

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
*(State or Other Jurisdiction of
Incorporation or Organization)*

2834
*(Primary Standard Industrial
Classification Code Number)*

47-3828760
*(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
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Worcester, Massachusetts 01605
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*(Name, address, including zip code, and telephone number,
including area code, of agent for service)*

Copies to:

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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: ☒ x

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	<input type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input checked="" type="checkbox"/> x	Smaller reporting company	<input checked="" type="checkbox"/> x
		Emerging growth company	<input type="checkbox"/>

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 JULY 19, 2024



6,497,800 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 6,497,800 shares of our common stock, par value \$0.0001 per share, 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.

Our common stock is listed on the Nasdaq Capital Market under the symbol "MBIO." On July 18, 2024, the last reported sale price of our common stock was \$0.3400 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 19 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 , 2024.

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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 the documents 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 and solid tumors. We aim to acquire rights to these technologies by licensing or otherwise acquiring an ownership interest in the technologies, funding their research and development and eventually either out-licensing or bringing the technologies to market.

Our pipeline is currently focused in two core areas: CAR T therapies for hematologic malignancies and CAR T therapies for solid tumors. For these therapies we have partnered with world class research institutions, including the City of Hope National Medical Center (“COH” or “City of Hope”), Fred Hutchinson Cancer Center (“Fred Hutch”), and Nationwide Children’s Hospital (“Nationwide”).

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 partners and transfer the underlying technology to our or our contract manufacturer's cell processing facility in order to conduct our own clinical trials.

We are developing CAR T therapy for hematologic malignancies in partnership with Fred Hutch targeting CD20 (MB-106). In May 2021, we announced that the U.S. Food and Drug Administration (“FDA”) accepted our Investigational New Drug (“IND”) Application for MB-106. As of December 2023, approximately 40 patients have been treated in an ongoing phase 1 clinical trial sponsored by Fred Hutch (ClinicalTrials.gov Identifier: NCT03277729), and approximately 20 patients have been treated in an ongoing phase 1 clinical trial sponsored by us (ClinicalTrials.gov Identifier: NCT05360238). In 2023, we received Safety Review Committee approval to continue dose escalation in all three active arms of the ongoing Mustang-sponsored phase 1 trial. We presented the latest results, demonstrating a favorable safety profile, complete response rate, and durability, from the ongoing Mustang-sponsored phase 1 trial at the 2023 American Society of Hematology (“ASH”) Annual Meeting. As of December 31, 2023, the MB-106 Mustang-sponsored phase 1 trial is pending one patient to complete the final dose level required to advance to phase 2 pivotal studies for treatment of patients with relapsed or refractory indolent B-cell non-Hodgkin lymphoma.

We are also developing CAR T therapy for solid tumors in partnership with COH targeting IL13Rα2 (MB-101). In addition, we have partnered with Nationwide for a herpes simplex virus type 1 (“HSV-1”) oncolytic virus (MB-108) in order to enhance the activity of MB-101 for the treatment of patients with high-grade malignant brain tumors. The Phase 1 clinical trial sponsored by COH for MB-101 (ClinicalTrials.gov Identifier: NCT02208362) has completed the treatment phase and patients continue to be assessed for long-term safety. A Phase 1 clinical trial sponsored by the University of Alabama at Birmingham (“UAB”) for MB-108 (ClinicalTrials.gov Identifier: NCT03657576) began during the third quarter of 2019. In October 2023, we announced that the FDA accepted our IND application for the combination of MB-101 and MB-108 – which is referred to as MB-109 – for the treatment of patients with IL13Rα2+ relapsed or refractory glioblastoma (“GBM”) and high-grade astrocytoma.

On May 18, 2023, we announced a series of changes resulting from a review of our portfolio of product candidates to determine the future strategy of our programs and the proper allocation of our resources. Following this review, we determined to discontinue development of our MB-102 (CD123), MB-103 (HER2), MB-104 (CS1) and MB-105 (PSCA) programs, all of which were CAR T therapies being developed in partnership with City of Hope.

Terminated Product Candidates (Gene Therapies and in vivo CAR-T)

We formerly developed several gene therapy product candidates, which included MB-117 and MB-217 (based on technologies licensed from St. Jude Children’s Research Hospital (“St. Jude”)) and MB-110 (based on technologies licensed from Leiden University Medical Centre (“LUMC”)). In April 2024, we entered into a termination and release agreement with St. Jude, pursuant to which we agreed to terminate the license agreement underpinning the MB-117 and MB-217 product candidates in exchange for a mutual release of liability and forgiveness by St. Jude of all amounts previously owing to them. Also in April 2024, we delivered a termination notice to LUMC pursuant to which we terminated the license agreement underpinning the MB-110 product candidate; we are currently in discussions with LUMC regarding the terms that will govern such termination. In June 2024, we also agreed with Mayo Foundation for Medical Education and Research (“Mayo Clinic”) to terminate the license agreement underpinning our (now former) preclinical in vivo CAR-T program, together with a related sponsored research agreement, in exchange for a mutual release of liability and forgiveness by Mayo Clinic of all amounts previously owed to them.

To date, we have not received approval for the sale of any of our product candidates in any market and, therefore, have not generated any product sales from our product candidates. In addition, we have incurred substantial operating losses since our inception, and expect to continue to incur significant operating losses for the foreseeable future and may never become profitable. As of March 31, 2024, we had an accumulated deficit of \$386.2 million.

Therapeutic Pipeline

Therapies for Oncology and Hematologic Malignancies

MB – 106: CD20 CAR T for B cell non-Hodgkin lymphoma (NHL) and chronic lymphocytic leukemia (CLL)

We believe CD20 is a promising target for immunotherapy of B-cell malignancies. CD20 is a B-cell lineage-specific phosphoprotein that is expressed in high, homogeneous density on the surface of more than 95% of B-cell NHL and CLL. CD20 is stable on the cell surface with minimal shedding, internalization, or modulation upon antibody binding and is present at only nanomolar levels as a soluble antigen. It is well established as an effective immunotherapy target, with extensive studies demonstrating improved tumor responses and survival of B-NHL patients treated with rituximab and other anti-CD20 antibodies. Importantly, CD20 continues to be expressed on the lymphoma cells of most patients with relapsed B-NHL despite repetitive rituximab treatments, and loss of CD20 expression is not a major contributor to treatment resistance. Thus, there is strong rationale for testing CD20 CAR T cells as an immunotherapy for NHL.

More than 80,000 new cases of NHL are diagnosed each year in the United States, and over 20,000 patients die of this group of diseases annually. Most forms of NHL, including follicular lymphoma, mantle cell lymphoma, marginal zone lymphoma, lymphoplasmacytic lymphoma, and small lymphocytic lymphoma ("SLL"), which account collectively for approximately 45% of all cases of NHL, are incurable with available therapies, except for allogeneic stem cell transplant ("allo-SCT"). However, many NHL patients are not suitable candidates for allo-SCT, and this treatment is also limited by significant rates of morbidity and mortality due to graft-versus-host disease. Aggressive B-cell lymphomas such as diffuse large B-cell lymphoma, the most common subtype of lymphoma, account for an additional 30-35% of NHL. The majority of patients with aggressive B-NHL are successfully treated with combination chemotherapy, but a significant proportion relapse or have refractory disease, and the outcome of these patients is poor. Innovative new treatments are therefore urgently needed.

Chronic lymphocytic leukemia/small lymphocytic lymphoma (CLL/SLL) is a mature B cell neoplasm characterized by a progressive accumulation of monoclonal B lymphocytes. CLL is considered to be identical (i.e., one disease with different manifestations) to the NHL SLL. The malignant cells seen in CLL and SLL have identical pathologic and immunophenotypic features. The term CLL is used when the disease manifests primarily in the blood, whereas the term SLL is used when involvement is primarily nodal.

CLL is the most common leukemia in adults in Western countries, accounting for approximately 25 to 35 percent of all leukemias in the United States. An estimated 20,700 new cases of CLL will be diagnosed in the United States in 2024. CLL is considered to be mainly a disease afflicting older adults, with a median age at diagnosis of approximately 70 years; however, it is not unusual to make this diagnosis in younger individuals (e.g., from approximately 30 to 39 years of age). The incidence increases rapidly with increasing age. The natural history of CLL is extremely variable, with survival times from initial diagnosis that range from approximately 2 to 20 years, and a median survival of approximately 10 years.

Most patients will have a complete or partial response to initial therapy. However, conventional therapy for CLL is not curative and most patients experience relapse. In addition, many patients will require a change in therapy due to intolerance. Since patients with CLL are generally elderly with a median age older than 70 years, and due to the relatively benign course of the disease in the majority of patients, only selected patients are candidates for intensive treatments such as allo-SCT. Innovative new treatments with a favorable safety profile are therefore urgently needed for patients with relapsed and refractory disease.

Under their IND, Fred Hutch is currently conducting a Phase 1/2 clinical study to evaluate the anti-tumor activity and safety of administering CD20-directed third-generation CAR T cells incorporating both 4-1BB and CD28 co-stimulatory signaling domains (MB-106) to patients with relapsed or refractory B-cell NHL or CLL (ClinicalTrials.gov Identifier: NCT03277729). Secondary endpoints of this study include safety and toxicity, preliminary antitumor activity as measured by overall response rate and complete remission rate, progression-free survival, and overall survival. The study is also assessing CAR T cell persistence and the potential immunogenicity of the cells. Finally, this study was designed so that, together with Fred Hutch, we could determine a recommended Phase 2 dose. Fred Hutch intends to enroll approximately 50 subjects in this study, which is being led by the Principal Investigator Mazyar Shadman, M.D., M.P.H., Associate Professor of Fred Hutch's Clinical Research Division.

The Fred Hutch IND was amended in 2019 to incorporate an optimized manufacturing process that had been developed in collaboration with us.

In May 2021, we announced that the FDA issued a safe to proceed letter for our IND application allowing for initiation of a multi-center Phase 1/2 clinical study of MB-106 in patients with relapsed or refractory B cell NHL or CLL (ClinicalTrials.gov Identifier: NCT05360238). In August 2022, the first patient was treated in our study.

In November 2021, Mustang was awarded a grant of approximately \$2.0 million from NCI of the National Institutes of Health. This two-year award partially funded the Mustang-sponsored multicenter trial to assess the safety, tolerability and efficacy of MB-106. In August 2023, we fully utilized the grant.

