strategic pivot to our lead product candidate, MB-106, and our disposal of non-core assets, including our facility, may not result in the anticipated cost savings and could result in total costs and expenses that are greater than expected.

Corporate Information

We are a majority-controlled subsidiary of Fortress.

Our principal executive offices are located at 377 Plantation Street, Worcester, Massachusetts 01605, and our telephone number is 781-652-4500. We maintain a website on the Internet at www.mustangbio.com and our e-mail address is info@mustangbio.com. Information on our website, or any other website, is not incorporated by reference in this prospectus. We have included our website address in this prospectus solely as an inactive textual reference.

THE OFFERING

The Selling Stockholders identified in this prospectus are offering on a resale basis a total of 2,743,530 shares of Common Stock underlying the 2023 Warrants, as more fully described below.

Common Stock to be Offered by Selling Stockholders:	Up to 2,743,530 shares of the Company's Common Stock
Shares of Common Stock Outstanding Prior to this Offering:	9,219,691 shares as of December 5, 2023
Shares of Common Stock Outstanding Assuming Exercise of All 2023 Warrants[(1)]:	11,963,221
Plan of Distribution:	The Selling Stockholders will determine when and how they will sell the Common Stock offered in this prospectus, as described in the section of this prospectus titled "*Plan of Distribution*."
Use of Proceeds:	We will not receive any proceeds from the sale of the Common Stock by the Selling Stockholders in this offering. See "*Use of Proceeds.*"
Risk Factors:	See "*Risk Factors*" incorporated by reference into this prospectus from our Quarterly Report on Form 10-Q for the quarter ended September 30, 2023 for a discussion of certain factors you should carefully consider before deciding to invest in shares of our Common Stock.
Nasdaq Capital Market Symbol:	MBIO

(1) The number of shares of Common Stock to be outstanding after this offering is based on 9,219,691 shares of our Common Stock outstanding as of December 5, 2023, and excludes:

- 70,102 shares of Common Stock issuable upon exercise of outstanding warrants having a weighted-average exercise price of $22.82 per share;
- 1,668,236 shares of Common Stock issuable upon exercise of outstanding pre-funded warrants having a nominal exercise price per share;
- 98,041 shares of Common Stock issuable upon the vesting and settlement of outstanding restricted stock units;
- 76,112 shares of Common Stock issuable upon the vesting and exercise of outstanding stock options; and

- 278,984 shares of Common Stock reserved for issuance and available for future grant under our 2016 Incentive Plan.

CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus and the documents incorporated herein by reference contain predictive or "forward-looking statements" within the meaning of the Securities Act and the Securities Exchange Act of 1934, as amended (the "Exchange Act"), and involve known and unknown risks, uncertainties and other factors that may cause our actual results, performance or achievements to be materially different from the future results, performance or achievements expressed or implied by such forward-looking statements. The words "anticipate," "believe," "estimate," "may," "expect" and similar expressions are generally intended to identify forward-looking statements. Such forward-looking statements include, but are not limited to, statements about our:

- expectations for increases or decreases in expenses;
- expectations for the clinical and pre-clinical development, manufacturing, regulatory approval, and commercialization of our product candidates or any other products we may acquire or in-license;
- our use of clinical research centers and other contractors;
- expectations for incurring capital expenditures to expand our research and development and manufacturing capabilities;
- expectations for generating revenue or becoming profitable on a sustained basis;
- expectations or ability to enter into marketing and other partnership agreements;
- expectations or ability to enter into product acquisition and in-licensing transactions;
- expectations or ability to build our own commercial infrastructure to manufacture, market and sell our product candidates;
- acceptance of our products by doctors, patients or payors;
- our ability to compete against other companies and research institutions;
- our ability to secure adequate protection for our intellectual property;
- our ability to attract and retain key personnel;
- availability of reimbursement for our products;
- estimates of the sufficiency of our existing cash and cash equivalents and investments to finance our operating requirements, including expectations regarding the value and liquidity of our investments;
- the volatility of our stock price;
- expected losses;
- expectations for future capital requirements;
- statements about the Company's expectations with respect to the consummation of the sale of its manufacturing facility and its ability to fund its operations, including continued investment in its research and development pipeline;
- the Company's anticipated savings and expenses relating to the consummation of the sale of its manufacturing facility;
- the postponing of the XSCID (formerly MB-107 and MB-207; going forward MB-117 and MB-217) pivotal trials and the related reduction in the Company's workforce;
- and the Company's plans and timeline regarding its XSCID program.

Our actual results may differ materially from the results anticipated in these forward-looking statements due to a variety of factors, including among other things, risks related to our recent history of losses and our ability to continue as a going concern (discussed under the heading "Liquidity and Capital Resources" in Note 1, Organization, Description of Business and Liquidity and Capital Resources, to our financial statements included in Part I, Item 1 of our Quarterly Report on Form 10-Q for the quarter ended September 30, 2023, filed with the SEC on November 14, 2023); the satisfaction of the conditions to the Company's receipt of the contingent payment in connection with the Company's sale of the Company's manufacturing facility in the anticipated timeframe or at all; whether uBriGene (Boston) Biosciences, Inc. ("uBriGene") is able to successfully perform its obligation to produce the Company's products under the manufacturing services agreement on a timely basis and to acceptable standards; disruption from the sale of the Company's manufacturing facility making it more difficult to maintain business and operational relationships; negative effects of the announcement or the consummation of the transaction on the market price of the Company's Common Stock; significant transaction costs; whether the U.S. Committee on Foreign Investment in the United States ("CFIUS") determines to require mitigating actions in connection with the sale of the Company's manufacturing facility, which may include suspension or termination of the transaction or the imposition of operating mechanisms that could make it more difficult for uBriGene to operate the facility; whether CFIUS determines to require the sale of the facility by uBriGene, which may jeopardize the Company's access to products manufactured at the facility; whether, even if CFIUS ultimately permits the sale of the Company's manufacturing facility, requisite consent from the landlord is not obtained; the development stage of the Company's primary product candidates; our ability to obtain, perform under, and maintain financing and strategic agreements and relationships; risks relating to the results of research and development activities; risks relating to the timing of starting and completing clinical trials; uncertainties relating to preclinical and clinical testing; our dependence on third-party suppliers; our ability to attract, integrate and retain key personnel; the early stage of products under development; our need to raise substantial additional funds; government regulation; patent and intellectual property matters; competition and those factors described in the section titled "*Risk Factors*" beginning on page 9 of this prospectus.

The forward-looking statements contained in this prospectus reflect our views and assumptions as of the date of this prospectus. Except as required by law, we assume no responsibility for updating any forward-looking statements.

We qualify all of our forward-looking statements by these cautionary statements.

