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

FORM S-3
REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933

AILERON THERAPEUTICS, INC.
(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

13-4196017
(I.R.S. Employer
Identification No.)

738 Main Street #398
Waltham, MA 02451
(617) 995-0900

(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

Manuel C. Alves-Aivado, M.D., Ph.D.
Chief Executive Officer
738 Main Street #398
Waltham, MA 02451
(617) 995-0900

(Name, address, including zip code, and telephone number, including area code, of agent for service)

Copies to:

Stuart M. Falber
Craig Hilts
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60 State Street
Boston, Massachusetts 02109
Telephone: (617) 526-6000

Approximate date of commencement of proposed sale to the public: From time to time after this registration statement becomes effective.

If the only securities being registered on this Form are being offered pursuant to dividend or interest reinvestment plans, please check the following box.

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, other than securities offered only in connection with dividend or interest reinvestment plans, check the following box.

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

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

If this Form is a registration statement pursuant to General Instruction I.D. or a post-effective amendment thereto that shall become effective upon filing with the Commission pursuant to Rule 462(e) under the Securities Act, check the following box.

If this Form is a post-effective amendment to a registration statement filed pursuant to General Instruction I.D. filed to register additional securities or additional classes of securities pursuant to Rule 413(b) under the Securities Act, check the following box.

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

Large accelerated filer

Accelerated filer

Non-accelerated filer

Smaller reporting company

Emerging growth company

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

The Registrant hereby amends this registration statement on such date or dates as may be necessary to delay its effective date until the registrant shall file a further amendment which specifically states that the registration statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933, as amended, or until the registration statement shall become effective on such date as the Commission, acting pursuant to said Section 8(a), may determine.

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The information in this prospectus is not complete and may be changed. The selling stockholders named in this prospectus may not sell these securities until the registration statement filed with the Securities and Exchange Commission is effective. This prospectus is not an offer to sell these securities and the selling stockholders named in this prospectus are not soliciting offers to buy these securities in any state or other jurisdiction where the offer or sale is not permitted.

Subject to Completion, dated January 29, 2024

PROSPECTUS

7,060,500 SHARES



COMMON STOCK

This prospectus relates to the resale from time to time of up to 7,060,500 shares of common stock, par value \$0.001 per share, of Aileron Therapeutics, Inc. by the selling stockholders listed on page 11, including their transferees, pledgees or donees or their respective successors, which consists of (i) 4,707,000 shares of common stock issuable upon the conversion of our Series X Non-Voting Convertible Preferred Stock, par value \$0.001 per share (the "Series X Preferred Stock"), issued to the selling stockholders in a private placement transaction and (ii) 2,353,500 shares of common stock underlying warrants issuable upon the exercise of warrants issued to the selling stockholders in a private placement transaction.

We have agreed to pay all expenses of the registration of the shares pursuant to a registration rights agreement entered into with the selling stockholders. The selling stockholders will pay all underwriting discounts and selling commissions, if any and related legal expenses incurred by the selling stockholders for the sale of shares of our common stock.

The selling stockholders identified in this prospectus, or their respective transferees, pledgees, donees or other successors-in-interest, may sell the shares on any national securities exchange or quotation service on which the securities may be listed or quoted at the time of sale, in the over-the-counter market or in transactions otherwise than on these exchanges or systems or in the over-the-counter market and in one or more transactions at fixed prices, at prevailing market prices at the time of the sale, at varying prices determined at the time of sale, or at negotiated prices. For additional information on the methods of sale that may be used by the selling stockholders, see the section entitled "Plan of Distribution" on page 20. For a list of the selling stockholders, see the section entitled "Selling Stockholders" on page 9.

We may amend or supplement this prospectus from time to time by filing amendments or supplements as required. You should read the entire prospectus and any amendments or supplements carefully before you make your investment decision.

Our common stock is traded on the Nasdaq Capital Market under the symbol "ALRN." On January 26, 2024, the closing sale price of our common stock on the Nasdaq Capital Market was \$5.04 per share. You are urged to obtain current market quotations for our common stock.

Our business and investing in our common stock involve significant risk. See "[Risk Factors](#)" on page 5 of this prospectus and in the documents incorporated by reference in this prospectus, for a discussion of the factors you should carefully consider before deciding to purchase these securities.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or passed upon the adequacy or accuracy 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

You should rely only on the information contained or incorporated by reference in this prospectus. We have not and the selling stockholders have not authorized any other person to provide you with different information. If anyone provides you with different or inconsistent information, you should not rely on it. This prospectus may only be used where it is legal to offer and sell shares of our common stock. If it is against the law in any jurisdiction to make an offer to sell these shares, or to solicit an offer from someone to buy these shares, then this prospectus does not apply to any person in that jurisdiction, and no offer or solicitation is made by this prospectus to any such person. You should assume that the information appearing in this prospectus is accurate only as of the date on the front cover of this prospectus, regardless of the time of delivery of this prospectus or of any sale of common stock. Our business, financial condition, results of operations and prospects may have changed since such date.

Unless the context otherwise indicates, references in this prospectus to “we,” “our” and “us” refer, collectively, to Aileron Therapeutics, Inc., a Delaware corporation, and its consolidated subsidiaries.

PROSPECTUS SUMMARY

This summary highlights selected information contained elsewhere in this prospectus and in the documents we incorporate by reference. This summary does not contain all of the information you should consider before making an investment decision. You should read this entire prospectus carefully, especially the risks of investing in our common stock discussed under “Risk Factors” beginning on page 5 of this prospectus, along with our consolidated financial statements and notes to those consolidated financial statements and the other information incorporated by reference in this prospectus.

Aileron Therapeutics, Inc.

We are a clinical stage biopharmaceutical company focused on developing novel therapies for the treatment of orphan pulmonary and fibrosis indications with no approved or limited effective treatments. We currently have two product candidates in clinical development, LTI-03 and LTI-01, and multiple candidates in preclinical development focused on fibrosis indications.

Corporate Information

We were incorporated under the laws of the State of Delaware on August 6, 2001 under the name Renegade Therapeutics, Inc. We changed our name to Aileron Therapeutics, Inc. on February 5, 2007. On October 31, 2023, we acquired Lung pursuant to the Merger Agreement (as defined below), after which time Lung became a wholly owned subsidiary of us. Our principal executive office is located at 738 Main Street #398, Waltham, MA 02451, and our telephone number is (617) 995-0900. Our website address is www.aileronrx.com. The information contained on, or that can be accessed through, our website is not a part of this prospectus. We have included our website address in this prospectus solely as an inactive textual reference.

Unless the context otherwise indicates, references in this prospectus to “Aileron,” “we,” “our,” “us” and “the Company” refer, collectively, to Aileron Therapeutics, Inc. and our consolidated subsidiaries.

Merger and Financing

In October 2023, we acquired Lung Therapeutics, Inc., a Texas corporation (“Lung”), pursuant to an Agreement and Plan of Merger (the “Merger Agreement”) by and among us, AT Merger Sub I, Inc., a Delaware corporation and our wholly owned subsidiary (“First Merger Sub”), AT Merger Sub II, LLC, a Delaware limited liability company and our wholly owned subsidiary (“Second Merger Sub”), and Lung. Pursuant to the Merger Agreement, First Merger Sub merged with and into Lung, pursuant to which Lung was the surviving entity and became a wholly owned subsidiary of Aileron (the “First Merger”). Immediately following the First Merger, Lung merged with and into Second Merger Sub, pursuant to which Second Merger Sub was the surviving entity (the “Second Merger” and, together with the First Merger, the “Merger”). Under the terms of the Merger Agreement, at the closing of the Merger, we issued to the Lung stockholders 344,345 shares of common stock, and 19,903 shares of newly designated Series X Preferred Stock (as described below). In addition, we assumed outstanding Lung stock options, which became options for common stock (the “Assumed Options”), and assumed warrants exercisable for Lung common stock, which each became a warrant to purchase shares of common stock (the “Assumed Warrants”).

Immediately following the closing of the Merger, in October 2023, we entered into a Stock and Warrant Purchase Agreement (the “Purchase Agreement”) with the selling stockholders, consisting of a group of accredited investors, led by Bios Partners, the majority shareholder of Lung prior to the closing of the Merger, and including Nantahala Capital, as well as additional undisclosed investors. Pursuant to the Purchase Agreement, we issued and sold (i) an aggregate of approximately 4,707 shares of Series X Preferred Stock, and (ii) warrants (the “Warrants”) to purchase up to an aggregate of 2,353,500 shares of common stock, for an aggregate purchase price of approximately \$18.4 million, which included the conversion of certain convertible promissory notes in the aggregate principal amount of approximately \$1.6 million issued by Lung to Bios Partners prior to the Merger at a 10% discount on the per share price of the Series X Preferred Stock (the “Financing”). The closing of the issuance and sale of these securities was consummated on November 2, 2023 (the “Financing Closing Date”).

For a detailed description of the transactions contemplated by the Merger Agreement and the Purchase Agreement with the selling stockholders and the securities issued pursuant thereto, see the section entitled “Selling Stockholders” in this prospectus. We filed the registration statement on Form S-3, of which this prospectus forms a part, to fulfill our contractual obligations under the Registration Rights Agreement (as defined below) to provide for the resale by the selling stockholders of the shares of common stock offered hereby.

Implications of Being a Smaller Reporting Company

We are a “smaller reporting company,” meaning that the market value of our stock held by non-affiliates is less than \$700 million and our annual revenue was less than \$100 million during our most recently completed fiscal year. We may continue to be a smaller reporting company if either (i) the market value of our stock held by non-affiliates is less than \$250 million or (ii) our annual revenue was less than \$100 million during the most recently completed fiscal year and the market value of our stock held by non-affiliates is less than \$700 million. We may rely on exemptions from certain disclosure requirements that are available to smaller reporting companies. For so long as we remain a smaller reporting company, we are permitted and intend to rely on exemptions from certain disclosure and other requirements that are applicable to other public companies that are not smaller reporting companies.