In June 2022, MB-106 received Orphan Drug Designation for the treatment of Waldenström macroglobulinemia ("WM").

In December 2023, we presented preliminary clinical data for the indolent lymphoma patients treated in the ongoing Mustang-sponsored multicenter Phase 1/2 clinical study at the American Society of Hematology (ASH) annual meeting. All 9 patients responded clinically to treatment; the observed overall response rate was 100%. All 5 follicular lymphoma patients achieved a complete response. Among the WM patients 1 patient attained a very good partial response, and 2 patients attained a partial response. The single patient with a hairy cell leukemia variant experienced stable disease. The safety profile demonstrated that MB-106 was well tolerated with no occurrences of cytokine release syndrome ("CRS") above grade 1, and no immune effector cell-associated neurotoxicity syndrome ("ICANS") of any grade was reported. Cell expansion and persistence were also demonstrated.

In the first quarter of 2024, we completed a successful End-of-Phase 1 meeting with the FDA regarding a potential pivotal Phase 2 single-arm clinical trial for the treatment of WM. Per the discussions, the FDA agreed with the proposed overall design of the pivotal trial for WM at the recommended dose of 1×10^7 CAR-T cells/kg and requested only minimal modifications to the study protocol. No additional nonclinical studies are expected prior to Phase 2 or a Biologics License Application ("BLA") filing. Due to limited resources, and as a result of the reduction in work force described below, we have suspended patient accrual and follow-up activities under the ongoing Phase 1 trial and do not expect to initiate our pivotal Phase 2 single-arm clinical trial of MB-106 for the treatment of WM trial in 2024. Subject to available funds, we intend to rely on third party service providers to conduct study and manufacturing services to advance our priority potential product candidates.

Also in the first quarter of 2024, we completed enrollment of the indolent lymphoma arm in our multicenter Phase 1 trial. The tenth and final patient enrolled was a patient with follicular lymphoma (FL) who achieved a complete response following treatment with 1×10^7 CAR-T cells/kg. As a result, the overall complete response rate for FL in the Phase 1 portion of this trial was sustained at 100% (N=6), with no occurrence of CRS above grade 1 and no ICANS of any grade, despite not using prophylactic tocilizumab or dexamethasone.

In March 2024, we announced plans to collaborate with Fred Hutch for a proof-of-concept Phase 1 investigator-sponsored clinical trial evaluating MB-106 in autoimmune diseases.

In March 2024, we were granted the Regenerative Medicine Advanced Therapy ("RMAT") designation by the FDA for the treatment of relapsed or refractory CD20 positive WM and FL, based on potential improvement in response as seen in clinical data-to-date. Drugs eligible for RMAT designation are those intended to treat, modify, reverse or cure a serious or life-threatening disease or condition, and that present preliminary clinical evidence indicating the drug has the potential to address unmet medical needs for such disease or condition. RMAT designation provides regenerative medicine advanced therapy products with the same benefits to expedite the development and review of a marketing application that are available to drugs that receive Breakthrough Therapy Designation. These advantages include timely advice and interactive communications with FDA, as well as proactive and collaborative involvement by senior FDA managers and experienced review and regulatory health project management staff. A product designated as an RMAT also may be eligible for other FDA-expedited programs, such as Priority Review. The FDA also may conduct a rolling review of products in its expedited programs, reviewing portions of a marketing application before the complete application is submitted.

MB-109: Combination MB-101 (IL13R α 2 CAR T Cell Program for Glioblastoma) and MB-108 (HSV-1 oncolytic virus C134) as a Potential Treatment for IL13R α 2+ Relapsed or Refractory Glioblastoma (GBM) and High-Grade Astrocytoma

An attractive novel approach to control glioblastoma is adoptive cellular immunotherapy utilizing CAR T cells. CAR T cells can be engineered to recognize very specific antigenically distinct tumor populations and to migrate through the brain parenchyma to kill malignant cells. In addition, oncolytic viruses ("OVs") have been developed to effectively infect and kill cancer cells in the tumor, as well as modify the microenvironment to increase tumor immunogenicity and immune cell trafficking within the tumor. Due to these properties, OVs have been studied in combination with other treatments to enhance the effectiveness of immunotherapies.

Preliminary anti-tumor activity has been observed in clinical studies administering the OV (MB-108) and CAR T cell therapy (MB-101) as single agents; however, the combination has not yet been explored. To determine if the combination of both therapies will result in a synergistic effect, investigators from COH developed preclinical studies in orthotopic GBM models in nude mice. Dr. Christine Brown from City of Hope presented these preclinical studies at the American Association for Cancer Research 2022 Annual Meeting. It was observed that co-treatment with HSV-1 OV and IL13R α 2-directed CAR-T cells resulted in no additional adverse events beyond those seen with the individual therapies, and, more notably, that pre-treatment with HSV-1 OV re-shaped the tumor microenvironment by increasing immune cell infiltrates and enhanced the efficacy of sub-therapeutic doses of IL13R α 2-directed CAR-T cell therapy delivered either intraventricularly or intratumorally. These preclinical studies aimed to provide a deeper understanding of this combination approach to support the potential benefit of a combination study that will evaluate HSV-1 OV (MB-108) and IL13R α 2-directed CAR-T cells (MB-101).

In October 2023, we received a safe-to-proceed "approval" from the FDA for our MB-109 IND application allowing us to initiate a Phase 1, open-label, non-randomized, multicenter study of MB-109 in patients with IL13R α 2+ recurrent GBM and high-grade astrocytoma. In this Phase 1 clinical study, we intend to evaluate the combination of CAR-T cells (MB-101) and the herpes simplex virus type 1 oncolytic virus (MB-108) in patients with IL13R α 2+ high-grade gliomas. The design of this study involves first a lead in cohort, wherein patients are treated with MB-101 alone without prior MB-108 administration. After successful confirmation of the safety profile of MB-101 alone, the study will then investigate increasing doses of intratumorally administered MB-108 followed by dual intratumoral (ICT) and intraventricular (ICV) administration of MB-101. Due to limited resources, we do not currently expect to initiate this study until such time, if any, that additional resources become available to us.

MB-101 (IL13R α 2 CAR T Cell Program for Glioblastoma)

GBM is the most common brain and central nervous system ("CNS") cancer, accounting for approximately 49.1% of malignant primary brain and CNS tumors, approximately 54% of all gliomas, and approximately 16% of all primary brain and CNS tumors. More than 14,490 new GBM cases were predicted to be diagnosed in the U.S. for 2023. Malignant brain tumors are the second leading cause of cancer-related deaths in adolescents and young adults aged 15-39 and the most common cancer occurring among 15-19-year-olds in the U.S. While GBM is a rare disease with an incidence of 2-3 cases per 100,000 persons per year in the U.S. and European Union ("EU"), it is quite lethal, with five-year survival rate historically under 10%, which has been virtually unchanged for decades. Standard of care therapy consists of maximal surgical resection, radiation, and chemotherapy with temozolomide, which, while rarely curative, is shown to extend median overall survival from 4.5 to 15 months. GBM remains difficult to treat due to the inherent resistance of the tumor to conventional therapies.

Immunotherapy approaches targeting brain tumors offer promise over conventional treatments. IL13R α 2 is an attractive target for CAR T therapy, as it has limited expression in normal tissue but is overexpressed on the surface of greater than 50% of GBM tumors. CAR-T cells are designed to express membrane-tethered IL-13 receptor ligand ("IL-13") mutated at a single site (glutamic acid at position 13 to a tyrosine; E13Y) with high affinity for IL13R α 2 and reduced binding to IL13R α 1 in order to reduce healthy tissue targeting (Kahlon KS *et al. Cancer Research*. 2004;64:9160-9166).

We are developing an optimized CAR-T product incorporating enhancements in CAR-T design and T cell engineering to improve antitumor potency and T cell persistence. These include a second-generation hinge-optimized CAR containing mutations in the IgG4 linker to reduce off-target Fc interactions (Jonnalagadda M *et al. Molecular Therapy*. 2015;23(4):757-768.), a 4-1BB (CD137) co-stimulatory signaling domain for improved survival and maintenance of CAR T cells, and the extracellular domain of CD19 as a selection/tracking marker. In order to further improve persistence, either central memory T-cells (T_{CM}) or enriched CD62L+ naïve and memory T cells (T_{N/MEM}) are isolated and enriched. Our manufacturing process limits *ex vivo* expansion, which is designed to reduce T cell exhaustion and maintain a T_{CM} or T_{N/MEM} phenotype. Based on experiments with CAR-Ts in mouse xenograft models of GBM, these CAR-modified T_{CM} and T_{N/MEM} cells have been shown to be more potent and persistent than earlier generations of CAR-T cells.

Our academic partners at COH have recently completed the treatment phase of their Phase 1 study, which was designed to assess the feasibility and safety of using T_{CM} or T_{N/MEM} enriched IL13R α 2-specific CAR-engineered T cells for clinical study participants with IL13R α 2 recurrent/refractory malignant glioma (ClinicalTrials.gov Identifier: NCT02208362). In this study, COH enrolled and treated 65 patients, with 58 patients receiving 3 cycles of CAR T cells per the study protocol. Preliminary data indicated that the CAR-T cells were well tolerated, and no dose-limiting toxicities were observed in any of the study arms, nor were there any occurrences of CRS or treatment-related deaths. Of the 58 patients evaluable for disease response, 50%

achieved stable disease (SD) or better; 22%, including 8 patients with grade 4 gliomas, achieved SD or better for at least 90 days. Two patients achieved partial response, and one patient achieved complete response on the study. In 2016 COH reported that a patient had achieved a complete response to treatment based on the imaging and clinical features set forth by the Response Assessment in Neuro-Oncology Criteria ("RANO"). This result was published as a case report in the *New England Journal of Medicine* (Brown CE et al. *NEJM*. 2016;375:2561-9). As described in the paper, this patient diagnosed with recurrent multifocal glioblastoma received multiple infusions of IL13Rα2-specific CAR-T cells over 220 days through two intracranial delivery routes – infusions into the resected tumor cavity followed by infusions into the ventricular system. Intracranial infusions of IL13Rα2-targeted CAR-T cells were not associated with any toxic effects of grade 3 or higher. After CAR-T cell treatment, regression of all intracranial and spinal tumors was observed, along with corresponding increases in levels of cytokines and immune cells in the cerebrospinal fluid. This clinical response was sustained for 7.5 months after the initiation of CAR T-cell therapy; however, the patient's disease eventually recurred at four new locations that were distinct and non-adjacent to the original tumors, and biopsy of one of these lesions showed decreased expression of IL13Rα2.