RISK FACTORS

Investing in our Common Stock involves a high degree of risk. Our business is influenced by many factors that are difficult to predict, involve uncertainties that may materially affect actual results and are often beyond our control. We have identified a number of these factors below and under the heading "*Risk Factors*" in our Quarterly Report on Form 10-Q for the quarter ended September 30, 2023, as updated by our subsequently filed Quarterly Reports on Form 10-Q, each of which are incorporated by reference in this prospectus, as well as in other information included or incorporated by reference in this prospectus and any prospectus supplement. You should consider carefully these risks and uncertainties before deciding to invest in our Common Stock. If any of the risks identified herein or the risks identified as risk factors in the incorporated documents were to materialize, our business, financial condition, results of operations, and future growth prospects could be materially and adversely affected. In that event, the market price of our Common Stock could decline, and you could lose part of or all of your investment in our Common Stock. See the section of this prospectus titled "*Where You Can Find More Information.*"

Risks Related to this Offering and our Securities

The trading price of the shares of our Common Stock has been and is likely to continue to be highly volatile, and purchasers of our Common Stock could incur substantial losses.

Our stock price has been and will likely continue to be volatile for the foreseeable future. The stock market in general and the market for biotechnology companies in particular have experienced extreme volatility that has often been unrelated to the operating performance of particular companies. As a result of this volatility, investors may not be able to sell their Common Stock at or above the price they paid.

In addition, in the past, stockholders have initiated class action lawsuits against biotechnology and pharmaceutical companies following periods of volatility in the market prices of these companies' securities. Such litigation and any litigation that may be instituted against us, our officers and/or our directors in the future, could cause us to incur substantial costs and divert management's attention and resources, which could have a material adverse effect on our business, financial condition and results of operations.

A substantial number of shares of our Common Stock could be sold into the public market in the near future, which could depress our stock price.

Sales of substantial amounts of Common Stock in the public market could reduce the prevailing market prices for our Common Stock. Substantially all of our outstanding Common Stock is eligible for sale as are shares of Common Stock issuable under vested and exercisable stock options. If our existing stockholders sell a large number of shares of our Common Stock, or the public market perceives that existing stockholders might sell shares of Common Stock, the market price of our Common Stock could decline significantly. These sales might also make it more difficult for us to sell equity securities at a time and price that we deem appropriate.

DIVIDEND POLICY

We have never declared or paid any cash dividends on our Common Stock and do not anticipate paying any cash dividends in the foreseeable future. Any future determination to pay dividends will be at the discretion of our board of directors and will depend on our financial condition, results of operations, capital requirements and other factors our board of directors deems relevant.

USE OF PROCEEDS

We will not receive any proceeds from the sale of the Common Stock covered by this prospectus and any accompanying prospectus supplement. All proceeds from the sale of the Common Stock will be for the respective accounts of the Selling Stockholders named herein.

We will bear all other costs, fees and expenses incurred in effecting the registration of the offering and sale of the Common Stock covered by this prospectus and any accompanying prospectus supplement, including, without limitation, all registration and filing fees, Nasdaq listing fees and fees and expenses of our counsel and our accountants, in accordance with the terms of the Purchase Agreement. The Selling Stockholders will pay any discounts, commissions, and fees of underwriters, selling brokers, dealer managers or similar securities industry professionals incurred by the Selling Stockholders in disposing of the Common Stock covered by this prospectus.

DETERMINATION OF OFFERING PRICE

The prices at which the shares of Common Stock covered by this prospectus may actually be sold will be determined by the prevailing public market price for shares of our Common Stock or be negotiations between the Selling Stockholders and buyers of our Common Stock in private transactions or as otherwise described in "*Plan of Distribution*."

THE SELLING STOCKHOLDERS

The shares of Common Stock being offered by the Selling Stockholders are those issuable to the Selling Stockholders upon exercise of the 2023 Warrants. For additional information regarding the issuances of those shares of Common Stock and 2023 Warrants, see "*Prospectus Summary – Private Placement of Warrants*" above. We are registering the resale of the shares of Common Stock in order to permit the Selling Stockholders to offer the shares for resale from time to time. Except for the ownership of the shares of Common Stock and the 2023 Warrants as well as their purchase of other securities from us in the past, the Selling Stockholders have not had any material relationship with us within the past three years.

The table below lists the Selling Stockholders and other information regarding the beneficial ownership of the shares of Common Stock by the Selling Stockholders. The second column lists the number of shares of Common Stock beneficially owned by the Selling Stockholders, based on its ownership of the shares of Common Stock and 2023 Warrants, as well as any other securities of ours owned by the Selling Stockholders, as of December 5, 2023, assuming exercise of the 2023 Warrants held by the Selling Stockholders on that date, without regard to any limitations on exercises.

The third column lists the shares of Common Stock being offered by this prospectus by the Selling Stockholders.

In accordance with the terms of the Purchase Agreement, this prospectus covers the resale of the maximum number of shares of Common Stock issuable upon exercise of the 2023 Warrants, determined as if the outstanding 2023 Warrants were exercised in full as of the trading day immediately preceding the date this registration statement was initially filed with the SEC, each as of the trading day immediately preceding the applicable date of determination and all subject to adjustment as provided in the Purchase Agreement, without regard to any limitations on the exercise of the 2023 Warrants. The third and fourth column assumes the sale of all of the shares offered by the Selling Stockholders pursuant to this prospectus.

We cannot advise you as to whether the Selling Stockholders will in fact sell any or all of such Common Stock. In addition, the Selling Stockholders may sell, transfer or otherwise dispose of, at any time and from time to time, the Common Stock and 2023 Warrants in transactions exempt from the registration requirements of the Securities Act after the date of this prospectus. For purposes of this table, we have assumed that the Selling Stockholders will have sold all of the securities covered by this prospectus upon the completion of the offering.

Under the terms of the 2023 Warrants, a selling stockholder may not exercise the 2023 Warrants to the extent such exercise would cause such selling stockholder, together with its affiliates and attribution parties, to beneficially own a number of shares of Common Stock which would exceed 4.99% or 9.99%, as applicable, of our then-outstanding Common Stock following such exercise, excluding for purposes of such determination shares of Common Stock issuable upon exercise of the 2023 Warrants that have not been exercised. The number of shares in the second and fourth columns do not reflect this limitation. The Selling Stockholders may sell all, some or none of its shares

in this offering. See "*Plan of Distribution*."

Name of Selling Stockholder	Number of Shares of Common Stock Beneficially Owned Immediately Prior to the Offering	Maximum Number of Shares of Common Stock Being Offered for Resale Under this Prospectus	Number of Shares of Common Stock Beneficially Owned After the Maximum Offered Shares are Sold [1]	Percentage of Outstanding Shares of Common Stock Beneficially Owned Immediately Following the Sale of Shares[1][2]
Armistice Capital, LLC[3]	4,886,237[4]	2,588,236	2,298,001	19.2%[5]
John Chambers[6]	14,753	14,753	0	*
Noam Rubenstein[6]	34,165	34,165	0	*
Craig Schwabe[6]	5,241	5,241	0	*
Michael Vasinkevich[6]	99,582	99,582	0	*
Charles Worthman[6]	1,553	1,553	0	*

* Less than 1%

(1) Assumes the Selling Stockholders sell all of the shares of Common Stock being offered by this prospectus.

(2) Percentage calculated based upon the assumption that the Selling Stockholders sell all of the shares of Common Stock offered by this prospectus.