THE OFFERING

Common stock offered by selling stockholders	7,060,500 shares, consisting of 4,707,000 shares of common stock issuable upon conversion of the Series X Preferred Stock issued to the selling stockholders in the Financing and 2,353,500 shares of common stock issuable upon exercise of the Warrants issued to the selling stockholders in the Financing.
Use of proceeds	We will not receive any proceeds from the sale of shares in this offering.
Risk factors	You should read the “Risk Factors” section included or incorporated by reference in this prospectus for a discussion of factors to consider carefully before deciding to invest in shares of our common stock.
Nasdaq Capital Market symbol	“ALRN”

RISK FACTORS

Investing in our common stock involves a high degree of risk. You should carefully consider the risks and uncertainties described in this prospectus, including the risk factors set forth in our most recent Annual Report on Form 10-K and other filings we make with the Securities and Exchange Commission (the “SEC”) from time to time, which are incorporated by reference herein, before making an investment decision pursuant to this prospectus.

Our business, financial condition and results of operations could be materially and adversely affected by any or all of these risks or by additional risks and uncertainties not presently known to us or that we currently deem immaterial that may adversely affect us in the future.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS AND INDUSTRY DATA

This prospectus contains forward-looking statements that involve substantial risks and uncertainties. All statements, other than statements of historical facts, contained in this prospectus, including statements regarding our strategy, future operations, future financial position, future revenue, projected costs, prospects, plans and objectives of management and expected market growth are forward-looking statements. The words “anticipate,” “believe,” “continue,” “could,” “estimate,” “expect,” “intend,” “may,” “plan,” “potential,” “predict,” “project,” “should,” “target,” “would” and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words.

These forward-looking statements include, among other things, statements about:

- our plans to develop and commercialize LTI-03 and LTI-01, including the potential benefits thereof;
- our unproven approach to drug research and development in the area of fibrotic diseases, with a focus on Caveolin-1-related peptides, and our ability to develop marketable products;
- our ongoing and future clinical trials for LTI-03 and LTI-01, whether conducted by us or by any future collaborators, including our ability to enroll patients in our clinical trials, the timing of initiation of these trials and of the anticipated results;
- the possibility that we may be adversely affected by economic, business, and/or competitive factors, including risks inherent in pharmaceutical research and development, such as: adverse results in our drug discovery, preclinical and clinical development activities, the risk that the results of our preclinical studies and early clinical trials may not be replicated in later clinical trials, and the risk that any of our clinical trials may not commence, continue or be completed on time, or at all;
- our ability to recognize the anticipated benefits of the Merger;
- the outcome of any legal proceedings that may be instituted against us following the Merger;
- our expectations regarding our ability to fund our operating expenses, our planned activities, and capital expenditure requirements with our cash, cash equivalents and investments;
- our estimates regarding expenses, future revenue, capital requirements and needs for additional financing;
- the timing of and our ability to obtain and maintain marketing approvals for LTI-03 and LTI-01;
- the rate and degree of market acceptance and clinical utility of any products for which we receive marketing approval;
- our commercialization, marketing and manufacturing capabilities and strategy;
- our intellectual property position and strategy, and our ability to obtain, maintain and enforce intellectual property rights for our platform and development candidates;
- our ability to identify additional product candidates with significant commercial potential;
- our plans to enter into collaborations for the development and commercialization of LTI-03, LTI-01 and any additional product candidates;
- our reliance on third-party manufacturing and supply vendors;
- potential benefits of any future collaboration;
- developments relating to our competitors and our industry;
- the impact of government laws and regulations;
- the impact of holders of our Series X Preferred Stock requiring us to settle any conversion demand in cash in the event we are unable to obtain stockholder approval for the conversion of our Series X Preferred Stock;
- the impact of affiliated stockholders choosing to act together; and
- our ability to maintain our listing on the Nasdaq Capital Market.

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We may not actually achieve the plans, intentions or expectations disclosed in our forward-looking statements, and you should not place undue reliance on our forward-looking statements. Actual results or events could differ materially from the plans, intentions and expectations disclosed in the forward-looking statements we make. We have included important factors in the cautionary statements included, or incorporated by reference, in this prospectus, particularly in the “Risk Factors” section, that could cause actual results or events to differ materially from the forward-looking statements that we make. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, collaborations, joint ventures or investments that we may make or enter into.

You should read this prospectus, the documents incorporated by reference in this prospectus and the documents we have filed as exhibits to the registration statement of which this prospectus is a part completely and with the understanding that our actual future results may be materially different from what we expect. We do not assume any obligation to update any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law.

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

This prospectus includes or incorporates by reference statistical and other industry and market data that we obtained from industry publications and research, surveys and studies conducted by third parties. Industry publications and third-party research, surveys and studies generally indicate that their information has been obtained from sources believed to be reliable, although they do not guarantee the accuracy or completeness of such information.

USE OF PROCEEDS

We are filing the registration statement of which this prospectus is a part to permit holders of the shares of our common stock described in the section entitled "Selling Stockholders" to resell such shares. We are not selling any securities under this prospectus and we will not receive any proceeds from the sale of shares by the selling stockholders.

The selling stockholders will pay all underwriting discounts and commissions, if any and related legal expenses incurred by the selling stockholders in disposing of the shares. We will pay all other expenses incurred in effecting the registration of the shares covered by this prospectus, including, without limitation, all registration and filing fees, printing fees, Nasdaq listing fees and fees and expenses of our counsel and our accountants.

SELLING STOCKHOLDERS

This prospectus covers the resale or other disposition from time to time by the selling stockholders identified in the table below of up to an aggregate of 7,060,500 shares of our common stock.

Merger Agreement

On October 31, 2023, we completed our acquisition of Lung in accordance with the Merger Agreement, pursuant to which we issued to the stockholders of Lung 344,345 shares of common stock and 19,903 shares of Series X Preferred Stock that are convertible into an aggregate of 19,903,000 shares of common stock in accordance with the terms of the Certificate of Designation (as defined below) and subject to stockholder approval as described below. In addition, we reserved for issuance 1,775,909 shares of common stock underlying the Assumed Options and 726,437 shares of common stock underlying the Assumed Warrants. We did not issue any shares of common stock or Series X Preferred Stock to the selling stockholders in the Merger, and no selling stockholder holds any Assumed Warrants.

Securities Purchase Agreement

Immediately following the closing of the Merger, on October 31, 2023, we entered into the Purchase Agreement with the selling stockholders pursuant to which we issued and sold (i) an aggregate of approximately 4,707 shares of Series X Preferred Stock that are convertible into an aggregate of 4,707,000 shares of common stock in accordance with the terms of the Certificate of Designation and subject to stockholder approval, and (ii) the Warrants to purchase up to an aggregate of 2,353,500 shares of common stock, for an aggregate purchase price of approximately \$18.4 million, which includes the conversion of certain convertible promissory notes in the aggregate principal amount of approximately \$1.6 million issued by Lung to Bio Partners prior to the Merger at a 10% discount to the per share price of the Series X Preferred Stock. The closing of the issuance and sale of these securities was consummated on November 2, 2023. The Warrants are exercisable any time after the later of May 2, 2024 and the date stockholder approval for Conversion Proposal (as defined below) is obtained and on or prior to May 2, 2027.

The exercise price of the Warrants is \$4.89 per share, subject to certain price and share adjustments, including for stock splits, stock dividends, recapitalizations, subdivisions, combinations, reclassifications, noncash distributions and cash dividends. The Warrants issued in the Financing provide that we will not effect the exercise of any portion of any Warrant, and a holder will not have the right to exercise any portion of any Warrant, to the extent that after giving effect to such exercise, the holder (together with its affiliates and any other persons acting as a group together with the holder or any of its affiliates), would beneficially own in excess of a percentage elected by the holder up to 19.99% of the number of shares of common stock outstanding immediately after giving effect to such exercise, as such percentage ownership is determined in accordance with the terms of the Warrants (the "Warrant Beneficial Ownership Limitation"); provided, however, that any holder may, upon written notice to us, increase or decrease such percentage to any other percentage not in excess of 19.99%; provided, further, that any increase or decrease in such percentage will not be effective until 61 days after such notice is delivered to us.

Series X Preferred Stock

Subject to stockholder approval of the Conversion Proposal, each share of Series X Preferred Stock is convertible into 1,000 shares of common stock. Pursuant to the Merger Agreement, we have agreed to hold a stockholders meeting to submit the following matters to our stockholders for their consideration: (i) the approval of the conversion of the Series X Preferred Stock issued pursuant to the Merger Agreement and the Purchase Agreement into shares of common stock in accordance with Nasdaq Listing Rule 5635(a) (the "Conversion Proposal"), and (ii) if deemed necessary or appropriate by us or as otherwise required by law or contract, the approval of an amendment to our certificate of incorporation to authorize sufficient shares of common stock for the conversion of the Series X Preferred Stock issued pursuant to the Merger Agreement and the Purchase Agreement and/or to effectuate a reverse stock split. We filed a preliminary proxy statement for our 2023 annual meeting of stockholders on January 19, 2024. Assuming stockholder approval of the Conversion Proposal, on the fourth business day after such approval, each share of Series X Preferred Stock

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then outstanding would automatically convert into 1,000 shares of common stock, subject to certain beneficial ownership limitations, including that a holder of Series X Preferred Stock is prohibited from converting shares of Series X Preferred Stock into shares of common stock if, as a result of such conversion, such holder (together with its affiliate and any other persons acting as a group together with the holder or any of its affiliates) would beneficially own more than a specified percentage (to be initially set at 19.99% and thereafter adjusted by the holder to a number not to exceed 19.99%) of the total number of shares of common stock issued and outstanding immediately after giving effect to such conversion (the “Series X Preferred Stock Beneficial Ownership Limitation” and together with the Warrant Beneficial Ownership Limitation, the “Beneficial Ownership Limitations”). Shares of Series X Preferred Stock not converted automatically are thereafter subject to conversion at the option of the holder. The preferences, rights and limitations initially applicable to the Series X Preferred Stock are set forth in the Certificate of Designation of Preferences, Rights and Limitations of the Series X Preferred Stock filed with the Secretary of State of the State of Delaware on October 31, 2023 (the “Certificate of Designation”).