Results from this COH study have laid the foundation for potentially three new MB-101 studies listed below. Due to limited resources, we do not expect to initiate study #3 below until such time, if any, that additional resources become available to us.

1. MB-101 with or without nivolumab and ipilimumab in treating patients with recurrent or refractory glioblastoma (currently enrolling patients; ClinicalTrials.gov Identifier: NCT04003649) sponsored by COH;
2. MB-101 in treating patients with recurrent or refractory glioblastoma with a substantial component of leptomeningeal disease (currently enrolling patients; ClinicalTrials.gov Identifier: NCT04661384) sponsored by COH;
3. MB-101 in combination with the herpes simplex virus type 1 oncolytic virus (MB-108) in treating patients with recurrent or refractory glioblastoma or high-grade astrocytoma, as described above. This combination therapy, to be administered in a phase 1 two-center trial under our IND, will be referred to as MB-109.

MB - 108 (HSV 1 oncolytic virus C134)

MB-108 is a next-generation oncolytic herpes simplex virus ("oHSV") that is conditionally replication competent; that is, it can replicate in tumor cells, but not in normal cells, thus killing the tumor cells directly through this process. Replication of C134 in the tumor itself not only kills the infected tumor cells but causes the tumor cell to act as a factory to produce new virus. These virus particles are released as the tumor cell dies and can then proceed to infect other tumor cells in the vicinity and continue the process of tumor kill. In addition to this direct oncolytic activity, the virus promotes an immune response against surviving tumor cells, which increases the antitumor effect of the therapy. The virus expresses a gene from another virus from the same overall virus family, human cytomegalovirus, which allows it to replicate better in the tumor cells than its first-generation predecessors. However, the virus has also been genetically engineered to minimize the production of any toxic effects for the patient receiving the therapy.

To improve this virus over its first-generation predecessors, modifications have focused on improving viral replication and spread within the tumor bed and on enhancing bystander damage to uninfected tumor cells. These effects cumulatively should result in converting an immunologically cold tumor to an immunologically hot tumor, which we anticipate will increase the efficacy of our IL13Rα2 directed CAR T for the treatment of GBM and high-grade astrocytoma.

The O'Neal Comprehensive Cancer Center at the UAB is the single clinical trial site for the Phase 1 trial of MB-108, and this site has initiated a Phase 1 trial that began enrolling patients in 2019 (ClinicalTrials.gov Identifier: NCT03657576). The primary objective of this study is to determine the safety and tolerability of a single dose of MB-108 administered via a stereotactic intracerebral injection and to determine the maximally tolerated dose ("MTD") of the oncolytic virus. Secondary objectives are to obtain preliminary information about the potential benefit of MB-108 in the treatment of patients with recurrent malignant gliomas, including relevant data on markers of efficacy, time to tumor progression and patient survival. As of April 2023, 9 patients had been enrolled in this study.

Recent Developments

Sale of Manufacturing Facility – Overview of Transaction

On May 18, 2023, we entered into an Asset Purchase Agreement (the "Original Asset Purchase Agreement") with uBriGene (Boston) Biosciences, Inc., a Delaware corporation ("uBriGene"), pursuant to which we agreed to sell our leasehold interest in our 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 (the "Transaction"). We and uBriGene subsequently entered into Amendment No. 1, dated as of June 29, 2023, and Amendment No. 2, dated as of July 28, 2023, to the Original Asset Purchase Agreement (the Original Asset Purchase Agreement, as so amended, the "Prior Asset Purchase Agreement").

On July 28, 2023 (the "Closing Date"), pursuant to the Prior Asset Purchase Agreement, we completed the sale of all of our assets that primarily relate to the manufacturing and production of cell and gene therapies at the Facility (such operations, the "Transferred Operations" and such assets, the "Transferred Assets") to uBriGene for upfront consideration of \$6 million cash (the "Base Amount"). The Transferred Assets that were transferred to uBriGene on the Closing Date include, but are not limited to: (i) our leases of equipment and other personal property and all other property, equipment, machinery, tools, supplies, inventory, fixtures and all other personal property primarily related to the Transferred Operations, (ii) the data, information, methods, quality management systems, and intellectual property primarily used for the purposes of the Transferred Operations, (iii) the records and filings, including customer and vendor lists, production data, standard operating procedures and business records relating to, used in or arising under the Transferred Operations and (iv) all transferrable business license, permits and approvals necessary to operate the Transferred Operations. Certain Transferred Assets, including our lease of the Facility and contracts that are primarily used in the Transferred Operations (the "Transferred Contracts") did not transfer to uBriGene on the Closing Date.

Voluntary Notice to U.S. Committee on Foreign Investment in the United States

uBriGene is an indirect, wholly owned subsidiary of UBrigene (Jiangsu) Biosciences Co., Ltd., a Chinese contract development and manufacturing organization. Under the Prior Asset Purchase Agreement, we and uBriGene agreed to use our reasonable best efforts to obtain clearance for the Transaction from the U.S. Committee on Foreign Investment in the United States ("CFIUS"), although obtaining such clearance was not a condition to closing the Transaction. In accordance with the Prior Asset Purchase Agreement, we and uBriGene previously submitted a voluntary joint notice to CFIUS on August 10, 2023.

Following an initial 45-day review period and subsequent 45-day investigation period, on November 13, 2023, CFIUS requested that we and uBriGene withdraw and re-file our joint voluntary notice to allow more time for review and discussion regarding the nature and extent of national security risk posed by the Transaction. Upon CFIUS's request, we and uBriGene submitted a request to withdraw and re-file our joint voluntary notice to CFIUS, and on November 13, 2023, CFIUS granted this request, accepted the joint voluntary notice and commenced a new 45-day review period on November 14, 2023. CFIUS's 45-day review ended on December 28, 2023. Since CFIUS had not concluded its review by December 28, 2023, the proceeding transitioned to a subsequent 45-day investigation period, which ended on February 12, 2024.

Following the 45-day review period and subsequent 45-day investigation period described above, on February 12, 2024, we and uBriGene requested permission to withdraw and re-file our joint voluntary notice to allow more time for review and discussion regarding the nature and extent of national security risk posed by the Transaction. Upon our joint request to withdraw and re-file their joint voluntary notice to CFIUS, on February 12, 2024, CFIUS granted this request, accepted the joint voluntary notice and commenced a new 45-day review period on February 13, 2024. CFIUS's new 45-day review ended on March 28, 2024. Because CFIUS had not yet concluded its action, the proceeding transitioned to a second 45-day phase as CFIUS further investigated the Transaction. On March 28, 2024, CFIUS advised us that its investigation would be completed no later than May 13, 2024.

On May 13, 2024, together with uBriGene and CFIUS, we executed a National Security Agreement (the "NSA"), pursuant to which we and uBriGene agreed to abandon the Transaction and all other transactions contemplated by the Asset Purchase Agreement and the agreements entered into in connection therewith. The execution of the NSA was the result of CFIUS' determination that such transactions posed a risk to the national security of the United States. We disagree with this position but did not feel a meaningful likelihood existed that the Transaction would be consummated in light of CFIUS' objections. The NSA imposes certain conditions on us and uBriGene and its affiliates. Most significantly, we agreed (i) not to effect the Transaction with uBriGene or any of its affiliates; and (ii) to appoint a point of contact representative with whom CFIUS and uBriGene's designated contact person may interact as needed. The NSA also obligates uBriGene to sell, or otherwise dispose of, the equipment assets purchased within 180 days after the execution of the NSA, with uBriGene able to eliminate some of its obligations under the NSA if it is able to sell the equipment assets purchased back to us within 45 days after the execution of the NSA (an "Expedited Divestment").

June 2024 Repurchase of Assets

On June 27, 2024 (the "Effective Date"), we entered into an Asset Purchase Agreement (the "Asset Purchase Agreement") with uBriGene, pursuant to which we agreed, subject to the terms and conditions set forth therein, to repurchase (the "Repurchase Transaction") the assets, properties and rights previously transferred by the Company to uBriGene under the Asset Purchase Agreement, excluding any inventory transferred under the Purchase Agreement that has been consumed or transferred to a third party by uBriGene since the closing of the Asset Purchase Agreement (collectively, the "Repurchased Assets"). For the avoidance of doubt, "Repurchased Assets" also includes all MBio Assets (as such term is defined in the NSA) that were previously sold, transferred, conveyed, assigned, delivered, or contributed by us or our affiliates to uBriGene or its affiliates, to the extent such MBio Assets have not been consumed or transferred to a third party by uBriGene since the closing of the Asset Purchase Agreement. The Repurchased Assets do not include inventory acquired by uBriGene after the closing of the Asset Purchase Agreement. We further agreed to assume all obligations, liabilities and commitments previously transferred by us to uBriGene under the Asset Purchase Agreement. The Repurchase Transaction was intended to constitute an Expedited Divestment by uBriGene pursuant to the NSA with CFIUS.

As consideration for the Repurchase Transaction, we agreed to pay to uBriGene a total purchase price (the "Purchase Price") of \$1,395,138, consisting of (i) an upfront payment of \$100,000 due within five (5) business days of the Effective Date and a (ii) subsequent amount of \$1,295,138 due on the date that is twelve (12) months after the Closing (the "Deferred Amount"). In the event that as of the original (or any extended) date on which the Deferred Amount is payable we have, as of the date of the public reporting of our then-most recent quarterly audited or unaudited financial statements, net assets below \$20 million, then we may, upon written notice to uBriGene, elect to delay our payment obligation of the Deferred Amount by an additional six (6) months, with no limit on the number of such extensions available to us. Notwithstanding the foregoing, if we have not paid the Deferred Amount in full as of the date that is 12 (twelve) months after closing of the Repurchase Transaction, any amounts that remain outstanding will accrue interest at a rate of 5% per annum beginning on the date that is 12 (twelve) months after closing and until the Deferred Amount is paid in full.

The Asset Purchase Agreement contains customary representations and warranties from both us and uBriGene with respect to each party. Additionally, we agreed to provide a purchase price allocation schedule to uBriGene within sixty (60) days of the Effective Date.