(3) The securities reported herein are held by Armistice Capital Master Fund Ltd., a Cayman Islands exempted company (the "Master Fund"), and may be deemed to be indirectly beneficially owned by: (i) Armistice Capital, LLC ("Armistice Capital"), as the investment manager of the Master Fund; and (ii) Steven Boyd, as the Managing Member of Armistice Capital. Armistice Capital and Steven Boyd disclaim beneficial ownership of the securities except to the extent of their respective pecuniary interests therein. The address of the Master Fund is c/o Armistice Capital, LLC, 510 Madison Ave, 7th Floor, New York, NY 10022.

(4) Consists of (i) Private Placement Warrants to purchase up to 2,588,236 shares of Common Stock with an exercise price of $1.58 per share, (ii) Pre-Funded Warrants to purchase up to 1,668,236 shares of Common Stock with an exercise price of $0.001 per share, and (iii) 629,765 shares of Common Stock. The Pre-Funded Warrants are subject to a beneficial ownership limitation of 9.99% and the Private Placement Warrants are subject to a beneficial ownership of 4.99% (each, a "Beneficial Ownership Limitation"), which limitations preclude the Master Fund from exercising any portion of either to the extent that, following such exercise, the Master Fund's ownership of our Common Stock would exceed the applicable beneficial ownership limitation.

(5) The amounts and percentages in the table are provided without regard to the applicable Beneficial Ownership Limitation

(6) Each of the selling stockholders is affiliated with H.C. Wainwright & Co., LLC, a registered broker dealer with a registered address of H.C. Wainwright & Co., LLC, 430 Park Ave, 3rd Floor, New York, NY 10022, and has sole voting and dispositive power over the securities held. The number of shares beneficially owned prior to this offering consist of shares of Common Stock issuable upon exercise of placement agent warrants, which were received as compensation. The selling stockholder acquired the placement agent warrants in the ordinary course of business and, at the time the placement agent warrants were acquired, the selling stockholder had no agreement or understanding, directly or indirectly, with any person to distribute such securities.

PLAN OF DISTRIBUTION

The Selling Stockholders of the securities and any of their pledgees, assignees and successors-in-interest may, from time to time, sell any or all of its securities covered hereby on the principal trading market or any other stock exchange, market or trading facility on which the securities are traded or in private transactions. These sales may be at fixed or negotiated prices. The Selling Stockholders may use any one or more of the following methods when selling securities:

- ordinary brokerage transactions and transactions in which the broker-dealer solicits purchasers;
- block trades in which the broker-dealer will attempt to sell the securities as agent but may position and resell a portion of the block as principal to facilitate the transaction;
- purchases by a broker-dealer as principal and resale by the broker-dealer for its account;
- an exchange distribution in accordance with the rules of the applicable exchange;

- privately negotiated transactions;
- settlement of short sales;
- in transactions through broker-dealers that agree with the Selling Stockholders to sell a specified number of such securities at a stipulated price per security;
- through the writing or settlement of options or other hedging transactions, whether through an options exchange or otherwise;
- a combination of any such methods of sale; or
- any other method permitted pursuant to applicable law.

The Selling Stockholders may also sell securities under Rule 144 or any other exemption from registration under the Securities Act, if available, rather than under this prospectus. Broker-dealers engaged by the Selling Stockholders may arrange for other brokers-dealers to participate in sales. Broker-dealers may receive commissions or discounts from the Selling Stockholders (or, if any broker-dealer acts as agent for the purchaser of securities, from the purchaser) in amounts to be negotiated, but, except as set forth in a supplement to this prospectus, in the case of an agency transaction not in excess of a customary brokerage commission in compliance with FINRA Rule 2121; and in the case of a principal transaction a markup or markdown in compliance with FINRA Rule 2121.

In connection with the sale of the securities or interests therein, theSelling Stockholders may enter into hedging transactions with broker-dealers or other financial institutions, which may in turn engage in short sales of the securities in the course of hedging the positions they assume. The Selling Stockholders may also sell securities short and deliver these securities to close out their short positions, or loan or pledge the securities to broker-dealers that in turn may sell these securities. The Selling Stockholders may also enter into option or other transactions with broker-dealers or other financial institutions or create one or more derivative securities which require the delivery to such broker-dealer or other financial institution of securities offered by this prospectus, which securities such broker-dealer or other financial institution

may resell pursuant to this prospectus (as supplemented or amended to reflect such transaction).

The Selling Stockholders and any broker-dealers or agents that are involved in selling the securities may be deemed to be "underwriters" within the meaning of the Securities Act in connection with such sales. In such event, any commissions received by such broker-dealers or agents and any profit on the resale of the securities purchased by them may be deemed to be underwriting commissions or discounts under the Securities Act. Each of the Selling Stockholders have informed us that it does not have any written or oral agreement or understanding, directly or indirectly, with any person to distribute the securities.

We are required to pay certain fees and expenses incurred by us incident to the registration of the securities. We have agreed to indemnify the Selling Stockholders against certain losses, claims, damages and liabilities, including liabilities under the Securities Act.

We agreed to keep this prospectus effective until the earlier of (i) the date on which the securities may be resold by theSelling Stockholders without registration and without regard to any volume or manner-of-sale limitations by reason of Rule 144, without the requirement for us to be in compliance with the current public information under Rule 144 under the Securities Act or any other rule of similar effect or (ii) all of the securities have been sold pursuant to this prospectus or Rule 144 under the Securities Act or any other rule of similar effect. The resale securities will be sold only through registered or licensed brokers or dealers if required under applicable state securities laws. In addition, in certain states, the resale securities covered hereby may not be sold unless they have been registered or qualified for sale in the applicable state or an exemption from the registration or qualification requirement is available and is complied with.

Under applicable rules and regulations under the Exchange Act, any person engaged in the distribution of the resale securities may not simultaneously engage in market making activities with respect to the Common Stock for the applicable restricted period, as defined in Regulation M, prior to the commencement of the distribution. In addition, the Selling Stockholders will be subject to applicable provisions of the Exchange Act and the rules and regulations thereunder, including Regulation M, which may limit the timing of purchases and sales of the Common Stock by the Selling Stockholders or any other person. We will make copies of this prospectus available to the Selling Stockholders and have informed them of the need to deliver a copy of this prospectus to each purchaser at or prior to the time of the sale (including by compliance with Rule 172 under the Securities Act).

DESCRIPTION OF CAPITAL STOCK

When used herein, the terms "Company," "we," "our," and "us" refer to Mustang Bio, Inc.

Capital Stock

The Company is authorized to issue 200,000,000 shares of Common Stock with a par value of $0.0001 per share, of which 1,000,000 shares are designated as Class A Common Stock and 2,000,000 of preferred stock at $0.0001 par value of which 250,000 are designated as Class A Preferred Stock.

The holders of Common Stock are entitled to one vote per share of Common Stock held.

As of December 5, 2023, there were 9,219,691 shares of our Common Stock outstanding held by 72 record stockholders.

The undesignated preferred stock may be issued from time to time in one or more series. Our Board of Directors is authorized to determine or alter the dividend rights, dividend rate, conversion rights, voting rights, rights and terms of redemption (including sinking fund provisions, if any), the redemption price or prices, the liquidation preferences and other designations, powers, preferences and relative, participating, optional or other special rights, if any, and the qualifications, limitations and restrictions granted to or imposed upon any wholly unissued series of preferred stock, and to fix the number of shares of any series of preferred stock (but not below the number of shares of any such series then outstanding).