Registration Rights Agreement

In connection with the Financing, we entered into a registration rights agreement with the selling stockholders, dated as of November 2, 2023 (the “Registration Rights Agreement”), pursuant to which we agreed to file a resale registration statement covering the resale of the shares of common stock issued to the selling stockholders in the Merger, if any, the shares of common stock issuable upon conversion of the Series X Preferred Stock issued to the selling stockholders in the Merger, if any, and the Financing, the shares of common stock issuable upon exercise of the Assumed Warrants held by the selling stockholders, if any, and the shares of common stock issuable upon exercise of the Warrants issued to the selling stockholders in the Financing. We agreed to file such registration statement with the SEC within 90 calendar days following the closing of the Financing, and to keep such registration statement effective until the earlier of (i) such time as all of the shares covered by this prospectus have been sold by the selling stockholders or (ii) the date that all of the shares covered by this prospectus may be sold without volume or manner-of-sale restrictions pursuant to Rule 144 and without the requirement for us to be in compliance with the current public information requirement under Rule 144.

We have granted the selling stockholders customary indemnification rights in connection with the registration statement. The selling stockholders have also granted us customary indemnification rights in connection with the registration statement. The registration statement of which this prospectus is a part has been filed in accordance with the Registration Rights Agreement.

The foregoing summary descriptions of the Merger Agreement, the Purchase Agreement, the Warrants, the Certificate of Designation and the Registration Rights Agreement do not purport to be complete and are qualified in their entirety by reference to the full text of such documents, which were filed as exhibits to our Current Report on Form 8-K filed on October 31, 2023, and are incorporated by reference herein.

Shares Being Registered Hereby

Throughout this prospectus, when we refer to the shares of our common stock being registered on behalf of the selling stockholders, we are referring to the shares of our common stock issuable upon conversion of the shares of Series X Preferred Stock issued to the selling stockholders pursuant to the Purchase Agreement and the shares of our common stock underlying the Warrants issued to the selling stockholders pursuant to the Purchase Agreement, without giving effect to the Beneficial Ownership Limitations described above. The selling stockholders may sell all, some or none of the shares of common stock subject to this prospectus. See the “Plan of Distribution” section of this prospectus as it may be supplemented and amended from time to time.

The shares of common stock being registered hereby may be offered from time to time by each selling stockholder, provided that the shares of common stock issuable upon conversion of the Series X Preferred Stock may only be offered after the relevant shares of Series X Preferred Stock are converted into shares of common stock pursuant to the terms of the Certificate of Designation and following stockholder approval of the Conversion Proposal, and provided further that the shares of common stock issuable upon exercise of the Warrants may only be offered after the Warrants are exercised for shares of common stock pursuant to the terms of the Warrants.

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The table below sets forth, based on our knowledge, information concerning the beneficial ownership of shares of our common stock by the selling stockholders as of December 31, 2023. The information in the table below with respect to the selling stockholders has been obtained from the selling stockholders. When we refer to the “selling stockholders” in this prospectus, or, if required, a post-effective amendment to the registration statement of which this prospectus is a part, we mean the selling stockholders listed in the table below as offering shares, as well as their respective transferees, pledgees, donees or other successors-in-interest.

The number of shares of common stock beneficially owned prior to the offering for each selling stockholder consists of all shares of our common stock beneficially owned by such selling stockholder as of December 31, 2023 including (i) all shares of our common stock issuable upon conversion of the Series X Preferred Stock issued to such selling stockholder in the Financing, subject to the Series X Preferred Stock Beneficial Ownership Limitation applicable to such selling stockholder and (ii) all shares of common stock issuable upon exercise of the Warrants issued to such selling stockholder in the Financing, subject to the Warrant Beneficial Ownership Limitation applicable to such selling stockholder. The percentages of shares owned before and after the offering are based on 4,885,512 shares of our common stock outstanding as of December 31, 2023, which includes the outstanding shares of common stock offered by this prospectus but does not include any shares of common stock offered by this prospectus that are issuable upon the conversion of the Series X Preferred Stock or that are issuable pursuant to the Warrants and are deemed outstanding in the table below because they are beneficially owned by a person.

Beneficial ownership is determined in accordance with the rules of the SEC and includes voting or investment power with respect to shares. Generally, a person “beneficially owns” shares of our common stock if the person has or shares with others the right to vote those shares or to dispose of them, or if the person has the right to acquire voting or disposition rights of shares of our common stock within 60 days. In computing the number of shares of our common stock beneficially owned by a person and the percentage ownership of that person, we deemed outstanding the shares of common stock issuable upon conversion of the Series X Preferred Stock and the exercise of the Warrants held by that selling stockholder, up to the Beneficial Ownership Limitations. We did not deem these shares outstanding, however, for the purpose of computing the percentage ownership of any other person. Unless otherwise indicated below, to our knowledge, each selling stockholder named in the table has sole voting and investment power with respect to the shares of common stock beneficially owned by it, except to the extent authority is shared by spouses under applicable law. The inclusion of any shares in this table does not constitute an admission of beneficial ownership for any selling stockholder named below.

Name of Selling Stockholder	Shares of Common Stock Beneficially Owned Prior to Offering		Number of Shares of Common Stock Being Offered(1)	Shares of Common Stock to be Beneficially Owned After Offering(2)	
	Number	Percentage		Number	Percentage
Entities affiliated with Bios Partners(3)	542,231	9.99%	3,901,500	—	—
Puffin Partners, LP(4)	542,231	9.99%	1,915,500	—	—
Blackwell Partners LC(5)	247,500	4.80%	247,500	—	—
Druid Hills Capital, LLC(6)	192,000	3.80%	192,000	—	—
Daniel Traylor(7)	192,000	3.80%	192,000	—	—
Walter Harrison III Revocable Trust(8)	153,000	3.00%	153,000	—	—

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Thomas W. Traylor Gift Trust(9)	96,000	1.90%	96,000	—	—
3i, LP(10)	94,500	1.90%	94,500	—	—
Lagos Trust(11)	76,500	1.50%	76,500	—	—
Nantahala Capital Partners Limited Partnership(12)	70,500	1.40%	70,500	—	—
NCP RFM LP(13)	64,500	1.30%	64,500	—	—
Melvyn E. Foster, Jr.(14)	57,000	1.20%	57,000	—	—

- (1) The number of shares of our common stock in the column “Number of Shares of Common Stock Being Offered” represents all of the shares of our common stock that a selling stockholder may offer and sell from time to time under this prospectus, including shares issuable upon conversion of the Series X Preferred Stock or issuable upon the exercise of the Warrants, without giving effect to the Beneficial Ownership Limitations.
- (2) We do not know when or in what amounts a selling stockholder may offer shares for sale. The selling stockholders might not sell any or might sell all of the shares offered by this prospectus. Because the selling stockholders may offer all or some of the shares pursuant to this offering, and because there are currently no agreements, arrangements or understandings with respect to the sale of any of the shares, we cannot estimate the number of the shares that will be held by the selling stockholders after completion of the offering. However, for purposes of this table, we have assumed that, after completion of the offering, none of the shares covered by this prospectus will be held by the selling stockholders, including common stock issuable upon conversion of the Series X Preferred Stock and common stock issuable upon exercise of the Warrants.
- (3) The shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” consist of (i) 542,000 shares of common stock underlying 542 shares of Series X Preferred Stock issued to Bios Clinical Opportunity Fund, LP in the Financing, and (ii) 231 shares of common stock issuable upon exercise of a Warrant issued to Bios Clinical Opportunity Fund, LP in the Financing. Bios Clinical Opportunity Fund, LP, Bios Fund III NT, LP, Bios Fund III QP, LP and Bios Fund III, LP (collectively, the “Bios Funds”) are prohibited from converting such shares of Series X Preferred Stock into common stock and from exercising such Warrants if, as a result of such conversion or such exercise, the Bios Funds would beneficially own more than 9.99% of the number of shares of our common stock outstanding immediately after giving effect to such conversion or such exercise. As a result, the shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” do not include (i) 1,038,000 shares of common stock underlying 1,038 shares of Series X Preferred Stock issued to Bios Clinical Opportunity Fund, LP in the Financing, (ii) 789,769 shares of common stock issuable upon exercise of a Warrant issued to Bios Clinical Opportunity Fund, LP in the Financing, (iii) 125,000 shares of common stock underlying 125 shares of Series X Preferred Stock issued to Bios Fund III NT, LP in the Financing, (iv) 62,500 shares of common stock issuable upon exercise of a Warrant issued to Bios Fund III NT, LP in the Financing, (v) 777,000 shares of common stock underlying 777 shares of Series X Preferred Stock issued to Bios Fund III QP, LP in the Financing, (vi) 388,500 shares of common stock issuable upon exercise of a Warrant issued to Bios Fund III QP, LP in the Financing, (vii) 119,000 shares of common stock underlying 119 shares of Series X Preferred Stock issued to Bios Fund III, LP in the Financing, and (viii) 59,500 shares of common stock issuable upon the exercise of a Warrant issued to Bios Fund III, LP in the Financing. The shares reported under “Number of Shares of Common Stock Being Offered” do not give effect to the Beneficial Ownership Limitations and consist of (i) 1,580,000 shares of common stock underlying 1,580 shares of Series X Preferred Stock issued to Bios Clinical Opportunity Fund, LP in the Financing, (ii) 790,000 shares of common stock issuable upon exercise of Warrants issued to Bios Clinical Opportunity Fund in the Financing, (iii) 125,000 shares of common stock underlying 125 shares of Series X Preferred Stock issued to Bios Fund III NT, LP in the Financing, (iv) 62,500 shares of common stock issuable upon exercise of a Warrant issued to Bios Fund III NT, LP in the Financing, (v) 777,000 shares of common stock underlying 777 shares of Series X Preferred Stock issued to Bios Fund III QP, LP in the Financing, (vi) 388,500 shares of common stock issuable upon exercise of a

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Warrant issued to Bios Fund III QP, LP in the Financing, (vii) 119,000 shares of common stock underlying 119 shares of Series X Preferred Stock issued to Bios Fund III, LP in the Financing, and (viii) 59,500 shares of common stock issuable upon the exercise of a Warrant issued to Bios Fund III, LP in the Financing. Aaron Glenn Louise Fletcher is the natural person who exercises voting and dispositive power with respect to securities held by the Bios Funds and may be deemed to be the beneficial owner of such securities. Mr. Fletcher disclaims beneficial ownership of such securities, except to the extent of his pecuniary interest therein. The address of the Bios Funds is 1751 River Run #400, Fort Worth, TX 76107.