Pursuant to the terms of the Asset Purchase Agreement, we and uBriGene terminated the following agreements between us that were entered into in connection with the Asset Purchase Agreement: (i) the Manufacturing Services Agreement, dated July 28, 2023, and work orders entered into under such agreement, (ii) the Quality Services Agreement, dated July 28, 2023, (iii) the Subcontracting CDMO Agreement, dated July 28, 2023, and work orders entered into under such agreement, (iv) the Quality Services Agreement, dated July 28, 2023, and (v) the Transition Services Agreement.

Notification of Non-Compliance with Nasdaq Continued Listing Requirements

On March 13, 2024, we received a deficiency letter (the "Letter") from the Listing Qualifications Department (the "Staff") of The Nasdaq Stock Market LLC ("Nasdaq") notifying us that we were not in compliance with the minimum stockholders' equity requirement for continued listing on the Nasdaq Capital Market under Nasdaq Listing Rule 5550(b)(1). Nasdaq Listing Rule 5550(b)(1) requires companies listed on the Nasdaq Capital Market to maintain stockholders' equity of at least \$2,500,000 (the "Stockholders' Equity Requirement"). As of December 31, 2023, we reported stockholders' equity of \$123,000. The Letter further noted that as of its date, we did not have a market value of listed securities of \$35 million, or net income from continued operations of \$500,000 in the most recently completed fiscal year or in two of the last three most recently completed fiscal years, the alternative quantitative standards for continued listing on the Nasdaq Capital Market.

The Letter had no immediate effect on our continued listing on the Nasdaq Capital Market, subject to our compliance with the other continued listing requirements. In accordance with Nasdaq rules, we were provided 45 calendar days, or until April 29, 2024, to submit a plan to regain compliance (the "Compliance Plan"). We submitted our Compliance Plan on April 29, 2024, and the Staff granted our request for an extension of 180 calendar days through September 9, 2024, to regain compliance with the Stockholders' Equity Requirement.

On May 16, 2024, we received a notice (the "Second Letter") from the Staff of Nasdaq indicating that the bid price of our common stock had closed below \$1.00 per share for 31 consecutive business days and, as a result, we were not in compliance with Nasdaq Listing Rule 5550(a)(2), which sets forth the minimum bid price requirement for continued listing on the Nasdaq Capital Market. The Second Letter from Nasdaq had no immediate effect on the listing of our common stock on Nasdaq. Pursuant to Nasdaq Listing Rule 5810(c)(3)(A), we were afforded a 180-calendar day grace period, or until November 12, 2024, to regain compliance with the bid price requirement. Compliance can be achieved by evidencing a closing bid price of at

least \$1.00 per share for a minimum of ten consecutive business days (but generally not more than 20 consecutive business days) during the 180-calendar day grace period.

If we do not regain compliance with the bid price requirement by November 12, 2024, we may be eligible for an additional 180-calendar day compliance period so long as we satisfy the criteria for initial listing on Nasdaq and the continued listing requirement for market value of publicly held shares and we provide written notice to Nasdaq of our intention to cure the deficiency during the second compliance period by effecting a reverse stock split, if necessary. In the event we are not eligible for the second grace period, Nasdaq staff will provide written notice that our common stock is subject to delisting; however, we may request a hearing before the Nasdaq Hearings Panel (the "Panel"), which request, if timely made, would stay any further suspension or delisting action by the Staff pending the conclusion of the hearing process and expiration of any extension that may be granted by the Panel. There can be no assurance that we would be successful in our efforts to maintain the listing of our common stock on the Nasdaq Capital Market.

April 2024 Reduction in Work Force

On April 10, 2024, our board of directors approved a reduction of our workforce by approximately 81% of our employee base in order to reduce costs and preserve capital due to the fundraising environment and continued uncertainty regarding the CFIUS review of the sale of the Facility and the Transaction with uBriGene. The workforce reduction took place primarily in April 2024 and was completed in the second quarter of 2024. As a result of these actions, we incurred personnel-related restructuring charges of approximately \$0.2 million in connection with one-time employee termination cash expenditures, which were incurred in the second quarter of 2024. We and our board of directors continue to evaluate all strategic and other alternatives related to the business.

Due to limited resources, and as a result of the reduction in work force described above, we do not expect to initiate our pivotal Phase 2 single-arm clinical trial of MB-106 for the treatment of WM trial in 2024. Subject to available funds, we intend rely on third party service providers to conduct study and manufacturing services to advance our priority potential product candidates.

May 2024 Public Offering

On April 29, 2024, we commenced a best efforts public offering with an institutional investor (the "Investor") (the "May 2024 Offering") of an aggregate of (i) 1,160,000 shares of common stock, (ii) pre-funded warrants (the "May 2024 Pre-Funded Warrants") to purchase up to an aggregate of 15,717,638 shares of common stock (the "May 2024 Pre-Funded Warrant Shares"), (iii) Series A-1 warrants (the "Series A-1 Warrants") to purchase up to an aggregate of 16,877,638 shares of common stock (the "Series A-1 Warrant Shares"), (iv) Series A-2 warrants (the "Series A-2 Warrants") to purchase up to an aggregate of 16,877,638 shares of common stock (the "Series A-2 Warrant Shares"), and (v) Series A-3 warrants (the "Series A-3 Warrants," and together with the Series A-1 Warrants and Series A-2 Warrants, the "Warrants") to purchase up to an aggregate of 16,877,638 shares of common stock (the "Series A-3 Warrant Shares"). Each share of common stock or May 2024 Pre-Funded Warrant was sold together with one Series A-1 Warrant to purchase one share of common stock, one Series A-2 Warrant to purchase one share of common stock, and one Series A-3 Warrant to purchase one share of common stock. The public offering price for each share of common stock and accompanying Warrants was \$0.237, and the public offering price for each May 2024 Pre-Funded Warrant and accompanying Warrants was \$0.2369. The May 2024 Pre-Funded Warrants have an exercise price of \$0.0001 per share, were exercisable immediately and will expire when exercised in full. Each Warrant has an exercise price of \$0.237 per share, will be exercisable beginning on the effective date of stockholder approval of the issuance of the shares upon exercise of the Warrants (the "Warrant Stockholder Approval"). The Series A-1 Warrant will expire on the five-year anniversary of the Warrant Stockholder Approval. The Series A-2 Warrant will expire on the twenty-four-month anniversary of the Warrant Stockholder Approval. The Series A-3 Warrant will expire on the nine-month anniversary of the Warrant Stockholder Approval.

The net proceeds of the May 2024 Offering, after deducting the fees and expenses of the Placement Agent (as defined below), described in more detail below, and other offering expenses payable by us, but excluding the net proceeds, if any, from the exercise of the Warrants, was approximately \$3.3 million. The May 2024 Offering closed on May 2, 2024.

In connection with the May 2024 Offering, we also entered into a warrant amendment agreement (the "Warrant Amendment Agreement") with the Investor. Under the Warrant Amendment Agreement, we agreed to amend certain existing warrants to purchase up to 2,588,236 shares of common stock that were previously issued in October 2023 to the Investor, with an exercise price of \$1.58 per share (the "Existing Warrants"), in consideration for their purchase of the securities in the May 2024 Offering, as follows: (i) lower the exercise price of the Existing Warrants to \$0.237 per share, (ii) provide that the Existing Warrants, as amended, will not be exercisable until the receipt of Warrant Stockholder Approval for the exercisability of the Warrants in the May 2024 Offering, and (iii) extend the original expiration date of the Existing Warrants by five years following the receipt of such Warrant Stockholder Approval. The Warrant Amendment Agreement became effective on May 2, 2024.

May 2024 At the Market Offering Agreement

On May 31, 2024, we entered into an At the Market Offering Agreement (the "ATM Agreement") with H.C. Wainwright & Co. LLC (the "Manager") under which we may offer and sell, from time to time at our sole discretion, shares of our common stock (the "ATM Shares"), through or to the Manager. The offer and sale, if any, of ATM Shares by us under the Offering Agreement will be made pursuant to our registration statement on Form S-3 (File No. 333-279891) (the "Registration Statement") under the Securities Act, and the related prospectus included therein, filed with the SEC on May 31, 2024, and declared effective on June 12, 2024.

Under the ATM Agreement, the Manager may sell ATM Shares by any method permitted by law deemed to be an "at the market offering" as defined in Rule 415(a)(4) under the Securities Act. The Manager will use commercially reasonable efforts to sell the ATM Shares from time to time, based upon instructions from us (including any price, time or size limits or other customary parameters or conditions we may impose). We will pay the Manager a commission of 3.0% of the gross proceeds from the sales of ATM Shares sold through the Manager under the ATM Agreement and have provided the Manager with customary indemnification and contribution rights. We will also reimburse the Manager for certain expenses incurred in connection with the ATM Agreement. The Company and the Manager may each terminate the ATM Agreement at any time upon specified prior written notice.

The offering of ATM Shares pursuant to the ATM Agreement will terminate upon the earlier of (i) the sale of all ATM Shares subject to the ATM Agreement or (ii) the termination of the ATM Agreement in accordance with its terms.

Termination of 2018 At Market Issuance Sales Agreement

On May 31, 2024, we delivered notice to B. Riley Securities, Inc. (formerly B. Riley FBR, Inc.), Cantor Fitzgerald & Co., and the Manager (collectively, the "Agents") to terminate our At Market Issuance Sales Agreement, dated July 27, 2018, as amended on July 20, 2020, December 31, 2020, and April 14, 2023 (collectively, the "2018 Sales Agreement"), with the Agents. Termination of the 2018 Sales Agreement was effective June 5, 2024, pursuant to Section 13(b) of the 2018 Sales Agreement.

Pursuant to the terms of the 2018 Sales Agreement, we were previously able to issue and sell, from time to time through or to the Agents, shares

of our common stock, having an aggregate offering price of up to \$100,000,000, subject to the limitations of Instruction I.B.6 of Form S-3. As a result of the termination of the 2018 Sales Agreement, we will not issue or sell any additional shares of our common stock under the 2018 Sales Agreement.

June 2024 Registered Direct Offering and Concurrent Private Placement of Warrants

On June 19, 2024, we entered into a Securities Purchase Agreement (the "Purchase Agreement") with Armistice Capital Master Fund Ltd. ("Armistice"), an institutional accredited investor, pursuant to which we agreed to issue and sell, in a registered direct offering priced at-the-market under the rules of Nasdaq (the "Registered Direct Offering"), (i) 3,025,000 shares of common stock, at a price per Share of \$0.41 and (ii) pre-funded warrants (the "Pre-Funded Warrants") to purchase up to 3,105,000 shares of our common stock, at a price per Pre-Funded Warrant equal to \$0.4099, the price per share of common stock, 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 Direct 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 our outstanding common stock immediately following the consumption of the Registered Direct Offering. The Pre-Funded Warrants have an exercise price of \$0.0001 per share, became exercisable upon issuance and remain exercisable until exercised in full.