Class A Common Stock

The holders of Class A Common Stock are entitled to the number of votes equal to the number of whole shares of Common Stock into which the shares of Class A Common Shares held by such holder are convertible. For a period of ten years from issuance, the holders of the Class A Common Stock have the right to appoint one member of the Board of Directors of Mustang. To date, the holders of Class A Common Stock have not yet appointed such director.

Class A Preferred Stock

The Class A Preferred Stock is identical to undesignated Common Stock other than as to voting rights, conversion rights, and the PIK dividend right.

The holders of the outstanding shares of Class A Preferred Stock receive on each January 1 (each a "PIK Dividend Payment Date") after the original issuance date of the Class A Preferred Stock until the date all outstanding Class A Preferred Stock is converted into Common Stock or redeemed (and the purchase price is paid in full), pro rata per share dividends paid in additional fully paid and non-assessable shares of Common Stock such that the aggregate number of shares of Common Stock issued pursuant to such PIK dividend is equal to 2.5% of the Corporation's fully-diluted outstanding capitalization on the date that is one business day prior to any PIK Dividend Payment Date ("PIK Record Date"). In the event the Class A Preferred Stock converts into Common Stock, the holders shall receive all PIK dividends accrued through the date of such conversion. No dividend or other distribution shall be paid, or declared and set apart for payment (other than dividends payable solely in capital stock on the capital stock) on the shares of Common Stock until all PIK dividends on the Class A Preferred Stock shall have been paid or declared and set apart for payment. All dividends are non-cumulative.

On any matter presented to the stockholders for their action or consideration at any meeting of stockholders (or by written consent of stockholders in lieu of meeting), each holder of outstanding shares of Class A Preferred Stock shall be entitled to cast for each share of Class A Preferred Stock held by such holder as of the record date for determining stockholders entitled to vote on such matter, the number of votes that is equal to one and one-tenth (1.1) times a fraction, the numerator of which is the sum of (A) the number of shares of outstanding Common Stock and (B) the whole shares of Common Stock in to which the shares of outstanding Class A Common Stock and the Class A Preferred Stock are convertible, and the denominator of which is number of shares of outstanding Class A Preferred Stock. Thus, the Class A Preferred Stock will at all times constitute a voting majority.

Each share of Class A Preferred Stock is convertible, at the option of the holder, into one fully paid and nonassessable share of Common Stock, subject to certain adjustments. If the Company, at any time effects a subdivision or combination of the outstanding Common Stock (by any stock split, stock dividend, recapitalization, reverse stock split or otherwise), the applicable conversion ratio in effect immediately before that subdivision is proportionately decreased or increased, as applicable, so that the number of shares of Common Stock issuable on conversion of each share of Class A Preferred Stock shall be increased or decreased, as applicable, in proportion to such

increase or decrease in the aggregate number of shares of Common Stock outstanding. Additionally, if any reorganization, recapitalization, reclassification, consolidation or merger involving the Company occurs in which the Common Stock (but not the Class A Preferred Stock) is converted into or exchanged for securities, cash or other property, then each share of Class A Preferred Stock becomes convertible into the kind and amount of securities, cash or other property which a holder of the number of shares of Common Stock of the Company issuable upon conversion of one share of the Class A Preferred Stock immediately prior to such reorganization, recapitalization, reclassification, consolidation or merger would have been entitled to receive pursuant to such transaction.

Additional Features

Other features of our capital stock include:

- *Dividend Rights*. The holders of outstanding shares of our Common Stock, including Class A Common Stock, are entitled to receive dividends out of funds legally available at the times and in the amounts that our Board of Directors may determine. All dividends are non-cumulative.
- *Voting Rights*. The holders of our Common Stock are entitled to one vote for each share of Common Stock held on all matters submitted to a vote of the stockholders, including the election of directors. Our certificate of incorporation and bylaws do not provide for cumulative voting rights.
- *No Preemptive or Similar Rights.* The holders of our Common Stock have no preemptive, conversion, or subscription rights, and there are no redemption or sinking fund provisions applicable to our Common Stock.
- *Right to Receive Liquidation Distributions.* Upon our liquidation, dissolution, or winding-up, the assets legally available for distribution to our stockholders would be distributable ratably among the holders of our Common Stock, including Class A Common Stock, outstanding at that time after payment of other claims of creditors, if any.
- *Fully Paid and Non-Assessable.* All of the outstanding shares of our Common Stock, including Class A Common Stock, and the Class A Preferred Stock are duly issued, fully paid and non-assessable.

LEGAL MATTERS

McGuireWoods LLP, Charlotte, North Carolina, will pass upon the validity of the securities being offered by this prospectus. Additional legal matters may be passed upon for us or any underwriters, dealers or agents, by counsel that we will name in the applicable prospectus supplement.

EXPERTS

The financial statements of Mustang Bio, Inc. as of December 31, 2022 and 2021 and for each of the years in the two-year period ended December 31, 2022, have been incorporated by reference herein in reliance upon the reports of KPMG LLP, independent registered public accounting firm, incorporated by reference herein, and upon the authority of said firm as experts in auditing and accounting. The audit report covering the December 31, 2022 financial statements contains an explanatory paragraph that states the Company's expectation to generate operating losses and negative operating cash flows in the future, projections of future inability to meet certain financial debt covenants, and the need for additional funding to support its planned operations raises substantial doubt about the entity's ability to continue as a going concern. The financial statements do not include any adjustments that might result from the outcome of that uncertainty.

WHERE YOU CAN FIND MORE INFORMATION

We file reports and proxy statements with the SEC. These filings include our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and proxy statements on Schedule 14A, as well as any amendments to those reports and proxy statements, which are available free of charge through our website as soon as reasonably practicable after we file them with, or furnish them to, the SEC. Our Internet website address is www.mustangbio.com. Our website and the information contained on, or that can be accessed through, the website will not be deemed to be incorporated by reference in, and are not considered part of, this prospectus. You should not rely on any such information in making your decision whether to purchase our securities. The SEC also maintains a website at www.sec.gov that contains reports, proxy and information statements and other information regarding us and other issuers that file electronically with the SEC.

We have filed with the SEC a registration statement on Form S-1 under the Securities Act relating to the securities being offered by this prospectus. This prospectus, which constitutes part of that registration statement, does not contain all of the information set forth in the registration statement or the exhibits and schedules which are part of the registration statement. For further information about us and the securities offered, see the registration statement and the exhibits and schedules thereto. Statements contained in this prospectus regarding the contents of any contract or any other document to which reference is made are not necessarily complete, and, in each instance where a copy of a contract or other document has been filed as an exhibit to the registration statement, reference is made to the copy so filed, each of those statements being qualified in all respects by the reference.

INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The SEC allows us to "incorporate by reference" into this prospectus the information we file with the SEC in other documents, which means that we can disclose important information to you by referring you to those documents instead of having to repeat the information in this prospectus. The information incorporated by reference is considered to be part of this prospectus, and later information that we file with the SEC will automatically update and supersede such information. We incorporate by reference the documents listed below and any future information filed (rather than furnished) with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act between the date of this prospectus and the date all securities to which this prospectus relates have been sold or the offering is otherwise terminated and also between the date of the initial registration statement and prior to effectiveness of the registration statement, provided, however, that we are not incorporating any information furnished under Item 2.02 or Item 7.01 of any Current Report on Form 8-K:

- our Annual Report on Form 10-K for the fiscal year ended December 31, 2022 (the "2022 Form 10-K");
- our Quarterly Reports on Form 10-Q for the three months ended March 31, 2023, June 30, 2023 and September 30, 2023;
- the information specifically incorporated by reference into the 2022 Form 10-K from our Definitive Proxy Statement on Schedule 14A, filed with the SEC on April 28, 2023;
- our Current Reports on Form 8-K filed with the SEC on March 3, 2023; April 3, 2023; April 13, 2023; April 20, 2023; May 22, 2023; June 23, 2023; June 30, 2023; July 11, 2023; July 20, 2023; July 31, 2023; August 14, 2023; August 16, 2023; October 4, 2023, October 26; 2023; November 2, 2023; December 11, 2023; and December 11, 2023; and
- the description of the Company's capital stock included in Exhibit 4.3 to the 2022 Form 10-K.

We will provide to each person, including any beneficial owner, to whom a copy of this prospectus supplement and the related prospectus is delivered, a copy of any or all of the information that we have incorporated by reference into this prospectus supplement and the related prospectus, but not delivered with this prospectus supplement and

the related prospectus. We will provide this information upon written or oral request at no cost to the requester. You may request this information by contacting our corporate headquarters at the following address: 377 Plantation Street, Worcester, Massachusetts 01605, Attn: General Counsel, or by calling (781) 652-4500.

A statement contained in a document incorporated by reference into this prospectus shall be deemed to be modified or superseded for purposes of this prospectus to the extent that a statement contained in this prospectus, any prospectus supplement or in any other subsequently filed document which is also incorporated in this prospectus modifies or replaces such statement. Any statements so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this prospectus.

2,743,530 Shares of Common Stock

PROSPECTUS

, 2023

PART II

INFORMATION NOT REQUIRED IN PROSPECTUS

Item 13. ***Other Expenses of Issuance and Distribution***

The following table indicates the expenses to be incurred in connection with the offering described in this registration statement, other than underwriting discounts and commissions, all of which will be paid by us. All amounts are estimated except the SEC registration fee.

	Amount
SEC registration fee	$ 575.02
Accounting fees and expenses	$ 25,000.00
Legal fees and expenses	$ 100,000.00
Miscellaneous fees and expenses	$ 0.00
Total expenses	$ 125,575.02

Item 14. ***Indemnification of Directors and Officers***

Under the General Corporation Law of the State of Delaware ("DGCL"), a corporation may include provisions in its certificate of incorporation that will relieve its directors of monetary liability for breaches of their fiduciary duty to the corporation, except under certain circumstances, including a breach of the director's duty of loyalty, acts or omissions of the director not in good faith or which involve intentional misconduct or a knowing violation of law, the approval of an improper payment of a dividend or an improper purchase by the corporation of stock or any transaction from which the director derived an improper personal benefit. The Company's Amended and Restated Certificate of Incorporation, as amended, eliminates the personal liability of directors to the Company or its stockholders for monetary damages for breach of fiduciary duty as a director with certain limited exceptions set forth in the DGCL.

Section 145 of the DGCL grants to corporations the power to indemnify each officer and director against liabilities and expenses incurred by reason of the fact that he or she is or was an officer or director of the corporation if he or she acted in good faith and in a manner he or she 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 his or her conduct was unlawful. The Company's Amended and Restated Certificate of Incorporation, as amended, and Amended and Restated Bylaws, as amended, provide for indemnification of each officer and director of the Company to the fullest extent permitted by the DGCL. Section 145 of the DGCL also empowers corporations to purchase and maintain insurance on behalf of any person who is or was an officer or director of the corporation against liability asserted against or incurred by him in any such capacity, whether or not the corporation would have the power to indemnify such officer or director against such liability under the provisions of Section 145 of the DGCL.

Item 15. ***Recent Sales of Unregistered Securities.***

Set forth below is information regarding all securities sold by us since December 11, 2020, the offer and sale of which were not registered under the Securities Act. Also included is the consideration received by us for such securities and information relating to the section of the Securities Act, or rule of the SEC, under which exemption from registration was claimed.

On October 26, 2023, the Company entered into a Securities Purchase Agreement (the "Purchase Agreement") with an institutional accredited investor, for a private placement offering of warrants to purchase 2,588,236 shares of Common Stock. Pursuant to the Purchase Agreement, the Company agreed to issue and sell the warrants at an offering price of $0.125 per warrant to purchase one share of Common Stock. The warrants have an exercise price of $1.58 per share (subject to adjustment as set forth in the warrants), were exercisable immediately upon issuance and will expire five and one-half (5.5) years from the date on which the warrants become exercisable. The warrants contain standard anti-dilution adjustments to the exercise price including for share splits, share dividend, rights offerings and pro rata distributions. This private placement closed on October 30, 2023, concurrently with an offering to the same institutional accredited investor that was registered under the Securities Act. The gross proceeds to the Company from the private placement, before deducting placement agent fees and other estimated offering expenses payable by the Company, were approximately $0.32

million. H.C. Wainwright & Co., LLC ("Wainwright") acted as the exclusive placement agent in connection with the private placement under an engagement, between the Company and Wainwright. Pursuant to the Engagement Letter, Wainwright was paid a cash fee equal to 7.0% of the gross proceeds received by the Company in the Offerings, a management fee equal to 1.0% of the gross proceeds of the Offering, $75,000 for non-accountable expenses and a clearing fee of $15,950. In addition, under the terms of the Engagement Letter, the Company issued to Wainwright (or its designees) warrants to purchase up to 155,294 shares of Common Stock (the "Wainwright Warrants"). The Wainwright Warrants have substantially the same terms as the Warrants, except that the Wainwright Warrants will expire five (5) years from the commencement of the sales of the Offerings and have an exercise price of $2.125 per share (subject to customary adjustment as set forth in the Wainwright Warrants). The 2023 Warrants were offered and sold in reliance on the exemption from registration provided by Section 4(a)(2) of the Securities Act. The investor also represented that it qualified as an "accredited investor" within the meaning of Rule 501 of Regulation D.