- (4) The shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” consist of (i) 542,000 shares of common stock underlying 1,220 shares of Series X Preferred Stock issued to Puffin Partners, LP in the Financing and (ii) 231 shares of common stock issuable upon the exercise of a Warrant issued to Puffin Partners, LP in the Financing. Puffin Partners, LP is prohibited from converting such shares of Series X Preferred Stock into common stock and from exercising such Warrants if, as a result of such conversion or such exercise, Puffin Partners, LP would beneficially own more than 9.99% of the number of shares of our common stock outstanding immediately after giving effect to such conversion or such exercise. As a result, the shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” do not include (i) 735,000 shares of common stock underlying 57 shares of Series X Preferred Stock issued to Puffin Partners, LP in the Financing, and (ii) 638,269 shares of common stock issuable upon exercise of a Warrant issued to Puffin Partners, LP in the Financing. The shares reported under “Number of Shares of Common Stock Being Offered” do not give effect to the Beneficial Ownership Limitations and consist of (i) 1,277,000 shares of common stock underlying 1,277 shares of Series X Preferred Stock issued to Puffin Partners, LP in the Financing, and (ii) 638,500 shares of common stock issuable upon exercise of a Warrant issued to Puffin Partners, LP in the Financing. Charles E. Gale is the natural person who exercises voting and dispositive power with respect to the securities held by Puffin Partners, LP and may be deemed to be the beneficial owner of such securities. Mr. Gale disclaims beneficial ownership of such securities, except to the extent of his pecuniary interest therein. The address of Puffin Partners, LP is 4215 West Lovers Lane, Suite 200, Dallas, TX 75209.
- (5) The shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” consist of (i) 165,000 shares of common stock underlying 165 shares of Series X Preferred Stock issued to Blackwell Partners LC in the Financing, and (ii) 82,500 shares of common stock issuable upon exercise of a Warrant issued to Blackwell Partners LC in the Financing. Nantahala Capital Management, LLC is a Registered Investment Adviser and has been delegated the legal power to vote and/or direct the disposition of the securities held by Blackwell Partners LC on behalf of such selling stockholder as General Partner, Investment Manager, or Sub-Advisor and would be considered the holder of such securities. The foregoing shall not be deemed to be an admission by the record owners or selling stockholder that they are themselves beneficial owners of such securities for purposes of the Exchange Act, or any other purpose. Wilmot Harkey and Daniel Mack are managing members of Nantahala Capital Management, LLC and may be deemed to have voting and dispositive power over the securities held by Blackwell Partners LC. The address of Blackwell Partners LC is c/o Blackwell Partners LLC – Series A, 280 South Mangum Street, Suite 210, Durham, NC 27701.
- (6) The shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” consist of (i) 128,000 shares of common stock underlying 128 shares of Series X Preferred Stock issued to Druid Hills Capital, LLC in the Financing, and (ii) 64,000 shares of common stock issuable upon exercise of a Warrant issued to Druid Hills Capital, LLC in the Financing. William G. Payne is the natural person who exercises voting and dispositive power with respect to the securities held by Druid Hills Capital, LLC and may be deemed to be the beneficial owner of such securities. Mr. Payne disclaims beneficial ownership of such securities, except to the extent of his pecuniary interest therein. The address of Druid Hills Capital, LLC is 2525 Knight Street #400, Dallas, TX 75219.
- (7) The shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” consist of (i) 128,000 shares of common stock underlying 128 shares of Series X Preferred Stock issued to Daniel Traylor in the Financing, and (ii) 64,000 shares of common stock issuable upon exercise of a Warrant issued to Mr. Traylor in the Financing. The address of Mr. Traylor is 5410 Farquhar Lane, Dallas, TX 76209.

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- (8) The shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” consist of (i) 102,000 shares of common stock underlying 102 shares of Series X Preferred Stock issued to Walter Harrison III Revocable Trust in the Financing, and (ii) 51,000 shares of common stock issuable upon exercise of a Warrant issued to Walter Harrison III Revocable Trust in the Financing. Walter F. Harrison III is the natural person who exercises voting and dispositive power with respect to the securities held by Walter Harrison III Revocable Trust and may be deemed to be the beneficial owner of such securities. Mr. Harrison disclaims beneficial ownership of such securities, except to the extent of his pecuniary interest therein.
- (9) The shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” consist of (i) 64,000 shares of common stock underlying 64 shares of Series X Preferred Stock issued to Thomas W. Traylor Gift Trust in the Financing, and (ii) 32,000 shares of common stock issuable upon exercise of a Warrant issued to Thomas W. Traylor Gift Trust in the Financing. Daniel Traylor is the natural person who exercises voting and dispositive power with respect to the securities held by Thomas W. Traylor Gift Trust and may be deemed to be the beneficial owner of such securities. Mr. Traylor disclaims beneficial ownership of such securities, except to the extent of his pecuniary interest therein. The address of Thomas W. Traylor Gift Trust is 4215 Lovers Lane, Suite 150, Dallas, TX 75209.
- (10) The shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” consist of (i) 63,000 shares of common stock underlying 63 shares of Series X Preferred Stock issued to 3i, LP in the Financing, and (ii) 31,500 shares of common stock issuable upon exercise of a Warrant issued to 3i, LP in the Financing. The business address of 3i, LP is 2 Wooster Street, 2nd Floor, New York, New York 10013. 3i LP’s principal business is that of a private investor. Maier Joshua Tarlow is the manager of 3i Management, LLC, the general partner of 3i, LP, and has sole voting control and investment discretion over securities beneficially owned directly by 3i, LP and indirectly by 3i Management, LLC. The foregoing should not be construed in and of itself as an admission by Mr. Tarlow as to beneficial ownership of the securities beneficially owned directly by 3i, LP and indirectly by 3i Management, LLC.
- (11) The shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” consist of (i) 51,000 shares of common stock underlying 51 shares of Series X Preferred Stock issued to Lagos Trust in the Financing, and (ii) 25,500 shares of common stock issuable upon exercise of a Warrant issued to Lagos Trust in the Financing. Richard Kent McGaughy is the natural person who exercises voting and dispositive power with respect to the securities held by Lagos Trust and may be deemed to be the beneficial owner of such securities. Mr. McGaughy disclaims beneficial ownership of such securities, except to the extent of his pecuniary interest therein. The address of Lagos Trust is 4215 Lovers Ln., Ste. 100, Dallas, TX 75209.
- (12) The shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” consist of (i) 47,000 shares of common stock underlying 47 shares of Series X Preferred Stock issued to Nantahala Capital Partners Limited Partnership in the Financing, and (ii) 23,500 shares of common stock issuable upon exercise of a Warrant issued to Nantahala Capital Partners Limited Partnership in the Financing. Wilmot Harkey and Daniel Mack are the natural persons who exercise shared voting and dispositive power with respect to the securities held by Nantahala Capital Partners Limited Partnership and may be deemed to be the beneficial owners of such securities. Nantahala Capital Management, LLC is a Registered Investment Adviser and has been delegated the legal power to vote and/or direct the disposition of the securities held by Nantahala Capital Partners Limited Partnership on behalf of such selling stockholder as General Partner, Investment Manager, or Sub-Advisor and would be considered the holder of such securities. The foregoing shall not be deemed to be an admission by the record owners or selling stockholder that they are themselves beneficial owners of such securities for purposes of the Exchange Act, or any other purpose. Wilmot Harkey and Daniel Mack are managing members of Nantahala Capital Management, LLC and may be deemed to have voting and dispositive power over the securities held by Nantahala Capital Partners Limited Partnership. The address of Nantahala Capital Partners Limited Partnership is 130 Main St., 2nd Floor, New Canaan, CT, 06840.

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- (13) The shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” consist of (i) 43,000 shares of common stock underlying 43 shares of Series X Preferred Stock issued to NCP RFM LP in the Financing, and (ii) 21,500 shares of common stock issuable upon exercise of a Warrant issued to NCP RFM LP in the Financing. Nantahala Capital Management, LLC is a Registered Investment Adviser and has been delegated the legal power to vote and/or direct the disposition of the securities held by NCP RFM LP on behalf of such selling stockholder as General Partner, Investment Manager, or Sub-Advisor and would be considered the holder of such securities. The foregoing shall not be deemed to be an admission by the record owners or selling stockholder that they are themselves beneficial owners of such securities for purposes of the Exchange Act, or any other purpose. Wilmot Harkey and Daniel Mack are managing members of Nantahala Capital Management, LLC and may be deemed to have voting and dispositive power over the securities held by NCP RFM LP. The address of NCP RFM LP is 130 Main St., 2nd Floor, New Canaan, CT, 06840.
- (14) The shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” consist of (i) 38,000 shares of common stock underlying 38 shares of Series X Preferred Stock issuable upon exercise of a Warrant issued to Melvyn E. Foster, Jr. in the Financing, and (ii) 19,000 shares of common stock issuable upon exercise of a Warrant issued to Mr. Foster in the Financing.

Relationships with Selling Stockholders

Except as set forth below, none of the selling stockholders has held any position or office with, or otherwise had a material relationship with us, or any of our subsidiaries within the past three years.

In connection with the Merger, entities affiliated with Bio Partners, the majority shareholder of Lung prior to the Merger, received an aggregate of 196,909 shares of common stock and 11,506 shares of Series X Preferred Stock. In addition, options to purchase an aggregate of 2,275 shares of Lung common stock held by entities affiliated with Bios Partners were assumed by us in the Merger, which became options to purchase shares of our common stock, and warrants to purchase an aggregate of 637,489 shares of Lung common stock held by entities affiliated with Bios Partners were assumed in the Merger, which became warrants to purchase shares of our common stock. Furthermore, in connection with the Financing, entities affiliated with Bios Partners were issued the following securities: (i) Bios Clinical Opportunity Fund was issued 1,580 shares of Series X Preferred Stock and warrants to purchase 790,000 shares of common stock, (ii) Bios Fund III NT, LP was issued 125 shares of Series X Preferred Stock and warrants to purchase 62,500 shares of common stock, (iii) Bios Fund II QP, LP was issued 777 shares of Series X Preferred Stock and warrants to purchase 388,500 shares of common stock, and (iv) Bio Fund III, LP was issued 119 shares of Series X Preferred Stock and warrants to purchase 59,500 shares of common stock.