The Registered Direct Offering closed on June 21, 2024. We intend to use the net proceeds from the Registered Direct Offering for general corporate purposes and working capital requirements.

In a concurrent private placement, pursuant to the terms of the Purchase Agreement, we also agreed to issue and sell to Armistice unregistered warrants (the "Private Placement Warrants") to purchase up to 6,130,000 shares of common stock, at an offering price of \$0.41 per Private Placement Warrant to purchase one share of common stock (the "Private Placement" and, together with the Registered Direct Offering, the "Offerings") (which offering price was included in the purchase price per share of common stock or Pre-Funded Warrant). The Private Placement Warrants have an exercise price of \$0.41 per share (subject to customary adjustments as set forth in the Private Placement Warrants), were 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 June 18, 2024, between us and Wainwright (the "Engagement Letter"). Pursuant to the Engagement Letter, we issued to Wainwright (or its designees) warrants to purchase up to 367,800 shares of common stock (the "Wainwright Warrants" and, together with the Private Placement Warrants, the "2024 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 \$0.5125 per share (subject to customary adjustment as set forth in the Wainwright Warrants), representing 125% of the purchase price per share of common stock in the Registered Direct Offering.

Summary Risk Factors

Our business is subject to risks of which you should be aware before making an investment decision. You should carefully consider the risk factors described under the heading "*Risk Factors*," and in the other reports and documents that we have filed with the SEC.

Corporate Information

We are a majority-controlled subsidiary of Fortress Biotech, Inc. We were incorporated under the laws of the State of Delaware on March 13, 2015. 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.

Implications of Being a Smaller Reporting Company

We are a smaller reporting company as defined in the Securities Exchange Act of 1934, as amended (the "Exchange Act"). We may take advantage of certain of the scaled disclosures available to smaller reporting companies and will be able to take advantage of these scaled disclosures for so long as (i) the market value of our voting and non-voting common stock held by non-affiliates is less than \$250 million measured on the last business day of our second fiscal quarter or (ii) our annual revenue is less than \$100 million during the most recently completed fiscal year and the market value of our voting and non-voting common stock held by non-affiliates is less than \$700 million measured on the last business day of our second fiscal quarter. Specifically, as a smaller reporting company, we may choose to present only the two most recent fiscal years of audited financial statements in our Annual Reports on Form 10-K and have reduced disclosure obligations regarding executive compensation, and if we are a smaller reporting company with less than \$100 million in annual revenue, we would not be required to obtain an attestation report on internal control over financial reporting issued by our independent registered public accounting firm.

THE OFFERING

The Selling Stockholders identified in this prospectus are offering on a resale basis a total of 6,497,800 shares of common stock underlying the 2024 Warrants, as more fully described below.

Common Stock to be Offered by Selling Stockholders: Up to 6,497,800 shares of the Company's common stock

Shares of Common Stock Outstanding Prior to this Offering: 34,432,138 shares as of July 16, 2024

Shares of Common Stock Outstanding Assuming Exercise of All 2024 Warrants:⁽¹⁾ 40,929,938

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: An investment in our securities involves a high degree of risk and could result in a loss of your entire investment. Prior to making an investment decision, you should carefully consider all of the information in this prospectus and, in particular, you should evaluate the risk factors set forth under the caption "Risk Factors."

Nasdaq Capital Market Symbol: MBIO

(1) The number of shares of common stock to be outstanding after this offering is based on 34,432,138 shares of our common stock outstanding as of July 16, 2024, and excludes:

- 54,459,204 shares of common stock issuable upon exercise of outstanding warrants having a weighted-average exercise price of \$0.273 per share;
- 13,697 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;
- 56,359 shares of our common stock issuable upon conversion of the Class A common stock, at the holders' election;
- 16,666 shares of our common stock issuable upon conversion of the Class A Preferred Stock, at the holders' election;
- 394,393 shares of common stock reserved for issuance and available for future grant under our 2016 Incentive Plan; and
- 338,315 shares of our common stock reserved for future issuance under the Mustang Bio, Inc. 2019 Employee Stock Purchase Plan, as amended (the "ESPP"), plus any future increases, including annual automatic evergreen increases, in the number of shares of common stock reserved for issuance thereunder

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 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 pharmaceutical product candidates or any other products we may acquire or in-license;
- 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, if approved;
- expectations for the acceptance of our product candidates, if approved, by doctors, patients or payors;
- ability to compete against other companies and research institutions;
- ability to attract, hire and retain qualified personnel, including the impact of our recently announced reduction in work force;
- ability to secure adequate protection for our intellectual property;
- ability to attract and retain key personnel;
- ability to obtain reimbursement for our products, if approved;
- 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;
- stock price and the volatility of the equity markets;
- expected losses; and
- expectations for future capital requirements.

We have based these forward-looking statements largely on our current expectations, estimates, forecasts, and projections about future events and financial trends that we believe may affect our financial condition, results of operations, business strategy, and financial needs. In light of the significant uncertainties in these forward-looking statements, you should not rely upon forward-looking statements as predictions of future events. Although we believe that we have a reasonable basis for each forward-looking statement contained in this prospectus, we cannot guarantee that the future results, levels of activity, performance, or events and circumstances reflected in the forward-looking statements will be achieved or occur at all. You should refer to the section entitled "*Risk Factors*" in this prospectus and the risk factors set forth in the documents incorporated by reference in this prospectus for a discussion of important factors that may cause our actual results to differ materially from those expressed or implied by our forward-looking statements. Furthermore, if our forward-looking statements prove to be inaccurate, the inaccuracy may be material. Except as required by law, we undertake no obligation to publicly update any forward-looking statements, whether as a result of new information, future events or otherwise.

You should read this prospectus and the documents incorporated by reference in this prospectus completely and with the understanding that our actual future results may be materially different from what we expect. We qualify all of the forward-looking statements in this prospectus 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 some of these factors below and under the heading "Risk Factors" in our [Annual Report on Form 10-K for the year ended December 31, 2023](#), as supplemented by our [Quarterly Report on Form 10-Q for the quarter ended March 31, 2024](#), which is 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 the Company and this Offering

There is substantial doubt about our ability to continue as a going concern, which may hinder our ability to obtain future financing.

We are not yet generating revenue, have incurred substantial operating losses since our inception and expect to continue to incur significant operating losses for the foreseeable future as we execute on our product development plan and may never become profitable. As of March 31, 2024, we had cash and cash equivalents of \$1.3 million and an accumulated deficit of \$386.2 million, and, as of December 31, 2023, we had cash and cash equivalents of \$6.2 million and an accumulated deficit of \$381.0 million. We do not believe that our cash is sufficient for the next twelve months. As a result, there is substantial doubt about our ability to continue as a going concern. Our ability to continue as a going concern will depend on our ability to obtain additional funding, as to which no assurances can be given. If we are unable to obtain funds when needed or on acceptable terms, we may be required to curtail our current development programs, cut operating costs, forgo future development and other opportunities or even terminate our operations.

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. This reliance on third parties increases the risk that we will not have sufficient quantities of our product candidates or any future product candidate or such quantities at an acceptable cost, which could delay, prevent or impair our development or commercialization efforts.

Due to limited resources, and in light of our reduction in work force in April 2024, we may increase our reliance on third-party manufacturers or third-party collaborators for the manufacture of commercial supply of one or more product candidates for which our collaborators or we obtain marketing approval. We may be unable to establish any agreements with third-party manufacturers or to do so on acceptable terms. Even if we are able to establish agreements with third-party manufacturers, reliance on third-party manufacturers entails additional risks, including, but not necessarily limited to:

- reliance on the third party for regulatory compliance and quality assurance, while still being required by law to establish adequate oversight and control over products furnished by that third party;
- the possible breach of the manufacturing agreement by the third party;
- manufacturing delays if our third-party manufacturers are unable to obtain raw materials due to supply chain disruptions, give greater priority to the supply of other products over our product candidates or otherwise do not satisfactorily perform according to the terms of the agreement between us;
- the possible misappropriation of our proprietary information, including our trade secrets and know-how; and
- the possible termination or nonrenewal of the agreement by the third party at a time that is costly or inconvenient for us.

We rely on our third-party manufacturers to produce or purchase from third-party suppliers the materials and equipment necessary to produce our product candidates for our preclinical and clinical trials. Forces beyond our control could disrupt the global supply chain and impact our or our third-party manufacturers' ability to obtain raw materials or other products necessary to manufacture our product candidates. There are a limited number of suppliers for raw materials and equipment that we use (or that are used on our behalf) to manufacture our product candidates, and there may be a need to assess alternate suppliers to prevent a possible disruption of the manufacture of the materials and equipment necessary to produce our product candidates for our preclinical and clinical trials, and if approved, ultimately for commercial sale. We do not have any control over the process or timing of the acquisition of these raw materials or equipment by our third-party manufacturers. Any significant delay in the supply of a product candidate, or the raw material components thereof, for an ongoing preclinical or clinical trial due to the need to replace a third-party manufacturer could considerably delay completion of our preclinical or clinical trials, product testing and potential regulatory approval of our product candidates. If our manufacturers or we are unable to purchase these raw materials or equipment after regulatory approval has been obtained for our product candidates, the commercial launch of our product candidates would be delayed or there would be a shortage in supply, which would impair our ability to generate revenues from the sale of our product candidates.

The facilities used by contract manufacturers to potentially manufacture our product candidates must be approved by the FDA pursuant to inspections that will be conducted after we submit a New Drug Application (NDA) or BLA to the FDA. We are required by law to establish adequate oversight and control over raw materials, components and finished products furnished by our contract manufacturers, but we do not control the day-to-day manufacturing operations of, and are dependent on, the contract manufacturers for compliance with current Good Manufacturing Practices ("cGMP") regulations for manufacture of our product candidates. Third-party manufacturers may not be able to comply with the cGMP regulations or similar regulatory requirements outside the United States. Our failure, or the failure of our third-party manufacturers, to comply with applicable regulations could result in sanctions being imposed on us, including clinical holds, fines, injunctions, restrictions on imports and exports, civil penalties, delays, suspension or withdrawal of approvals, license revocation, seizures or recalls of product candidates or products, operating restrictions and criminal prosecutions, any of which could significantly and adversely affect supplies of our products.