Item 16. ***Exhibits and Financial Statement Schedules***

Exhibit No.	Description	Incorporated by Reference				Filed herewith
		Form	File Number	Date	Exhibit No.	
2.1	Asset Purchase Agreement, dated May 18, 2023, between the Company and uBriGene (Boston) Biosciences, Inc. #	8-K	001-38191	May 22, 2023	1.1	
2.2	First Amendment to Asset Purchase Agreement, dated June 29, 2023, between the Company and uBriGene (Boston) Biosciences, Inc.	8-K	001-38191	June 30, 2023	2.2	
2.3	Second Amendment to Asset Purchase Agreement, dated July28, 2023, between the Company and uBriGene (Boston) Biosciences, Inc.	8-K	001-38191	July 31, 2023	2.3	
3.1	Amended and Restated Certificate of Incorporation of Mustang Bio, Inc. (formerly Mustang Therapeutics, Inc.), dated July 26, 2016	10-12G	000-5568	July 28, 2016	3.1	
3.2	Certificate of Amendment of the Amended and Restated Certificate of Incorporation of Mustang Bio, Inc., dated June 14, 2018	10-Q	001-38191	August 13, 2018	3.1	
3.3	Certificate of Amendment of the Amended and Restated Certificate of Incorporation of Mustang Bio, Inc., dated September 30, 2019	8-K	001-38191	September 30, 2019	3.1	
3.4	Certificate of Amendment of the Amended and Restated Certificate of Incorporation of Mustang Bio, Inc., dated December 4, 2020	8-K	001-38191	December 4, 2020	3.1	

3.5	Certificate of Amendment of the Amended and Restated Certificate of Incorporation of Mustang Bio, Inc., dated June 17, 2021	8-K	001-38191	June 22, 2021	3.1	
3.6	Certificate of Amendment of the Amended and Restated Certificate of Incorporation of Mustang Bio, Inc., dated July 5, 2022	8-K	001-38191	July 7, 2022	3.1	
3.7	Certificate of Amendment of the Amended and Restated Certificate of Incorporation of Mustang Bio, Inc., dated April 3, 2023	8-K	001-38191	April 3, 2023	3.1	
3.8	Amended and Restated Bylaws of Mustang Bio, Inc.	8-K	001-38191	April 3, 2023	3.2	
4.1	Specimen certificates evidencing shares of common stock, Class A common stock and Class A preferred stock	10-12G	000-5568	July 28, 2016	4.1	
4.2	Form of Warrant Agreement	10-12G	000-5568	July 28, 2016	4.2	
4.3	Common Stock Warrant issued by Mustang Bio, Inc. to NSC Biotech Venture Fund I, LLC, dated July 5, 2016	10-12G	000-5568	July 28, 2016	10.5	
4.4	Warrant to Purchase Common Stock issued to Runway Growth Finance Corp., dated March 4, 2022	8-K	001-3891	March 8, 2022	4.1	
4.5	Amendment No. 3 to At Market Issuance Sales Agreement, dated April 14, 2023, between the Registrant B. Riley Securities, Inc., Cantor Fitzgerald & Co. and H.C. Wainwright & Co., LLC	8-K	001-38191	April 20, 2023	1.1	
4.6	Form of Pre-funded Warrant	8-K	001-38191	October 30, 2023	4.1	
4.7	Form of Warrant	8-K	001-38191	October 30, 2023	4.2	
4.8	Form of Wainwright Warrant	8-K	001-38191	October 30, 2023	4.3	

4.9	Description of Securities of Mustang Bio, Inc.	10-K	001-38191	March 30, 2023	4.3	
5	Opinion of McGuireWoods LLP					X

10.1	Second Amended and Restated Founders Agreement between Fortress Biotech, Inc. and Mustang Bio, Inc., dated July 26, 2016	10-12G	000-5568	July 28, 2016	10.1
10.2	Management Services Agreement between Fortress Biotech, Inc. and Mustang Bio, Inc., dated March 13, 2015	10-12G	000-5568	July 28, 2016	10.2
10.3	Future Advance Promissory Note to Fortress Biotech, Inc., dated May 5, 2016	10-12G	000-5568	July 28, 2016	10.3
10.4	Promissory Note to NSC Biotech Venture Fund I, LLC, dated July 5, 2016	10-12G	000-5568	July 28, 2016	10.4
10.5	License Agreement by and between Mustang Bio, Inc. and City of Hope, dated March 17, 2015 #	10-12G	000-5568	July 28, 2016	10.6
10.6	Sponsored Research Agreement by and between Mustang Bio, Inc. and City of Hope, dated March 17, 2015	10-12G	000-5568	July 28, 2016	10.7
10.7	Mustang Bio, Inc. 2016 Incentive Plan†	10-12G	000-5568	July 28, 2016	10.8
10.8	Mustang Bio, Inc. Non-Employee Directors Compensation Plan †	10-12G	000-5568	July 28, 2016	10.9
10.9	Agreement by and between Mustang Bio, Inc. and Chord Advisors, LLC, dated April 8, 2016	10-12G	000-5568	July 28, 2016	10.10
10.10	Board Advisory Services Agreement by and between Mustang Bio, Inc. and Caribe BioAdvisors, LLC	10-K	000-5568	March 31, 2017	10.11
10.11	Exclusive License Agreement by and between Mustang Bio, Inc. and The Regents of the University of California, dated March 17, 2017 #	10-Q	000-5568	August 14, 2017	10.4
10.12	Exclusive License Agreement (IV/ICV) by and between Mustang Bio, Inc. and City of Hope, dated February 17, 2017 #	10-Q	000-55668	August 14, 2017	10.5

10.13	Amended and Restated Exclusive License Agreement (IL13Ra2) by and between Mustang Bio, Inc. and City of Hope, dated February 17, 2017 #	10-K	000-5568	March 31, 2017	10.15
10.14	Amended and Restated Exclusive License Agreement (Spacer) by and between Mustang Bio, Inc. and City of Hope, dated February 17, 2017 #	10-K	000-5568	March 31, 2017	10.16
10.15	Employment Agreement between Manuel Litchman and Mustang Bio, Inc., effective as of April 24, 2017 †	8-K	000-5568	April 24, 2017	10.1
10.16	Lease Agreement by and between Mustang Bio, Inc. and WCS - 377 Plantation Street, Inc., dated October 27, 2017	10-Q	001-3891	November 14, 2017	10.1
10.17	Sublease Agreement by and between Mustang Bio, Inc., and The Paul Reverse Life Insurance Company, dated June 14, 2022	10-K	001-3891	March 30, 2023	10.22
10.18	First Amendment to Sublease Agreement by and between Mustang Bio, Inc. and The Paul Revere Life Insurance Company, dated October 25, 2022	10-K	001-3891	March 30, 2023	10.23
10.19	Mustang Bio, Inc. 2019 Employee Stock Purchase Plan †	10-Q	001-3891	August 9, 2019	10.1
10.20	Second Amendment to the Mustang Bio, Inc. 2016 Equity Incentive Plan, dated June 17, 2021 †	8-K	001-3891	June 22, 2021	10.1
10.21	Third Amendment to Mustang Bio, Inc. 2016 Equity Incentive Plan, dated June 21, 2022 †	8-K	001-3891	June 24, 2022	10.1
10.22	Amendment to the Mustang Bio, Inc. 2019 Employee Stock Purchase Plan, dated June 17, 2021 †	8-K	001-3891	June 22, 2021	10.2
10.23	Loan and Security Agreement by and between Mustang Bio, Inc., the Borrower, the Lenders, and Runway Growth Finance Corp. (as agent), dated March 4, 2022	8-K	001-38191	March 8, 2022	99.1