Under the Certificate of Designation, we have agreed that we will not, without the affirmative vote of the holders of a majority of the then outstanding shares of the Series X Preferred Stock, (i) alter or change adversely the powers, preferences or rights given to the Series X Preferred Stock or alter or amend the Certificate of Designation, amend or repeal any provision of, or add any provision to, our restated certificate of incorporation or by-laws, or file any articles of amendment, certificate of designations, preferences, limitations and relative rights of any series of preferred stock, if such action would adversely alter or change the preferences, rights, privileges or powers of, or restrictions provided for the benefit of the Series X Preferred Stock, (ii) issue further shares of Series X Preferred Stock or increase or decrease (other than by conversion) the number of authorized shares of Series X Preferred Stock, or (iii) enter into any agreement with respect to any of the foregoing. Additionally, the approval of the holders of a majority of the Series X Preferred Stock is required for certain change of control transactions, provided that this approval right will terminate upon stockholder approval of the Conversion Proposal.

DESCRIPTION OF CAPITAL STOCK

The following description summarizes certain information regarding our securities that are registered under Section 12 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), and is qualified by reference to our restated certificate of incorporation and amended and restated bylaws.

Authorized Capital Stock

Our authorized capital stock consists of 45,000,000 shares of common stock, par value \$0.001 per share, and 5,000,000 shares of preferred stock, par value \$0.001 per share. As of December 31, 2023, 4,885,512 shares of our common stock were outstanding and 24,610 shares of our Series X Preferred Stock were outstanding.

Common Stock

Voting Rights. Holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of stockholders and do not have cumulative voting rights. An election of directors by our stockholders will be determined by a plurality of the votes cast by the stockholders entitled to vote on the election. Any matter other than the election of directors to be voted upon by the stockholders at such meeting will be decided by the affirmative vote of our stockholders having a majority in voting power of the votes cast by the stockholders present or represented and voting on such matter, except when a different vote is required by law, our certificate of incorporation or our bylaws.

Dividends. Holders of our common stock are entitled to receive proportionately any dividends as may be declared and paid on the common stock from funds lawfully available therefor as and when determined by our board of directors, subject to any preferential dividend rights of outstanding preferred stock.

Liquidation and Dissolution. In the event of our liquidation or dissolution, the holders of our common stock are entitled to receive proportionately all assets available for distribution to stockholders after the payment of all debts and other liabilities and subject to the prior rights of any outstanding preferred stock.

Other Rights. Holders of our common stock have no preemptive, subscription, redemption or conversion rights. The rights, preferences and privileges of holders of our common stock are subject to and may be adversely affected by the rights of the holders of shares of any series of preferred stock that we may designate and issue in the future. Outstanding shares of our common stock are non-assessable. Holders of our common stock are not, and will not be, subject to any liability as stockholders.

Preferred Stock

Under the terms of our certificate of incorporation, our board of directors is authorized to issue shares of preferred stock in one or more series without stockholder approval. Our board of directors has the discretion to determine the rights, preferences, privileges and restrictions, including voting rights, dividend rights, conversion rights, redemption privileges and liquidation preferences, of each series of preferred stock. The issuance of preferred stock could impede the completion of a merger, tender offer or other takeover attempt.

Series X Preferred Stock

Pursuant to the Certificate of Designation, we designated 24,847 shares of our authorized and unissued preferred stock as Series X Preferred Stock, and established the rights, preferences and privileges of the Series X Preferred Stock, which are summarized below.

Conversion. Subject to stockholder approval, (i) effective as of 5:00 p.m. (Eastern time) on the fourth business day after the date such stockholder approval is received, each share of Series X Preferred Stock then outstanding automatically converts into common stock at a rate of 1,000 shares of common stock for every one share of Series X Preferred Stock that is converted, and (ii) at any time thereafter at the option of the holder, into 1,000 shares of common stock, in the case of each of (i) and (ii) subject to certain beneficial ownership limitations, including that a holder of Series X Preferred Stock is prohibited from converting shares of Series X Preferred Stock

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into shares of common stock if, as a result of such conversion, such holder (together with its affiliates and any other persons acting as a group together with the holder or any of its affiliates) would beneficially own more than a specified percentage (to be initially set at 19.99% and thereafter adjusted by the holder to a number not to exceed 19.99%) of the total number of shares of common stock issued and outstanding immediately after giving effect to such conversion.

Voting Rights. Except as otherwise required by law, the Series X Preferred Stock does not have voting rights. However, as long as any shares of Series X Preferred Stock are outstanding, we will not, without the affirmative vote of the holders of a majority of the then outstanding shares of the Series X Preferred Stock, (i) alter or change adversely the powers, preferences or rights given to the Series X Preferred Stock or alter or amend the Certificate of Designation, amend or repeal any provision of, or add any provision to, our restated certificate of incorporation or by-laws, or file any articles of amendment, certificate of designations, preferences, limitations and relative rights of any series of preferred stock, if such action would adversely alter or change the preferences, rights, privileges or powers of, or restrictions provided for the benefit of the Series X Preferred Stock, (ii) issue further shares of Series X Preferred Stock or increase or decrease (other than by conversion) the number of authorized shares of Series X Preferred Stock, or (iii) enter into any agreement with respect to any of the foregoing. Additionally, the approval of the holders of a majority of the Series X Preferred Stock is required for certain change of control transactions, provided that this approval right will terminate upon stockholder approval of the Conversion Proposal.

Dividends. Holders of Series X Preferred Stock are entitled to receive dividends on shares of Series X Preferred Stock equal, on an as-converted-to-common-stock basis, and in the same form as dividends actually paid on shares of the common stock.

Liquidation and Dissolution. The Series X Preferred Stock ranks on parity with common stock upon any such liquidation, dissolution or winding-up.

Common Stock Issuable Upon Exercise of Warrants

As of December 31, 2023, we had:

- warrants to purchase 646,759 shares of our common stock outstanding, with an exercise price of \$40.00 per share, which we issued in April 2019, which expire on April 2, 2024;
- warrants to purchase 726,437 shares of our common stock outstanding, with an exercise price of \$5.66, which were assumed in connection with the Merger, which expire on May 20, 2029; and
- warrants to purchase 2,353,500 shares of our common stock outstanding, which warrants were issued and sold in the Financing.

Provisions of Our Certificate of Incorporation and By-laws and the DGCL That May Have Anti-Takeover Effects

The Delaware General Corporation Law (the “DGCL”) contains, and our certificate of incorporation and by-laws contain, provisions that could have the effect of delaying, deferring or discouraging another party from acquiring control of us. These provisions, which are summarized below, are expected to discourage coercive takeover practices and inadequate takeover bids. These provisions are also designed to encourage persons seeking to acquire control of us to first negotiate with our board of directors.

Staggered Board; Removal of Directors. Our certificate of incorporation and by-laws divide our board of directors into three classes with staggered three-year terms. In addition, a director may be removed only for cause and only by the affirmative vote of the holders of at least 75% of the votes that all of our stockholders would be entitled to cast in an annual election of directors. Any vacancy on our board of directors, including a vacancy resulting from an enlargement of our board of directors, may be filled only by vote of a majority of our directors then in office. The classification of our board of directors and the limitations on the removal of directors and filling of vacancies could make it more difficult for a third party to acquire, or discourage a third party from seeking to acquire, control of our company.

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Stockholder Action by Written Consent; Special Meetings. Our certificate of incorporation provides that any action required or permitted to be taken by our stockholders must be effected at a duly called annual or special meeting of such holders and may not be effected by any consent in writing by such holders. Our certificate of incorporation and by-laws also provide that, except as otherwise required by law, special meetings of our stockholders can only be called by the chairman of our board of directors, our chief executive officer or our board of directors.

Advance Notice Requirements for Stockholder Proposals. Our by-laws establish an advance notice procedure for stockholder proposals to be brought before an annual meeting of stockholders, including proposed nominations of persons for election to our board of directors. Stockholders at an annual meeting may consider proposals or nominations specified in the notice of meeting or brought before the meeting by or at the direction of our board of directors or by a stockholder of record on the record date for the meeting who is entitled to vote at the meeting and who has delivered timely written notice in proper form to our secretary of the stockholder's intention to bring such business before the meeting. These provisions could have the effect of delaying until the next stockholder meeting stockholder actions that are favored by the holders of a majority of our outstanding voting securities.

Delaware Business Combination Statute. We are subject to Section 203 of the DGCL which prohibits a Delaware corporation from engaging in business combinations with an interested stockholder. An interested stockholder is generally defined as an entity or person beneficially owning 15% or more of the outstanding voting stock of the corporation or any entity or person affiliated with or controlling or controlled by such entity or person. Section 203 provides that an interested stockholder may not engage in business combinations with the corporation for a period of three years after the date that such stockholder became an interested stockholder, with the following exceptions:

- before such date, the board of directors of the corporation approved either the business combination or the transaction that resulted in the stockholder becoming an interested stockholder;
- upon completion of the transaction that resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction began, excluding for purposes of determining the voting stock outstanding (but not the outstanding voting stock owned by the interested stockholder) those shares owned (1) by persons who are directors and also officers and (2) employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; or
- on or after such date, the business combination is approved by the board of directors and authorized at an annual or special meeting of the stockholders, and not by written consent, by the affirmative vote of at least 66 2/3% of the outstanding voting stock that is not owned by the interested stockholder.

In general, Section 203 defines business combinations to include the following:

- any merger or consolidation involving the corporation and the interested stockholder;
- any sale, lease, transfer, pledge or other disposition of 10% or more of the assets of the corporation to or with the interested stockholder;
- subject to certain exceptions, any transaction that results in the issuance or transfer by the corporation of any stock of the corporation to the interested stockholder;
- any transaction involving the corporation that has the effect of increasing the proportionate share of the stock or any class or series of the corporation beneficially owned by the interested stockholder; or
- the receipt by the interested stockholder of the benefit of any loss, advances, guarantees, pledges or other financial benefits by or through the corporation.

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Amendment of Certificate of Incorporation and By-laws. The DGCL provides generally that the affirmative vote of a majority of the shares entitled to vote on any matter is required to amend a corporation's certificate of incorporation or by-laws, unless a corporation's certificate of incorporation or by-laws, as the case may be, requires a greater percentage. Our by-laws may be amended or repealed by a majority vote of our board of directors or by the affirmative vote of the holders of at least 75% of the votes that all of our stockholders would be entitled to cast in any annual election of directors. In addition, the affirmative vote of the holders of at least 75% of the votes that all of our stockholders would be entitled to cast in any annual election of directors is required to amend or repeal or to adopt any provisions inconsistent with any of the provisions of our certificate of incorporation described above under “—Staggered Board; Removal of Directors” and “—Stockholder Action by Written Consent; Special Meetings.”