One or more of the product candidates that we may develop may compete with other product candidates and products for access to manufacturing facilities. There are a limited number of manufacturers that operate under cGMP regulations and that might be capable of manufacturing for us. Any performance failure on the part of our existing or future manufacturers could delay clinical development or marketing approval. We do not currently have arrangements in place for redundant supply. If our current contract manufacturers cannot perform as agreed, we may be required to

replace such manufacturers. We may incur added costs and delays in identifying and qualifying any replacement manufacturers.

Future dependence upon others for the manufacture of our product candidates or products may adversely affect our future profit margins and our ability to commercialize any products that may receive marketing approval on a timely and competitive basis. We also expect to rely on third parties to distribute drug supplies for our clinical trials. Any performance failure on the part of our distributors could delay clinical development or marketing approval of our product candidates or commercialization of our products, if approved, producing additional losses and depriving us of potential product revenue.

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.

We do not intend to pay dividends on our common stock, so any returns will be limited to increases, if any, in our common stock's value. Your ability to achieve a return on your investment will depend on appreciation, if any, in the price of our common stock.

We currently anticipate that we will retain future earnings for the development, operation and expansion of our business and do not anticipate declaring or paying any cash dividends for the foreseeable future. Any future determination to declare dividends will be made at the discretion of our board of directors and will depend on, among other factors, our financial condition, operating results, capital requirements, general business conditions and other factors that our board of directors may deem relevant. Any return to stockholders will therefore be limited to the appreciation in the value of their stock, if any.

If we are unable to maintain compliance with all applicable continued listing requirements and standards of Nasdaq, our common stock may be delisted from Nasdaq.

On March 13, 2024, we received a Letter from the Staff of Nasdaq notifying us that we were not in compliance with the minimum stockholders' equity requirement for continued listing on the Nasdaq Capital Market under Nasdaq Listing Rule 5550(b)(1). Nasdaq Listing Rule 5550(b)(1) requires companies listed on the Nasdaq Capital Market to maintain the Stockholders' Equity Requirement. As of December 31, 2023, we reported stockholders' equity of \$123,000. The Letter further noted that as of its date, we did not have a market value of listed securities of \$35 million, or net income from continued operations of \$500,000 in the most recently completed fiscal year or in two of the last three most recently completed fiscal years, the alternative quantitative standards for continued listing on the Nasdaq Capital Market.

The Letter has no immediate effect on our continued listing on the Nasdaq Capital Market, subject to our compliance with the other continued listing requirements. In accordance with Nasdaq rules, we were provided 45 calendar days, or until April 29, 2024, to submit a plan to regain compliance (the "Compliance Plan"). We submitted our Compliance Plan on April 29, 2024 and the Staff granted our request for an extension of 180 calendar days through September 9, 2024 to regain compliance with the Stockholders' Equity Requirement.

On May 16, 2024, we received a notice (the "Second Letter") from the Staff of Nasdaq indicating that the bid price of our common stock had closed below \$1.00 per share for 31 consecutive business days and, as a result, we were not in compliance with Nasdaq Listing Rule 5550(a)(2), which sets forth the minimum bid price requirement for continued listing on the Nasdaq Capital Market. The Second Letter from Nasdaq had no immediate effect on the listing of our common stock on Nasdaq. Pursuant to Nasdaq Listing Rule 5810(c)(3)(A), we were afforded a 180-calendar day grace period, or until November 12, 2024, to regain compliance with the bid price requirement. Compliance can be achieved by evidencing a closing bid price of at least \$1.00 per share for a minimum of ten consecutive business days (but generally not more than 20 consecutive business days) during the 180-calendar day grace period.

If we do not regain compliance with the bid price requirement by November 12, 2024, we may be eligible for an additional 180-calendar day compliance period so long as we satisfy the criteria for initial listing on Nasdaq and the continued listing requirement for market value of publicly held shares and we provide written notice to Nasdaq of its intention to cure the deficiency during the second compliance period by effecting a reverse stock split, if necessary. In the event we are not eligible for the second grace period, Nasdaq staff will provide written notice that our common stock is subject to delisting; however, we may request a hearing before the Nasdaq Hearings Panel (the "Panel"), which request, if timely made, would stay any further suspension or delisting action by the Staff pending the conclusion of the hearing process and expiration of any extension that may be granted by the Panel. Although we intend to take all reasonable measures available to regain compliance under the Nasdaq Listing Rules and remain listed on the Nasdaq Capital Market, there can be no assurance that we would be successful in its efforts to maintain listing on the Nasdaq Capital Market.

If we are delisted from Nasdaq, there can be no assurance that our common stock will be eligible for trading on another stock exchange or quotation on an over-the-counter market. If we are not able to obtain a listing on another stock exchange or quotation service for our common stock, it may be extremely difficult or impossible for stockholders to sell their shares. Additionally, if we are delisted from Nasdaq, but obtain a substitute listing or quotation service for our common stock, it will likely be on a market with less liquidity and our common stock may therefore experience potentially more price volatility than it has historically experienced on Nasdaq. Stockholders may not be able to sell their shares of common stock on any such substitute

market in the quantities, at the times, or at the prices that could potentially be available on a more liquid trading market. As a result of these factors, if our common stock is delisted from Nasdaq, the value and liquidity of our common stock would likely be adversely affected. A delisting of our common stock from Nasdaq could also adversely affect our ability to obtain financing for our operations and/or result in a loss of confidence by investors, employees and/or business partners.

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 2024 Warrants. For additional information regarding the issuances of shares of common stock and 2024 Warrants, see "Prospectus Summary – June 2024 Registered Direct Offering and Concurrent Private Placement of Warrants" above. We are registering the resale of the shares of common stock issuable upon exercise of the 2024 Warrants in order to permit the Selling Stockholders to offer the shares for resale from time to time. H.C. Wainwright & Co. LLC has served as a financial advisor, sales agent, and placement agent for us in connection with several equity financings during the past three years. Except as set forth above, and except for the ownership of the shares of common stock and the 2024 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 2024 Warrants, as well as any other securities of ours owned by the Selling Stockholders, as of July 16, 2024, assuming exercise of the 2024 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 2024 Warrants, determined as if the outstanding 2024 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 2024 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 2024 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 2024 Warrants, a selling stockholder may not exercise the 2024 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 2024 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⁾⁽³⁾
Armistice Capital, LLC ⁽⁴⁾	59,351,150 ⁽⁵⁾	6,130,000	53,221,150	56.75%
Noam Rubenstein ⁽⁶⁾	353,152	115,857	237,295	0.68%
Craig Schwabe ⁽⁶⁾	39,418	12,413	27,005	0.08%
Michael Vasinkevich ⁽⁶⁾	748,949	235,852	513,097	1.46%
Charles Worthman ⁽⁶⁾	11,680	3,678	8,002	0.02%

- (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) Assumes the full exercise of the 2024 Warrants held by each respective Selling Stockholder, without regard to any beneficial ownership limitations on exercises.
- (4) The securities are directly 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. The warrants are subject to a beneficial ownership limitation of 4.99%, which limitation restricts the Selling Stockholder from exercising that portion of the warrants that would result in the Selling Stockholders and its affiliates owning, after exercise, a number of shares of common stock in excess of the beneficial ownership limitation. The address of the Master Fund is c/o Armistice Capital, LLC, 510 Madison Ave, 7th Floor, New York, NY 10022.
- (5) Consists of shares issuable upon exercise of Private Placement Warrants to purchase up to 6,130,000 shares of common stock with an exercise price of \$0.41 per share. The Private Placement Warrants are subject to a beneficial ownership of 4.99%, which limitation precludes the Master Fund from exercising any portion of such warrants to the extent that, following such exercise, the Master Fund's ownership of our common stock would exceed the 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, each selling stockholder had no agreement or understanding, directly or indirectly, with any person to distribute such securities.

PLAN OF DISTRIBUTION

The Selling Stockholders 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, the Selling 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.

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We agreed to keep this prospectus effective until the earlier of (i) the date on which the securities may be resold by the Selling 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).

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DESCRIPTION OF CAPITAL STOCK

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

Capital Stock

We are authorized to issue 200,000,000 shares of common stock, 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, \$0.0001 par value per share, of which 250,000 are designated as Class A Preferred Stock.

Common Stock

The holders of common stock are entitled to one vote per share held.

As of July 16, 2024, there were 34,432,138 shares of our common stock outstanding held by 71 stockholders of record.

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

Troutman Pepper Hamilton Sanders 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, 2023 and 2022, and for each of the years in the two-year period ended December 31, 2023, have been incorporated by reference herein in reliance upon the report of KPMG LLP, independent registered public accounting firm, incorporated by reference herein, and upon the authority of said firm as experts in accounting and auditing. The audit report covering the December 31, 2023, financial statements contains an explanatory paragraph that states the Company's expectation to generate operating losses and negative operating cash flows in the future, and the need for additional funding to support its planned operations raise substantial doubt about its 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" information from other documents that we file with it, which means that we can disclose important information to you by referring you to those documents. The information incorporated by reference is considered to be part of this prospectus. Information in this prospectus supersedes information incorporated by reference that we filed with the SEC prior to the date of this prospectus. We

incorporate by reference into this prospectus and the registration statement of which this prospectus is a part the information or documents listed below that we filed with the SEC (File No. 001-38191):

- [our Annual Report on Form 10-K for the year ended December 31, 2023, filed with the SEC on March 11, 2024;](#)
- [our Quarterly Report on Form 10-Q for the quarter ended March 31, 2024, filed with the SEC on May 15, 2024;](#)
- our Current Reports on Form 8-K filed with the SEC on [January 4, 2024](#); [January 25, 2024](#); [February 14, 2024](#); [March 15, 2024](#); [March 29, 2024](#); [April 12, 2024](#); [May 2, 2024](#); [May 21, 2024](#); [June 6, 2024](#); [June 24, 2024](#); and [July 3, 2024](#); and
- [the description of our common stock contained in our registration statement on Form 8-A filed with the SEC on August 21, 2017, including any amendments or reports filed for the purposes of updating this description.](#)

Notwithstanding the statements in the preceding paragraphs, no document, report or exhibit (or portion of any of the foregoing) or any other information that we have “furnished” to the SEC pursuant to the Exchange Act shall be incorporated by reference into this prospectus.