10.24	First Amendment to Loan and Security Agreement by and between Mustang Bio, Inc., the Borrower, the Lenders and Runway Growth Finance Corp. (as agent), dated December 7, 2022	8-K	001-38191	December 13, 2022	10.1
10.25	Amendment No. 2 to the Mustang Bio, Inc. 2019 Employee Stock Purchase Plan	8-K	001-38191	June 23, 2023	10.1
10.26	Second Amendment to Sublease, dated April 27, 2023, between the Company and The Paul Revere Life Insurance Company	8-K	001-38191	July 20, 2023	10.2

10.27	Third Amendment to Sublease, dated June 15, 2023, between the Company and The Paul Revere Life Insurance Company	8-K	001-38191	July 20, 2023	10.3	
10.28	Manufacturing Services Agreement, dated July 28, 2023, between the Company and uBriGene (Boston) Biosciences, Inc.	8-K	001-38191	July 31, 2023	10.1	
10.29	Sub-Contracting Manufacturing Services Agreement, dated July 28, 2023, between the Company and uBriGene (Boston) Biosciences, Inc.	8-K	001-38191	July 31, 2023	10.2	
10.30	Form of Securities Purchase Agreement, dated October 26, 2023, by and between the Company and the purchaser party thereto	8-K	001-38191	October 30, 2023	10.1	
23.1	Consent of Independent Registered Public Accounting Firm, KPMG LLP as to Mustang Bio, Inc., for year ended December 31, 2022					X
23.2	Consent of McGuireWoods LLP (included in Exhibit 5.1)					X
24.1	Power of Attorney (included in signature page hereto)					X
107	Filing Fee Table					X

Portions of this Exhibit have been omitted pursuant to Item 601(b)(1)(iv) of Regulation S-K.

† Management contract or compensatory plan.

Item 17. ***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 SEC 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.

(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 (i), (ii), and (iii) of this section 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 Securities Exchange Act of 1934 that are incorporated by reference in this 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;

4. That, for the purpose of determining liability under the Securities Act to any purchaser:

(i) Each prospectus filed by Registrant pursuant to Rule 424(b)(3) shall be deemed to be part of the registration statement as of the date the filed prospectus was deemed part of and included in the registration statement; and

(ii) Each prospectus required to be filed pursuant to Rule 424(b)(2), (b)(5), or (b)(7) as part of a registration statement in reliance on Rule 430B relating to an offering made pursuant to Rule 415(a)(1)(i), (vii), or (x) for the purpose of providing the information required by section 10(a) of the Securities Act of 1933 shall be deemed to be part of and included in the registration statement as of the earlier of the date such form of prospectus is first used after effectiveness or the date of the first contract of sale of securities in the offering described in the prospectus. As provided in Rule 430B, for liability purposes of the issuer and any person that is at that date an underwriter, such date shall be deemed to be a new effective date of the registration statement relating to the securities in the registration statement to which that prospectus relates, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof. Provided, however, that no statement made in a registration statement or prospectus that is part of the registration statement or made in a document incorporated or deemed incorporated by reference into the registration statement or prospectus that is part of the registration statement will, as to a purchaser with a time of contract of sale prior to such effective date, supersede or modify any statement that was made in the registration statement or prospectus that was part of the registration statement or made in any such document immediately prior to such effective date;

5. 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 section 15(d) of the Securities Exchange Act of 1934 (and, where applicable, each filing of an employee benefit plan's annual report pursuant to section 15(d) of the Securities Exchange Act of 1934) 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;

6. 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 SEC 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.

(b) The undersigned Registrant hereby undertakes that:

(i) for purposes of determining any liability under the Securities Act of 1933, the information omitted from the form of prospectus filed as part of this registration statement in reliance upon Rule 430A and contained in a form of prospectus filed by the Registrant pursuant to Rule 424(b)(1) or (4) or 497(h) under the Securities Act of 1933 shall be deemed to be part of this registration statement as of the time that it was declared effective.

(ii) For the purpose of determining any liability under the Securities Act of 1933, each post-effective amendment that contains a form of prospectus shall be deemed to be a new registration statement relating to the securities offered therein, and the offerings of such securities at that time shall be deemed to be the initial bona fide offering thereof.

SIGNATURES

Pursuant to the requirements of the Securities Act, the Registrant has duly caused this Registration Statement to be signed on its behalf by the undersigned, thereunto duly authorized, in Worcester, Massachusetts, on December 11, 2023.

Mustang Bio, Inc.

By: /s/ Manuel Litchman, M.D.
Name: Manuel Litchman, M.D.
Title: President and Chief Executive Officer

POWER OF ATTORNEY

Each person whose signature appears below constitutes and appoints each of Manuel Litchman, M.D., Eliot Lurier, and Matthew Wein, acting alone or together with another attorney-in-fact, as his or her true and lawful attorney-in-fact and agent, with full power of substitution and resubstitution, for such person and in his or her name, place and stead, in any and all capacities, to sign any or all further amendments (including post-effective amendments) to this registration statement (and any additional registration statement related hereto permitted by Rule 462(b) promulgated under the Securities Act, (and all further amendments, including post-effective amendments, thereto)), 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 and necessary to be done in and about the premises, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorney-in-fact and agent, or his or her substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act, this Registration Statement has been signed by the following persons in the capacities and on the dated indicated.

Signature	Title	Date
/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 Officer)*	December 11, 2023
/s/ Peter Carney Peter Carney	Controller and Interim Chief Accounting Officer *(Principal Accounting Officer)*	December 11, 2023
/s/ Michael S. Weiss Michael S. Weiss	Executive Chairman of the Board	December 11, 2023
/s/ Lindsay A. Rosenwald, M.D. Lindsay A. Rosenwald, M.D.	Director	December 11, 2023
/s/ Neil Herskowitz Neil Herskowitz	Director	December 11, 2023
/s/ Adam Chill Adam Chill	Director	December 11, 2023
/s/ Michael Zelefsky, M.D. Michael Zelefsky, M.D.	Director	December 11, 2023

McGuireWoods

McGuireWoods LLP
201 North Tryon Street
Suite 3000
Charlotte, NC 28202-2146

December 11, 2023

Mustang Bio, Inc.
377 Plantation Street
Worcester, Massachusetts 01605

RE: Registration Statement on Form S-1

Ladies and Gentlemen:

We have acted as counsel to Mustang Bio, Inc., a Delaware corporation (the "Company"), in connection with the Registration Statement on Form S-1 (as amended, the "Registration Statement") being filed by the Company on the date of this opinion letter with the Securities and Exchange Commission (the "SEC") under the Securities Act of 1933, as amended (the "Securities Act"). The Registration Statement relates to the registration of the offer and resale by certain selling stockholders of the Company of up to 2,743,530 shares of the Company's Common Stock (the "Common Stock"), par value $0.0001 per share (the "Securities"), which consists of (a) up to an aggregate of 2,588,236 shares of Common Stock that are issuable upon exercise of unregistered warrants (the "PIPE Warrants") purchased pursuant to the Purchase Agreement (as defined below), and (b) up to 155,294 shares of Common Stock that are issuable upon the exercise of certain unregistered private placement warrants (the "Placement Agent Warrants" and, together with the PIPE Warrants, the "Warrants") issued to designees of H.C. Wainwright & Co., LLC, the Company's placement agent pursuant to an engagement letter, dated as of October 9, 2023.