Exclusive Forum Selection. Our certificate of incorporation provides that, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware (or if the Court of Chancery does not have jurisdiction, the federal district court for the District of Delaware) shall be the sole and exclusive forum for (1) any derivative action or proceeding brought on our behalf, (2) any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers or employees to our company or stockholders, (3) any action asserting a claim against us arising pursuant to any provision of the DGCL or our certificate of incorporation or by-laws, or (4) any action asserting a claim against us governed by the internal affairs doctrine. We do not expect this choice of forum provision will apply to suits brought to enforce a duty or liability created by the Securities Act of 1933, as amended, (the “Securities Act”), the Exchange Act, or any other claim for which federal courts have exclusive jurisdiction. Although our certificate of incorporation contains the choice of forum provision described above, it is possible that a court could rule that such a provision is inapplicable for a particular claim or action or that such provision is unenforceable.

PLAN OF DISTRIBUTION

The selling stockholders may sell all or a portion of the shares beneficially owned by them and offered hereby from time to time directly or through one or more underwriters, broker-dealers or agents. If the shares are sold through underwriters or broker-dealers, the selling stockholders will be responsible for underwriting discounts or commissions or agent's commissions. The shares may be sold on any national securities exchange or quotation service on which the securities may be listed or quoted at the time of sale, in the over-the-counter market or in transactions otherwise than on these exchanges or systems or in the over-the-counter market and in one or more transactions at fixed prices, at prevailing market prices at the time of the sale, at varying prices determined at the time of sale, or at negotiated prices. These sales may be effected in transactions, which may involve crosses or block transactions. The selling stockholders may use any one or more of the following methods when selling shares:

- ordinary brokerage transactions and transactions in which the broker-dealer solicits purchasers;
- block trades in which the broker-dealer will attempt to sell the shares 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;
- broker-dealers may agree with the selling stockholders to sell a specified number of such shares at a stipulated price per share;
- through the writing or settlement of options or other hedging transactions, whether such options are listed on an options exchange or otherwise;
- a combination of any such methods of sale; and
- any other method permitted pursuant to applicable law.

The selling stockholders also may resell all or a portion of the shares in open market transactions in reliance upon Rule 144 under the Securities Act, as permitted by that rule, or Section 4(a)(1) under the Securities Act, if available, rather than under this prospectus, provided that they meet the criteria and conform to the requirements of those provisions.

Broker-dealers engaged by the selling stockholders may arrange for other broker-dealers to participate in sales. If the selling stockholders effect such transactions by selling shares to or through underwriters, broker-dealers or agents, such underwriters, broker-dealers or agents may receive commissions in the form of discounts, concessions or commissions from the selling stockholders or commissions from purchasers of the shares for whom they may act as agent or to whom they may sell as principal. Such commissions will be in amounts to be negotiated, but, except as set forth in a supplement to this prospectus, in the case of an agency transaction will not be 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 IM-2121.01.

In connection with sales of the shares or otherwise, 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 shares in the course of hedging in positions they assume. The selling stockholders may also sell shares short and if such short sale shall take place after the date that the registration statement of which this prospectus is a part is declared effective by the SEC, the selling stockholders may deliver shares covered by this prospectus to close out short positions and to return borrowed shares in connection with such short sales. The selling stockholders may also loan or pledge shares to broker-dealers that in turn may sell such shares, to the extent

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permitted by applicable law. The selling stockholders may also enter into option or other transactions with broker-dealers or other financial institutions or the creation of one or more derivative securities which require the delivery to such broker-dealer or other financial institution of shares offered by this prospectus, which shares such broker-dealer or other financial institution may resell pursuant to this prospectus (as supplemented or amended to reflect such transaction).

The selling stockholders may, from time to time, pledge or grant a security interest in some or all of the shares owned by them and, if they default in the performance of their secured obligations, the pledgees or secured parties may offer and sell the shares from time to time pursuant to this prospectus or any amendment to this prospectus under Rule 424(b)(3) or other applicable provision of the Securities Act, amending, if necessary, the list of selling stockholders to include the pledgee, transferee or other successors in interest as selling stockholders under this prospectus. The selling stockholders also may transfer and donate the shares in other circumstances in which case the transferees, donees, pledgees or other successors in interest will be the selling beneficial owners for purposes of this prospectus.

The selling stockholders and any broker-dealer or agents participating in the distribution of the shares may be deemed to be “underwriters” within the meaning of Section 2(11) of the Securities Act in connection with such sales. In such event, any commissions paid, or any discounts or concessions allowed to, any such broker-dealer or agent and any profit on the resale of the shares purchased by them may be deemed to be underwriting commissions or discounts under the Securities Act. Selling stockholders who are “underwriters” within the meaning of Section 2(a)(11) of the Securities Act will be subject to the applicable prospectus delivery requirements of the Securities Act including Rule 172 thereunder and may be subject to certain statutory liabilities of, including but not limited to, Sections 11, 12 and 17 of the Securities Act and Rule 10b-5 under the Exchange Act.

Each selling stockholder has informed us that it is not a registered broker-dealer and does not have any written or oral agreement or understanding, directly or indirectly, with any person to distribute the shares. Upon us being notified in writing by a selling stockholder that any material arrangement has been entered into with a broker-dealer for the sale of common stock through a block trade, special offering, exchange distribution or secondary distribution or a purchase by a broker or dealer, a supplement to this prospectus will be filed, if required, pursuant to Rule 424(b) under the Securities Act, disclosing (i) the name of each such selling stockholder and of the participating broker-dealer(s), (ii) the number of shares involved, (iii) the price at which such the shares were sold, (iv) the commissions paid or discounts or concessions allowed to such broker-dealer(s), where applicable, (v) that such broker-dealer(s) did not conduct any investigation to verify the information set out or incorporated by reference in this prospectus, and (vi) other facts material to the transaction. In no event shall any broker-dealer receive fees, commissions and markups, which, in the aggregate, would exceed eight percent (8.0%).

Under the securities laws of some U.S. states, the shares may be sold in such states only through registered or licensed brokers or dealers. In addition, in some U.S. states the shares may not be sold unless such shares have been registered or qualified for sale in such state or an exemption from registration or qualification is available and is complied with.

There can be no assurance that any selling stockholder will sell any or all of the shares registered pursuant to the registration statement of which this prospectus forms a part.

Each selling stockholder and any other person participating in such distribution will be subject to applicable provisions of the Exchange Act and the rules and regulations thereunder, including, without limitation, to the extent applicable, Regulation M of the Exchange Act, which may limit the timing of purchases and sales of any of the shares by the selling stockholder and any other participating person. To the extent applicable, Regulation M may also restrict the ability of any person engaged in the distribution of the shares to engage in market-making activities with respect to the shares. All of the foregoing may affect the marketability of the shares and the ability of any person or entity to engage in market-making activities with respect to the shares.

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We will pay all expenses of the registration of the shares pursuant to the registration rights agreement, including, without limitation, SEC filing fees and expenses of compliance with state securities or “blue sky” laws; *provided, however*, that each selling stockholder will pay all underwriting discounts and selling commissions, if any and any related legal expenses incurred by it. We will indemnify the selling stockholders against certain liabilities, including some liabilities under the Securities Act, in accordance with the Registration Rights Agreement, or the selling stockholders will be entitled to contribution. We may be indemnified by the selling stockholders against civil liabilities, including liabilities under the Securities Act, that may arise from any written information furnished to us by the selling stockholders specifically for use in this prospectus, in accordance with the related registration rights agreements, or we may be entitled to contribution.

LEGAL MATTERS

The validity of the securities in respect of which this prospectus is being delivered will be passed upon for us by Wilmer Cutler Pickering Hale and Dorr LLP, Boston, Massachusetts.

EXPERTS

The financial statements of Aileron Therapeutics, Inc. incorporated in this prospectus by reference to the Annual Report on Form 10-K for the year ended December 31, 2022 have been so incorporated in reliance on the report (which contains an explanatory paragraph relating to the Company's ability to continue as a going concern as described in Note 1 to the financial statements) of PricewaterhouseCoopers LLP, an independent registered public accounting firm, given on the authority of said firm as experts in auditing and accounting.

The financial statements of Lung Therapeutics, Inc. as of December 31, 2022 and 2021, and for each of the two years in the period ended December 31, 2022, incorporated by reference in this prospectus, have been audited by Deloitte & Touche LLP, an independent auditor, as stated in their report. Such financial statements are incorporated by reference in reliance upon the report of such firm given their authority as experts in accounting and auditing.

WHERE YOU CAN FIND MORE INFORMATION

We file annual, quarterly and current reports, proxy statements and other information with the SEC. Our SEC filings are available to the public over the Internet at the SEC's website at <http://www.sec.gov>. Copies of certain information filed by us with the SEC are also available on our website at <https://www.aileronrx.com/>. Our website is not a part of this prospectus and is not incorporated by reference in this prospectus.

This prospectus is part of a registration statement we filed with the SEC. This prospectus omits some information contained in the registration statement in accordance with SEC rules and regulations. You should review the information and exhibits in the registration statement for further information about us and our consolidated subsidiaries and the securities we are offering. Statements in this prospectus concerning any document we filed as an exhibit to the registration statement or that we otherwise filed with the SEC are not intended to be comprehensive and are qualified by reference to these filings and the exhibits attached thereto. You should review the complete document to evaluate these statements.