We also incorporate by reference into this prospectus all documents (other than current reports furnished under Item 2.02 or Item 7.01 of Form 8-K and exhibits filed on such form that are related to such items) that are filed by us with the SEC pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act (i) after the date of the initial filing of the registration statement of which this prospectus forms a part and prior to effectiveness of the registration statement, or (ii) after the date of this prospectus but prior to the termination of the offering. These documents include periodic reports, such as Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q and Current Reports on Form 8-K, as well as proxy statements on Schedule 14A.

We will provide to each person, including any beneficial owner, to whom a prospectus is delivered, without charge upon written or oral request, a copy of any or all of the documents that are incorporated by reference into this prospectus but not delivered with the prospectus, including exhibits that are specifically incorporated by reference into such documents. You should direct any requests for documents to Mustang Bio, Inc., 377 Plantation Street, Worcester, Massachusetts 01605, Attn: General Counsel, or by calling (781) 652-4500.

You also may access these filings on our website at www.mustangbio.com. We do not incorporate the information on our website into this prospectus or any supplement to this prospectus and you should not consider any information on, or that can be accessed through, our website as part of this prospectus or any supplement to this prospectus (other than those filings with the SEC that we specifically incorporate by reference into this prospectus or any supplement to this prospectus). You may also access these filings at the SEC’s website at www.sec.gov.

Any statement contained in a document incorporated or deemed to be incorporated by reference in this prospectus will be deemed modified, superseded or replaced for purposes of this prospectus to the extent that a statement contained in this prospectus modifies, supersedes or replaces such statement.



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	\$ 367.42
Accounting fees and expenses	\$ 25,000
Legal fees and expenses	\$ 100,000
Miscellaneous fees and expenses	\$ 4,632.58
Total expenses	\$ 130,000

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 January 1, 2021, 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.

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October 2023 Private Placement

On October 26, 2023, we entered into a Securities Purchase Agreement (the "October 2023 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 October 2023 Purchase Agreement, we agreed to issue and sell the warrants at an offering price of \$0.125 per warrant to purchase one share of common stock (the "October 2023 Private Placement Warrants"). The October 2023 Private Placement Warrants have an exercise price of \$1.58 per share (subject to adjustment as set forth in the October 2023 Private Placement Warrants), were exercisable immediately upon issuance and will expire five and one-half (5.5) years from the date on which the October 2023 Private Placement Warrants become exercisable. The October Private Placement 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 "October 2023 Offerings"). The gross proceeds to us from the private placement, before deducting placement agent fees and other estimated offering expenses payable by us, 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 us and Wainwright. Pursuant to the engagement letter, Wainwright was paid a cash fee equal to 7.0% of the gross proceeds received by us in the October 2023 Offerings, a management fee equal to 1.0% of the gross proceeds of the October 2023 Offering, \$75,000 for non-accountable expenses and a clearing fee of \$15,950 (the "October 2023 Engagement Letter"). In addition, under the terms of the October 2023 Engagement Letter, we issued to Wainwright (or its designees) warrants to purchase up to 155,294 shares of common stock (the "October 2023 Wainwright Warrants" and together with the October 2023 Private Placement Warrants, the "2023 Warrants"). The October 2023 Wainwright Warrants have substantially the same terms as the Warrants, except that the October 2023 Wainwright Warrants will expire five (5) years from the commencement of the sales of the October 2023 Offerings and have an exercise price of \$2.125 per share (subject to customary adjustment as set forth in the October 2023 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.

June 2024 Private Placement

On June 19, 2024, we entered into a Purchase Agreement with an institutional accredited investor, for the issuance and sale of Private Placement Warrants to purchase up to 6,130,000 shares of our common stock. Pursuant to the Purchase Agreement, we agreed to issue and sell the Private Placement Warrants at an offering price of \$0.41 per warrant to purchase one share of common stock. The Private Placement Warrants have an exercise price of \$0.41 per share (subject to adjustment as set forth in the Private Placement Warrants), were exercisable immediately upon issuance and will expire five and one-half (5.5) years from the date on which the Private Placement Warrants become exercisable. The Private Placement 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 June 21, 2024, concurrently with the Registered Direct Offering with the same institutional accredited investor that was registered under the Securities Act. The gross proceeds to us from the Private Placement, before deducting placement agent fees and other estimated offering expenses payable by us, were approximately \$2.51 million. Wainwright acted as the placement agent in connection with the Private Placement pursuant to an engagement agreement, between us and Wainwright. Wainwright was paid a cash fee equal to 7.0% of the gross proceeds received us in the Offerings, a management fee equal to 1.0% of the gross proceeds of the Offerings, \$75,000 for non-accountable expenses and a clearing fee of \$15,950. In addition, under the terms of the Engagement Letter, we issued to Wainwright (or its designees) Wainwright Warrants to purchase up to 367,800 shares of our common stock. The Wainwright Warrants have substantially the same terms as the Private Placement 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 \$0.5125 per share (subject to customary adjustment as set forth in the Wainwright Warrants). The 2024 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.

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Item 16. Exhibits and Financial Statement Schedules

The exhibits listed below are filed as part of this registration statement.

Exhibit No.	Description	Form	File Number	Date	Exhibit No.	Filed Herewith
<u>1.1</u>	<u>At Market Issuance Sales Agreement, dated July 27, 2018, between the Company, B. Riley FBR, Inc., Cantor Fitzgerald & Co., National Securities Corporation, and Oppenheimer & Co. Inc.</u>	<u>8-K</u>	<u>001-38191</u>	<u>July 27, 2018</u>	<u>1.1</u>	

1.2	Amendment No. 1 to At Market Issuance Sales Agreement, dated July 20, 2020, between the Company, B. Riley FBR, Inc., Cantor Fitzgerald & Co., National Securities Corporation and Oppenheimer & Co. Inc.	8-K	001-38191	July 24, 2020	1.2
1.3	Amendment No. 2 to At Market Issuance Sales Agreement, dated December 31, 2020, between the Company, B. Riley Securities, Inc., Cantor Fitzgerald & Co., National Securities Corporation, Oppenheimer & Co. Inc. and H.C. Wainwright & Co., LLC. (incorporated by reference to the Exhibit 1.1 of the Registrant's Current Report on Form 8-K (file No. 001-38191) filed with the SEC on December 31, 2020).	8-K	001-38191	December 31, 2020	1.1
1.4	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
1.5	At the Market Offering Agreement, dated May 31, 2024, by and between the Company and H.C. Wainwright & Co., LLC	8-K	001-38191	June 6, 2024	1.1
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 July 28, 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	Form of October Pre-funded Warrant	8-K	001-38191	October 30, 2023	4.1
4.6	Form of October Warrant	8-K	001-38191	October 30, 2023	4.2
4.7	Form of October Wainwright Warrant	8-K	001-38191	October 30, 2023	4.3
4.8	Form of May 2024 Pre-Funded Warrant	8-K	001-38191	May 2, 2024	4.1
4.9	Form of May 2024 Series A-1, A-2, and A-3 Warrant	8-K	001-38191	May 2, 2024	4.2
4.10	Form of May 2024 Placement Agent Warrant	8-K	001-38191	May 2, 2024	4.3
4.11	Form of June 2024 Pre-funded Warrant	8-K	001-38191	June 24, 2024	4.1
4.12	Form of June 2024 Warrant	8-K	001-38191	June 24, 2024	4.2
4.13	Form of June 2024 Wainwright Warrant	8-K	001-38191	June 24, 2024	4.3
5.1	Opinion of Troutman Pepper Hamilton Sanders LLP				
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

<u>10.6</u>	<u>Sponsored Research Agreement by and between Mustang Bio, Inc. and City of Hope, dated March 17, 2015</u>	<u>10-12G</u>	<u>000-5568</u>	<u>July 28, 2016</u>	<u>10.7</u>
<u>10.7</u>	<u>Agreement by and between Mustang Bio, Inc. and Chord Advisors, LLC, dated April 8, 2016</u>	<u>10-12G</u>	<u>000-5568</u>	<u>July 28, 2016</u>	<u>10.10</u>
<u>10.8</u>	<u>Board Advisory Services Agreement by and between Mustang Bio, Inc. and Caribe BioAdvisors, LLC</u>	<u>10-K</u>	<u>000-5568</u>	<u>March 31, 2017</u>	<u>10.11</u>
<u>10.9#</u>	<u>Exclusive License Agreement by and between Mustang Bio, Inc. and The Regents of the University of California, dated March 17, 2017</u>	<u>10-Q</u>	<u>000-5568</u>	<u>August 14, 2017</u>	<u>10.4</u>