This opinion letter is being furnished in accordance with the requirements of Item 16 of Form S-1 and Item 601(b)(5)(i) of Regulation S-K promulgated under the Securities Act. The Securities are described in the Registration Statement. Capitalized terms used and not defined herein shall have the meanings assigned to them in the Registration Statement.

Documents Reviewed

In connection with this opinion letter, we have examined:

(a) the Registration Statement, including the exhibits being filed therewith and incorporated by reference therein from previous filings made by the Company with the SEC;

(b) the prospectus contained in the Registration Statement (the "Prospectus");

(c) the PIPE Warrants;

(d) the Placement Agent Warrants; and

(e) the Securities Purchase Agreement, dated October 30, 2023, between the Company and the purchasers party thereto (the "Purchase Agreement").

In addition, we have examined and relied upon the following:

(i) a certificate from the corporate secretary of the Company certifying as to (A) true and correct copies of the Amended and Restated Certificate of Incorporation of the Company and Amended and Restated Bylaws of the Company, each as in effect the date hereof and as amended to date, and (B) the resolutions of the Board of Directors of the Company authorizing (1) the filing of the Registration Statement by the Company; and (2) the Securities issuable by the Company upon exercise of the Warrants;

(ii) a certificate dated December 11, 2023 issued by the Secretary of State of the State of Delaware, attesting to the corporate status of the Company in the State of Delaware; and

(iii) originals, or copies identified to our satisfaction as being true copies, of such other records, documents and instruments as we have deemed necessary for the purposes of this opinion letter.

"Applicable Law" means the Delaware General Corporation Law, the laws of the State of New York and the federal laws of the United States.

Assumptions Underlying Our Opinions

For all purposes of the opinions expressed herein, we have assumed, without independent investigation, the following:

(a) Factual Matters. To the extent that we have reviewed and relied upon (i) certificates of the Company or authorized representatives thereof, (ii) representations of the Company set forth in the Purchase Agreement and (iii) certificates and assurances from public officials, all of such certificates, representations and assurances are accurate with regard to factual matters and all official records (including filings with public authorities) are properly indexed and filed and are accurate and complete.

(b) Signatures. The signatures of individuals who signed the Purchase Agreement and the Warrants are genuine and (other than those of individuals signing on behalf of the Company at or before the date hereof) authorized.

(c) Authentic and Conforming Documents. All documents submitted to us as originals are authentic, complete and accurate, and all documents submitted to us as copies conform to authentic original documents.

(d) Organizational Status, Power and Authority and Legal Capacity of Certain Parties. All parties to the Purchase Agreement and the Warrants were, as of the date the Purchase Agreement and Warrants were executed and delivered, validly existing and in good standing in their respective jurisdictions of formation, except that no such assumption is made as to the Company as of the date hereof. All parties to the Purchase Agreement and the Warrants had, as of the date the Purchase Agreement and the Warrants were executed and delivered, the capacity and full power and authority to execute, deliver and perform the Purchase Agreement, the Warrants and the documents required or permitted to be delivered and performed thereunder. All individuals who signed the Purchase Agreement and the Warrants had, as of the date the Purchase Agreement and the Warrants were executed and delivered, the legal capacity to execute the Purchase Agreement and the Warrants.

(e) Authorization, Execution and Delivery of Subject Document. The Purchase Agreement, the Warrants and the documents required or permitted to be delivered thereunder have been duly authorized by all necessary corporate, limited liability company, business trust, partnership or other action on the part of the parties thereto and have been duly executed and delivered by such parties.

(f) Purchase Agreement and Warrants Binding on Certain Parties. The Purchase Agreement, the Warrants and the documents required or permitted to be delivered thereunder were, as of the date the Purchase Agreement was executed and delivered, valid and binding obligations enforceable against the parties thereto in accordance with their terms, except that no such assumption is made as to the Company.

(g) No Mutual Mistake, Amendments, etc. There has not been any mutual mistake of fact, fraud, duress or undue influence in connection with the issuance of the Securities as contemplated by the Registration Statement, the Purchase Agreement and the Warrants. There are and will be no oral or written statements or agreements that modify, amend or vary, or purport to modify, amend or vary, any of the terms of the Purchase Agreement.

(h) Registration. The Registration Statement shall have been declared effective under the Securities Act, and such effectiveness shall not have been terminated or rescinded.

Our Opinions

Based on and subject to the foregoing and the exclusions, qualifications, limitations and other assumptions set forth in this opinion letter, we are of the opinion that the Securities have been duly authorized and, when issued and delivered upon exercise of the Warrants against payment therefor in accordance with the terms of the Warrants, will be validly issued, fully paid and non-assessable.

Our opinions set forth above is limited to the Applicable Law, and we do not express any opinion concerning any other law.

Miscellaneous

The foregoing opinions are being furnished only for the purpose referred to in the first paragraph of this opinion letter. Our opinions are based on statutes, regulations and administrative and judicial interpretations which are subject to change. We undertake no responsibility to update or supplement these opinions subsequent to the effective date of the Registration Statement. Headings in this opinion letter are intended for convenience of reference only and shall not affect its interpretation. We hereby consent to the filing of this opinion as Exhibit 5.1 to the Registration Statement on or about the date hereof, to the incorporation by reference of this opinion of counsel into the Registration Statement and to the reference to our firm in the Prospectus under the caption “Legal Matters.” In giving this consent, we do not admit that we are within the category of persons whose consent is required by Section 7 of the Securities Act or the rules and regulations of the SEC promulgated thereunder.

Very truly yours,

/s/ McGuireWoods LLP
McGuireWoods LLP

Exhibit 23.1

Consent of Independent Registered Public Accounting Firm

We consent to the use of our report dated March 29, 2023, with respect to the financial statements of Mustang Bio, Inc., incorporated herein by reference, and to the reference to our firm under the heading "Experts" in the prospectus.

/s/ KPMG LLP
Boston, Massachusetts
December 11, 2023

Exhibit 107.1

Calculation of Filing Fee Tables

Form S-1

(Form Type)

Mustang Bio, Inc.

(Exact Name of Registrant as Specified in its Charter)

Table 1: Newly Registered Securities

Security Type	Security Class Title	Fee Calculation Rule[1]	Amount Registered[2]	Proposed Maximum Offering Price Per Unit[1]	Maximum Aggregate Offering Price[1]	Fee Rate	Amount of Registration Fee
Equity	Common Stock, par value $0.0001 per share	457(c)	2,743,530[3]	$ 1.42[2]	$ 3,895,812.60	$ 0.00014760	$ 575.02
Total Offering Amounts					$ 3,895,812.60		$ 575.02
Total Fee Offsets							—
Net Fee Due							$ 575.02

(1) Pursuant to Rule 457(c) 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 December 5, 2023.

(2) Pursuant to Rule 416(a) under the Securities Act, this registration statement also covers an indeterminate number of additional shares as may be issuable as a result of stock splits, reverse stock splits, stock dividends or similar transactions.

(3) Represents 2,743,530 shares of Common Stock issuable upon the exercise of common stock purchase warrants to purchase one share of Common Stock issued to certain selling stockholders on October 30, 2023.