INCORPORATION OF CERTAIN DOCUMENTS BY REFERENCE

The SEC allows us to incorporate by reference much of the information we file with the SEC, which means that we can disclose important information to you by referring you to those publicly available documents. The information that we incorporate by reference in this prospectus is considered to be part of this prospectus. Because we are incorporating by reference future filings with the SEC, this prospectus is continually updated and those future filings may modify or supersede some of the information included or incorporated in this prospectus. This means that you must look at all of the SEC filings that we incorporate by reference to determine if any of the statements in this prospectus or in any document previously incorporated by reference have been modified or superseded. This prospectus incorporates by reference the documents listed below (File No. 001-38130) and any future filings we make with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act (in each case, other than those documents or the portions of those documents not deemed to be filed) between the date of the initial registration statement and the effectiveness of the registration statement and following the effectiveness of the registration statement until the offering of the securities under the registration statement is terminated or completed:

- Our Annual Report on Form 10-K for the fiscal year ended December 31, 2022, filed with the SEC on [March 20, 2023](#), as amended by our Annual Report on Form 10-K/A for the fiscal year ended December 31, 2022, filed with the SEC on [April 28, 2023](#);
- Our definitive proxy statement for the 2023 Annual Meeting of Stockholders, filed with the SEC on [January 29, 2023](#);
- Our Quarterly Report on Form 10-Q for the fiscal quarters ended March 31, 2023, June 30, 2023 and September 30, 2023, as filed with the SEC on [May 8, 2023](#), [August 11, 2023](#), and [October 13, 2023](#), respectively;
- Our Current Reports on Form 8-K as filed on [February 23, 2023](#), [October 31, 2023](#) (other than Item 7.01), [January 10, 2024](#) and [January 25, 2024](#) and our Current Report on Form 8-K/A filed on [January 11, 2024](#); and

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- The description of our common stock contained in our Registration Statement on [Form 8-A](#) filed on June 23, 2017, as the description therein has been updated and superseded by the description of our capital stock contained in [Exhibit 4.2](#) to our Annual Report on Form 10-K for the fiscal year ended December 31, 2022, as filed with the SEC on [March 20, 2023](#), and including any amendments or reports filed for the purpose of updating such description.

You may request a copy of these documents, which will be provided to you at no cost, by writing or telephoning us using the following contact information:

Aileron Therapeutics, Inc.
738 Main Street #398
Waltham, MA 02451
(617) 995-0900

7,060,500 Shares



COMMON STOCK

PROSPECTUS

, 2024

PART II
INFORMATION NOT REQUIRED IN PROSPECTUS

Item 14. Other Expenses of Issuance and Distribution.

The following table sets forth the various expenses to be incurred in connection with the sale and distribution of the securities being registered hereby, all of which will be borne by Aileron Therapeutics, Inc. (except any underwriting discounts and commissions and expenses incurred by the selling stockholders for brokerage, accounting, tax or legal services or any other expenses incurred by the selling stockholders in disposing of the shares). All amounts shown are estimates except the SEC registration fee.

Registration Fee - Securities and Exchange Commission	\$ 4,178.95
Accountants Fees and Expenses	\$ 100,000
Legal Fees and Expenses	\$ 25,000
Printing Agent Fees and Expenses	\$ 6,000
Total	<u>\$135,178.95</u>

Item 15. Indemnification of Directors and Officers.

Section 102 of the DGCL permits a corporation to eliminate the personal liability of its directors or officers for monetary damages for a breach of fiduciary duty as a director or officer, except (1) where the director or officer breached his or her duty of loyalty, failed to act in good faith, engaged in intentional misconduct, knowingly violated a law or obtained an improper personal benefit, (2) where any director authorized the payment of a dividend or approved a stock repurchase in violation of Delaware corporate law, or (3) for any officer, in any action by or in the right of the corporation. Our certificate of incorporation provides that none of our directors shall be personally liable to us or our stockholders for monetary damages for any breach of fiduciary duty as a director, notwithstanding any provision of law imposing such liability, except to the extent that the DGCL prohibits the elimination or limitation of liability of directors for breaches of fiduciary duty.

Section 145 of the DGCL provides that a corporation has the power to indemnify a director, officer, employee, or agent of the corporation and certain other persons serving at the request of the corporation in related capacities against expenses (including attorneys' fees), judgments, fines and amounts paid in settlements actually and reasonably incurred by the person in connection with an action, suit or proceeding to which he or she is or is threatened to be made a party by reason of such position, if such person 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, in any criminal action or proceeding, had no reasonable cause to believe his or her conduct was unlawful, except that, in the case of actions brought by or in the right of the corporation, no indemnification shall be made with respect to any claim, issue or matter as to which such person shall have been adjudged to be liable to the corporation unless and only to the extent that the Court of Chancery or other adjudicating court determines that, despite the adjudication of liability but in view of all of the circumstances of the case, such person is fairly and reasonably entitled to indemnity for such expenses which the Court of Chancery or such other court shall deem proper.

Our certificate of incorporation provides that we will indemnify each person who was or is a party or is threatened to be made a party or is involved in any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative (other than an action by or in the right of us) by reason of the fact that he or she is or was, or has agreed to become, our director or officer, or is or was serving, or has agreed to serve, at our request as a director, officer, partner, employee or trustee of, or in a similar capacity with, another corporation, partnership, joint venture, trust or other enterprise (all such persons being referred to as an "Indemnitee"), or by reason of any action alleged to have been taken or omitted in such capacity, against all expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred in connection with such action, suit or proceeding and any appeal therefrom, if such Indemnitee acted in good faith and in a manner he or she reasonably believed to be in, or not opposed to, our best interests, and, with respect to any criminal

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action or proceeding, he or she had no reasonable cause to believe his or her conduct was unlawful. Our certificate of incorporation also provides that we will indemnify any Indemnitee who was or is a party to an action or suit by or in the right of us to procure a judgment in our favor by reason of the fact that the Indemnitee is or was, or has agreed to become, our director or officer, or is or was serving, or has agreed to serve, at our request as a director, officer, partner, employee or trustee of, or in a similar capacity with, another corporation, partnership, joint venture, trust or other enterprise, or by reason of any action alleged to have been taken or omitted in such capacity, against all expenses (including attorneys' fees) and, to the extent permitted by law, amounts paid in settlement actually and reasonably incurred in connection with such action, suit or proceeding, and any appeal therefrom, if the Indemnitee acted in good faith and in a manner he or she reasonably believed to be in, or not opposed to, our best interests, except that no indemnification shall be made with respect to any claim, issue or matter as to which such person shall have been adjudged to be liable to us, unless a court determines that, despite such adjudication but in view of all of the circumstances, he or she is entitled to indemnification of such expenses. Notwithstanding the foregoing, to the extent that any Indemnitee has been successful, on the merits or otherwise, he or she will be indemnified by us against all expenses (including attorneys' fees) actually and reasonably incurred by him or her or on his or her behalf in connection therewith. If we do not assume the defense, expenses must be advanced to an Indemnitee under certain circumstances.

Our board of directors has approved a form of indemnification agreement that has been executed by each of our directors and executive officers. In general, these agreements provide that we will indemnify the director or executive officer to the fullest extent permitted by law for claims arising in his or her capacity as a director or executive officer of our company or in connection with their service at our request for another corporation or entity. The indemnification agreements also provide for procedures that will apply in the event that a director or executive officer makes a claim for indemnification and establish certain presumptions that are favorable to the director or executive officer.

We maintain a general liability insurance policy that covers certain liabilities of our directors and officers arising out of claims based on acts or omissions in their capacities as directors or officers.

Item 16. Exhibits

A list of exhibits filed with this registration statement on Form S-3 is set forth on the Exhibit Index and is incorporated herein by reference.

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 of 1933, as amended, or the Securities Act;
 - (ii) To reflect in the prospectus any facts or events arising after the effective date of this 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 this 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 Securities and Exchange Commission, or the Commission, pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than 20 percent change in the maximum aggregate offering price set forth in the "Calculation of Registration Fee" table in the effective registration statement; and

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- (iii) To include any material information with respect to the plan of distribution not previously disclosed in this registration statement or any material change to such information in this registration statement;

provided, however, that paragraphs (1)(i), (1)(ii) and (1)(iii) 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, as amended, or the Exchange Act, that are incorporated by reference in this registration statement, or is contained in a form of prospectus filed pursuant to Rule 424(b) that is part of this registration statement.

- (2) That, for the purposes of determining any liability under the Securities Act, each 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 the time shall be deemed to be the initial *bona fide* offering thereof.
- (3) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.
- (b) The undersigned registrant hereby undertakes that, for purposes of determining any liability under the Securities Act, each filing of the registrant's annual report pursuant to Section 13(a) or 15(d) of the Exchange Act (and, where applicable, each filing of an employee benefit plan's annual report pursuant to Section 15(d) of the Exchange Act) that is incorporated by reference in this registration statement shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial *bona fide* offering thereof.
- (c) Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the registrant pursuant to the indemnification provisions described herein, or otherwise, the registrant has been advised that in the opinion of the Commission such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Securities Act and will be governed by the final adjudication of such issue..

EXHIBIT INDEX

Exhibit No.	Description
2.1	Agreement and Plan of Merger, dated October 31, 2023, by and among Aileron Therapeutics, Inc., AT Merger Sub I, Inc., AT Merger Sub II, LLC and Lung Therapeutics, Inc. (incorporated by reference to Exhibit 2.1 to the Registrant's Current Report on Form 8-K (File No. 001-38130) filed on October 31, 2023)
3.1	Certificate of Designation of Series X Non-Voting Convertible Preferred Stock (incorporated by reference to Exhibit 3.1 to the Registrant's Current Report on Form 8-K (File No. 001-38139) filed on October 31, 2023)
4.1	Specimen stock certificate evidencing shares of common stock (incorporated by reference to Exhibit 4.1 to the Registrant's Registration Statement on Form S-1 (File No. 333-218474) filed on June 19, 2017)
4.2	Restated Certificate of Incorporation of the Registrant, as amended (incorporated by reference to Exhibit 3.1 to the Registrant's Quarterly Report on Form 10-Q (File No. 001-38130) filed on August 11, 2021)
4.3	Certificate of Amendment of Restated Certificate of Incorporation of the Registrant (incorporated by reference to Exhibit 3.1 to the Registrant's Current Report on Form 8-K (File No. 001-38130) filed on November 10, 2022)
4.4	Amended and Restated By-laws of the Registrant (incorporated by reference to Exhibit 3.2 to the Registrant's Current Report on Form 8-K (File No. 001-38130) filed on July 5, 2017)
4.5	Form of Warrant to Purchase Common Stock to be issued pursuant to the Stock and Warrant Purchase Agreement (incorporated by reference to Exhibit 4.1 to the Registrant's Current Report on Form 8-K (File No. 001-38130) filed on October 31, 2023)
5.1*	Opinion of Wilmer Cutler Pickering Hale and Dorr LLP
10.1	Stock and Warrant Purchase Agreement, dated as of October 31, 2023, by and among Aileron Therapeutics, Inc. and each purchaser identified on Annex A thereto (incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K (File No. 001-38130) filed on October 31, 2023)
10.2	Form of Registration Rights Agreement, by and among Aileron Therapeutics, Inc. and certain purchasers named therein (incorporated by reference to Exhibit 10.2 to the Registrant's Current Report on Form 8-K (File No. 001-38130) filed on October 31, 2023)
23.1*	Consent of PricewaterhouseCoopers LLP
23.2*	Consent of Deloitte LLP
23.3*	Consent of Wilmer Cutler Pickering Hale and Dorr LLP (included in Exhibit 5.1)
24.1*	Power of Attorney (included on signature page)
107*	Filing Fee Table

* Filed herewith.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, as amended, the registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-3 and has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the city of Waltham, Commonwealth of Massachusetts, on January 29, 2024.