<u>10.10#</u>	<u>Exclusive License Agreement (IV/ICV) by and between Mustang Bio, Inc. and City of Hope, dated February 17, 2017</u>	<u>10-Q</u>	<u>000-55668</u>	<u>August 14, 2017</u>	<u>10.5</u>
<u>10.11#</u>	<u>Amended and Restated Exclusive License Agreement (CD123) by and between Mustang Bio, Inc. and City of Hope, dated February 17, 2017</u>	<u>10-K</u>	<u>001-3891</u>	<u>March 31, 2017</u>	<u>10.14</u>
<u>10.12#</u>	<u>Amended and Restated Exclusive License Agreement (IL13Ra2) by and between Mustang Bio, Inc. and City of Hope, dated February 17, 2017</u>	<u>10-K</u>	<u>000-5568</u>	<u>March 31, 2017</u>	<u>10.15</u>
<u>10.13#</u>	<u>Amended and Restated Exclusive License Agreement (Spacer) by and between Mustang Bio, Inc. and City of Hope, dated February 17, 2017</u>	<u>10-K</u>	<u>000-5568</u>	<u>March 31, 2017</u>	<u>10.16</u>
<u>10.14†</u>	<u>Employment Agreement between Manuel Litchman and Mustang Bio, Inc., effective as of April 24, 2017</u>	<u>8-K</u>	<u>000-5568</u>	<u>April 24, 2017</u>	<u>10.1</u>
<u>10.15#</u>	<u>License Agreement (CSI) by and between Mustang Bio, Inc. and City of Hope, dated May 31, 2017</u>	<u>10-Q/A</u>	<u>001-38191</u>	<u>November 14, 2017</u>	<u>10.1</u>
<u>10.16#</u>	<u>License Agreement (PSCA) by and between Mustang Bio, Inc. and City of Hope, dated May 31, 2017</u>	<u>10-Q/A</u>	<u>001-38191</u>	<u>November 14, 2017</u>	<u>10.2</u>
<u>10.17#</u>	<u>License Agreement (HER2) by and between Mustang Bio, Inc. and City of Hope, dated May 31, 2017</u>	<u>10-Q/A</u>	<u>001-38191</u>	<u>November 14, 2017</u>	<u>10.3</u>
<u>10.18</u>	<u>Lease Agreement by and between Mustang Bio, Inc. and WCS - 377 Plantation Street, Inc., dated October 27, 2017</u>	<u>10-Q</u>	<u>001-3891</u>	<u>November 14, 2017</u>	<u>10.1</u>
<u>10.19</u>	<u>Sublease Agreement by and between Mustang Bio, Inc., and The Paul Reverse Life Insurance Company, dated June 14, 2022</u>	<u>10-K</u>	<u>001-3891</u>	<u>March 30, 2023</u>	<u>10.22</u>
<u>10.20</u>	<u>First Amendment to Sublease Agreement by and between Mustang Bio, Inc. and The Paul Revere Life Insurance Company, dated October 25, 2022</u>	<u>10-K</u>	<u>001-3891</u>	<u>March 30, 2023</u>	<u>10.23</u>
<u>10.21</u>	<u>Second Amendment to Sublease, dated April 27, 2023, between the Company and The Paul Revere Life Insurance Company</u>	<u>8-K</u>	<u>001-38191</u>	<u>July 20, 2023</u>	<u>10.2</u>
<u>10.22</u>	<u>Third Amendment to Sublease, dated June 15, 2023, between the Company and The Paul Revere Life Insurance Company</u>	<u>8-K</u>	<u>001-38191</u>	<u>July 20, 2023</u>	<u>10.3</u>
<u>10.23</u>	<u>Mustang Bio, Inc. 2016 Incentive Plan †</u>	<u>10-12G</u>	<u>000-5568</u>	<u>July 28, 2016</u>	<u>10.8</u>
<u>10.24</u>	<u>Mustang Bio, Inc. Non-Employee Directors Compensation Plan †</u>	<u>10-12G</u>	<u>000-5568</u>	<u>July 28, 2016</u>	<u>10.9</u>
<u>10.25</u>	<u>Amendment to Mustang Bio, Inc. 2016 Incentive Plan</u>	<u>DEF 14A</u>	<u>001-3891</u>	<u>April 30, 2018</u>	<u>N/A</u>
<u>10.26</u>	<u>Second Amendment to the Mustang Bio, Inc. 2016 Equity Incentive Plan, dated June 17, 2021 †</u>	<u>8-K</u>	<u>001-3891</u>	<u>June 22, 2021</u>	<u>10.1</u>
<u>10.27</u>	<u>Third Amendment to Mustang Bio, Inc. 2016 Equity Incentive Plan, dated June 21, 2022 †</u>	<u>8-K</u>	<u>001-3891</u>	<u>June 24, 2022</u>	<u>10.1</u>
<u>10.28</u>	<u>Form of Option Agreement under the Mustang Bio, Inc. 2016 Incentive Plan</u>	<u>10-K</u>	<u>001-3891</u>	<u>March 11, 2024</u>	<u>10.28</u>

<u>10.29</u>	<u>Form of Restricted Stock Unit Agreement under the Mustang Bio, Inc. 2016 Incentive Plan</u>	<u>10-K</u>	<u>001- 3891</u>	<u>March 11, 2024</u>	<u>10.29</u>
<u>10.30</u>	<u>Form of Director Stock Award Agreement under the Mustang Bio, Inc. Non-Employee Directors Compensation Plan</u>	<u>10-K</u>	<u>001- 3891</u>	<u>March 11, 2024</u>	<u>10.30</u>
<u>10.31</u>	<u>Mustang Bio, Inc. 2019 Employee Stock Purchase Plan †</u>	<u>10-Q</u>	<u>001- 3891</u>	<u>August 9, 2019</u>	<u>10.1</u>
<u>10.32</u>	<u>Amendment to the Mustang Bio, Inc. 2019 Employee Stock Purchase Plan, dated June 17, 2021 †</u>	<u>8-K</u>	<u>001-3891</u>	<u>June 22, 2021</u>	<u>10.2</u>
<u>10.33</u>	<u>Amendment No. 2 to the Mustang Bio, Inc. 2019 Employee Stock Purchase Plan, dated June 21, 2023 †</u>	<u>8-K</u>	<u>001- 3891</u>	<u>June 21, 2023</u>	<u>10.1</u>
<u>10.34</u>	<u>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</u>	<u>8-K</u>	<u>001-38191</u>	<u>March 8, 2022</u>	<u>99.1</u>
<u>10.35</u>	<u>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</u>	<u>8-K</u>	<u>001-38191</u>	<u>December 13, 2022</u>	<u>10.1</u>
<u>10.36</u>	<u>Consulting Agreement by and between Mustang Bio, Inc. and Danforth Advisors, LLC dated March 17, 2022</u>	<u>8-K</u>	<u>001-38191</u>	<u>April 22, 2022</u>	<u>99.1</u>
<u>10.37</u>	<u>Manufacturing Services Agreement, dated July 28, 2023, between the Company and uBriGene (Boston) Biosciences, Inc.</u>	<u>8-K</u>	<u>001-38191</u>	<u>July 31, 2023</u>	<u>10.1</u>

10.38	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	
10.39	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	
10.40	Form of Securities Purchase Agreement, dated April 29, 2024, by and between the Company and the purchaser party thereto	8-K	001-38191	May 2, 2024	10.1	
10.41	Warrant Agreement Amendment, dated April 29, 2024, by and between the Company and the holder thereto	8-K	001-38191	May 2, 2024	10.2	
10.42	Form of Securities Purchase Agreement, dated June 19, 2024, by and between the Company and the purchaser party thereto	8-K	001-38191	June 24, 2024	10.1	
10.43#	Asset Purchase Agreement, dated June 27, 2024, by and between the Company and uBriGene (Boston) Biosciences, Inc.	8-K	001-38191	July 3, 2024	10.1	
23.1	Consent of Independent Registered Public Accounting Firm, KPMG LLP					X
23.2	Consent of Troutman Pepper Hamilton Sanders LLP (included in Exhibit 5.1)					X
24.1	Power of Attorney					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 July 19, 2024.

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. and James Murphy, 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
<u>/s/ Manuel Litchman, M.D.</u> Manuel Litchman, M.D.	President, Chief Executive Officer and Director (Principal Executive Officer)	July 19, 2024
<u>/s/ James Murphy</u> James Murphy	Interim Chief Financial Officer (Principal Financial and Accounting Officer)	July 19, 2024
<u>/s/ Michael S. Weiss</u> Michael S. Weiss	Chairman of the Board of Directors and Executive Chairman	July 19, 2024
<u>/s/ Adam Chill</u> Adam Chill	Director	July 19, 2024
<u>/s/ Neil Herskowitz</u> Neil Herskowitz	Director	July 19, 2024
<u>/s/ Lindsay A. Rosenwald, M.D.</u> Lindsay A. Rosenwald, M.D.	Director	July 19, 2024
<u>/s/ Michael Zelefsky, M.D.</u> Michael Zelefsky, M.D.	Director	July 19, 2024

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

troutman.com



July 19, 2024

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 (the "**Registration Statement**") being filed by the Company on the date of this opinion letter with the Securities and Exchange Commission (the "**Commission**") under the Securities Act of 1933, as amended (the "**Securities Act**"). The Registration Statement relates to the registration of the offer and resale by certain selling stockholders of the Company of up to 6,497,800 shares of the Company's Common Stock (the "**Common Stock**"), par value \$0.0001 per share (the "**Shares**"), which consists of (a) up to an aggregate of 6,130,000 shares of Common Stock that are issuable upon exercise of unregistered warrants (the "**PIPE Warrants**") purchased pursuant to the Securities Purchase Agreement, dated June 19, 2024, by and between the Company and the investor signatory thereto (the "**Purchase Agreement**"), and (b) up to 367,800 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 June 18, 2024.

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 Shares are described in the Registration Statement. Capitalized terms used and not defined herein shall have the meanings assigned to them in the Registration Statement.

As such counsel, we have examined such matters of fact and questions of law as we have considered appropriate for purposes of this opinion letter. With your consent, we have relied upon certificates and other assurances of officers of the Company and others as to factual matters without having independently verified such factual matters. In our examination of the aforesaid documents, we have assumed the genuineness of all signatures, the legal capacity of all natural persons, the accuracy and completeness of all documents submitted to us, the authenticity of all original documents, and the conformity to authentic original documents of all documents submitted to us as copies (including pdfs). We are opining herein as to the General Corporation Law of the State of Delaware, and we express no opinion with respect to any other laws.

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.



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(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 Shares 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.



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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 Shares have been duly authorized and, when issued and delivered upon the valid exercise of the Warrants against payment therefor in accordance with the terms of the Warrants, will be validly issued, fully paid and non-assessable.

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.

This opinion letter is for your benefit in connection with the Registration Statement and may be relied upon by you and by persons entitled to rely upon it pursuant to the applicable provisions of the Securities Act. We consent to your filing this opinion letter as an exhibit to the Registration Statement and to the reference to our firm in the Registration Statement under the heading "Legal Matters." In giving such consent, we do not thereby admit that we are in the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations of the Commission thereunder.

Very truly yours,

/s/ Troutman Pepper Hamilton Sanders LLP

TROUTMAN PEPPER HAMILTON SANDERS LLP



KPMG LLP
Two Financial Center
60 South Street
Boston, MA 02111

Consent of Independent Registered Public Accounting Firm

We consent to the use of our report dated March 11, 2024, 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.

KPMG LLP

Boston, Massachusetts
July 19, 2024

KPMG LLP, a Delaware limited liability partnership and a member firm of the KPMG global organization of independent member firms affiliated with KPMG International Limited, a private English company limited by guarantee.

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)	6,497,800 ⁽³⁾	\$ 0.3831 ⁽²⁾	<u>\$2,489,307.18</u>	<u>\$0.00014760</u>	<u>\$ 367.42</u>
Total Offering Amounts					<u>\$2,489,307.18</u>		<u>\$ 367.42</u>
Total Fee Offsets							<u>—</u>
Net Fee Due							<u><u>\$ 367.42</u></u>

(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 on July 17, 2024.

(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, stock dividends or similar transactions.

(3) Represents 6,497,800 shares of common stock issuable upon the exercise of common stock purchase warrants to purchase common stock issued to certain selling stockholders on June 21, 2024.