AILERON THERAPEUTICS, INC.

By: /s/ Manuel C. Alves-Aivado
Manuel C. Alves-Aivado, M.D., Ph.D.
Chief Executive Officer

SIGNATURES AND POWER OF ATTORNEY

We, the undersigned officers and directors of Aileron Therapeutics, Inc. hereby severally constitute and appoint Manuel C. Alves-Aivado, M.D., Ph.D., Susan L. Drexler, Brian Windsor, Ph.D., and Charles T. Garner, and each of them singly, our true and lawful attorneys-in-fact with full power to any of them, and to each of them singly, to sign for us and in our names in the capacities indicated below the Registration Statement on Form S-3 filed herewith and any and all amendments (including post-effective amendments) to said Registration Statement, and any registration statement filed pursuant to Rule 462 under the Securities Act of 1933, as amended, in connection with said Registration Statement, and to file or cause to be filed the same, with all exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, and generally to do all such things in our name and on our behalf in our capacities as officers and directors to enable Aileron Therapeutics, Inc. to comply with the provisions of the Securities Act of 1933, as amended, and all requirements of the Securities and Exchange Commission, hereby ratifying and confirming all that said attorneys, and each of them, or their substitute or substitutes, shall do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1933, as amended, this Registration Statement has been signed by the following persons in the capacities and on the dates indicated.

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Manuel C. Alves-Aivado</u> Manuel C. Alves-Aivado, M.D., Ph.D.	Chief Executive Officer and Director (Principal Executive Officer)	January 29, 2024
<u>/s/ Susan L. Drexler</u> Susan L. Drexler	Interim Chief Financial Officer (Principal Financial Officer and Principal Accounting Officer)	January 29, 2024
<u>/s/ Josef H. von Rickenbach</u> Josef H. von Rickenbach	Director, Chair of the Board of Directors	January 29, 2024
<u>/s/ Reinhard J. Ambros</u> Reinhard J. Ambros, Ph.D.	Director	January 29, 2024
<u>/s/ William C. Fairey</u> William C. Fairey	Director	January 29, 2024

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<u>/s/ Alan Musso</u> Alan Musso	Director	January 29, 2024
<u>/s/ Nolan Sigal</u> Nolan Sigal, M.D., Ph.D.	Director	January 29, 2024

January 29, 2024

Aileron Therapeutics, Inc.
738 Main Street #398
Waltham, MA 02451

Re: Registration Statement on Form S-3

Ladies and Gentlemen:

This opinion is furnished to you in connection with a Registration Statement on Form S-3 (the "Registration Statement") filed with the Securities and Exchange Commission (the "Commission") under the Securities Act of 1933, as amended (the "Securities Act"), for the registration of the resale of an aggregate of 7,060,500 shares (the "Shares") of common stock, \$0.001 par value per share (the "Common Stock"), of Aileron Therapeutics, Inc., a Delaware corporation (the "Company"). All of the Shares are being registered on behalf of certain stockholders of the Company (the "Selling Stockholders"). The Shares consist of (i) 4,707,000 shares of Common Stock (the "Conversion Shares") issuable upon the conversion of the Company's Series X Non-Voting Convertible Preferred Stock, par value \$0.001 per share (the "Series X Preferred Stock"), issued by the Company in a private placement transaction, and (ii) 2,353,500 shares of Common Stock (the "Warrant Shares") issuable upon exercise of warrants issued by the Company in a private placement transaction (the "Warrants").

We are acting as counsel for the Company in connection with the registration for resale of the Shares. We have examined signed copies of the Registration Statement as filed with the Commission. We have also examined and relied upon minutes of meetings of the Board of Directors of the Company as provided to us by the Company, the stock record books of the Company as provided to us by the Company, the Restated Certificate of Incorporation of the Company, the Amended and Restated By-laws of the Company and the Certificate of Designation of Series X Non-Voting Convertible Preferred Stock, each as restated and/or amended to date, and such other documents as we have deemed necessary for purposes of rendering the opinions hereinafter set forth.

In our examination of the foregoing documents, we have assumed the genuineness of all signatures, the authenticity of all documents submitted to us as originals, the conformity to original documents of all documents submitted to us as copies, the authenticity of the originals of such latter documents and the legal competence of all signatories to such documents.

Our opinion below, insofar as it relates to the Selling Stockholders' shares being fully paid, is based solely on a certificate of the Interim Chief Financial Officer of the Company confirming the Company's receipt of the consideration called for by the applicable resolutions authorizing the issuance of such shares. Our opinion below with respect to the Conversion Shares assumes that prior to the issuance of such shares, the Company's stockholders have approved the conversion of the Series X Preferred Stock into Common Stock.

We assume that the appropriate action will be taken, prior to the offer and sale of the Shares by the Selling Stockholders, to register and qualify the Shares for sale under all applicable state securities or "blue sky" laws.

We express no opinion herein as to the laws of any state or jurisdiction other than the General Corporation Law of the State of Delaware.

Wilmer Cutler Pickering Hale and Dorr LLP, 60 State Street, Boston, Massachusetts 02109

Beijing Berlin Boston Brussels Denver Frankfurt London Los Angeles New York Palo Alto San Francisco Washington

Based upon and subject to the foregoing, we are of the opinion that (i) the Conversion Shares have been duly authorized for issuance and, when issued and delivered upon conversion of the Series X Preferred Stock in accordance with the terms of the Company's Restated Certificate of Incorporation, will be validly issued, fully paid, and nonassessable, and (ii) the Warrant Shares have been duly authorized for issuance and, when issued and delivered in accordance with the terms of the Warrants, including the payment of the exercise price therefor, will be validly issued, fully paid and nonassessable.

It is understood that this opinion is to be used only in connection with the offer and sale of the Shares while the Registration Statement is in effect.

Please note that we are opining only as to the matters expressly set forth herein, and no opinion should be inferred as to any other matters. This opinion is based upon currently existing statutes, rules, regulations and judicial decisions, and we disclaim any obligation to advise you of any change in any of these sources of law or subsequent legal or factual developments which might affect any matters or opinions set forth herein.

We hereby consent to the filing of this opinion with the Commission as an exhibit to the Registration Statement in accordance with the requirements of Item 601(b)(5) of Regulation S-K under the Securities Act and to the use of our name therein and in the related Prospectus under the caption "Legal Matters." In giving such consent, we do not hereby admit that we are in the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations of the Commission.

Very truly yours,

/s/ Wilmer Cutler Pickering Hale and Dorr LLP
WILMER CUTLER PICKERING HALE AND DORR LLP

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in this Registration Statement on Form S-3 of Aileron Therapeutics, Inc. of our report dated March 20, 2023 relating to the financial statements, which appears in Aileron Therapeutics, Inc.'s Annual Report on Form 10-K for the year ended December 31, 2022. We also consent to the reference to us under the heading "Experts" in such Registration Statement.

/s/ PricewaterhouseCoopers LLP
Boston, Massachusetts
January 29, 2024

CONSENT OF INDEPENDENT AUDITOR

We consent to the incorporation by reference in this Registration Statement on Form S-3 of our report dated May 25, 2023 relating to the financial statements of Lung Therapeutics, Inc., appearing in the Current Report on Form 8-K/A of Aileron Therapeutics, Inc. filed on January 11, 2024. We also consent to the reference to us under the heading “Experts” in such Registration Statement.

/s/ Deloitte & Touche LLP

Morristown, NJ

January 29, 2024

Calculation of Filing Fee Tables

Form S-3
(Form Type)Aileron Therapeutics, Inc.
(Exact Name of Registrant as Specified in its Charter)

Table 1: Newly Registered and Carry Forward Securities

	Security Type	Security Class Title	Fee Calculation or Carry Forward Rule	Amount Registered	Proposed Maximum Offering Price Per Unit	Maximum Aggregate Offering Price	Fee Rate	Amount of Registration Fee	Carry Forward Form Type	Carry Forward File Number	Carry Forward Initial Effective Date	Filing Fee Previously Paid In Connection with Unsold Securities to be Carried Forward
Newly Registered Securities												
Fees to Be Paid	Equity	Common Stock, \$0.001 par value per share	Other	7,060,500 (1)	\$4.01 (2)	\$28,312,605.00 (2)	0.00014760	\$4,178.95				
Fees Previously Paid	—	—	—	—	—	—	—	—				
Carry Forward Securities												
Carry Forward Securities	—	—	—	—	—	—	—	—	—	—	—	—
	Total Offering Amounts					\$28,312,605.00 (2)	—	\$4,178.95				
	Total Fees Previously Paid							—				
	Total Fee Offsets							—				
	Net Fee Due							\$4,178.95				

- (1) The shares of common stock will be offered for resale by the selling stockholders pursuant to the prospectus contained in the registration statement to which this exhibit is attached. The registration statement registers the resale of an aggregate of 7,060,500 shares of the Registrant's common stock, which consists of (i) 4,707,000 shares of common stock issuable upon the conversion of the Registrant's Series X Non-Voting Convertible Preferred Stock (the "Series X Preferred Stock") issued in connection with a private placement transaction, and (ii) 2,353,500 shares of common stock issuable upon exercise of warrants issued by the Registrant in a private placement transaction. Pursuant to Rule 416 under the Securities Act of 1933, as amended (the "Securities Act"), the shares of common stock being registered hereunder include such indeterminate number of shares of common stock as may be issuable upon stock splits, stock dividends, or other distribution, recapitalization or similar events.
- (2) This estimate is made pursuant to Rule 457(c) of the Securities Act solely for purposes of calculating the registration fee. The price per share and aggregate offering price are based upon the average of the high and low prices of the Registrant's common stock on January 22, 2024, as reported on the Nasdaq Capital Market.