

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

**FORM S-1
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)

2834
(Primary Standard Industrial
Classification Code Number)
490 Arsenal Way, Suite 210
Watertown, Massachusetts 02472
(617) 995-0900

13-4196017
(I.R.S. Employer
Identification Number)

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

Manuel C. Alves Aivado, M.D., Ph.D.
President and Chief Executive Officer
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Watertown, Massachusetts 02472
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Copies to:

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Approximate date of commencement of proposed sale to public: As soon as practicable after this Registration Statement is declared effective.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, check the following box.

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

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

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

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, 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 not elected to use the extended transition period for complying with any new or revised financial accounting standards provided in Section 7(a)(2)(B) of the Securities Act.

CALCULATION OF REGISTRATION FEE

Title of Each Class of Securities to Be Registered	Amount to be Registered(1)	Proposed Maximum Offering Price Per Share(2)	Proposed Maximum Aggregate Offering Price(2)	Amount of Registration Fee
Common stock, par value \$0.001 per share	26,048,752	\$1.70	\$44,282,878	\$5,367.08

- (1) The shares will be offered for resale by selling stockholders. Pursuant to Rule 416 under the Securities Act, this registration statement also covers any additional number of shares of common stock issuable upon stock splits, stock dividends, dividends or other distribution, recapitalization or similar events with respect to the shares of common stock being registered pursuant to this registration statement.
- (2) Estimated solely for purposes of calculating the registration fee pursuant to Rule 457(c) under the Securities Act, based on average of high and low price per share of the common stock as reported on the Nasdaq Global Market on April 26, 2019.

The Registrant hereby amends this Registration Statement on such date or dates as may be necessary to delay its effective date until the Registrant shall file a further amendment which specifically states that this Registration Statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933 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 jurisdiction where the offer or sale is not permitted.

Subject to completion, dated April 30, 2019

PROSPECTUS



26,048,752 Shares

Common Stock

This prospectus relates to the resale, from time to time, of up to 26,048,752 shares of our common stock by the selling stockholders, including 14,032,064 shares of our common stock that are issuable upon the exercise of outstanding warrants to purchase our common stock held by the selling stockholders. The selling stockholders acquired 11,838,582 of the shares of common stock and the outstanding warrants pursuant to the securities purchase agreement dated March 28, 2019. The balance of the shares of common stock being registered were held by one of the selling stockholders as of March 28, 2019.

We are not selling any securities under this prospectus and we will not receive any proceeds from the sale of the shares.

We have agreed to bear all of the expenses incurred in connection with the registration of these shares. The selling stockholders will pay or assume discounts, commissions, fees of underwriters, selling brokers or dealer managers, if any, incurred for the sale of shares of our common stock.

The selling stockholders, or their pledgees, donees, transferees or other successors-in-interest, identified in this prospectus may offer the shares from time to time through public or private transactions at prevailing market prices, at prices related to prevailing market prices or at privately 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 19. For a list of the selling stockholders, see the section entitled "Selling Stockholders" on page 14.

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 listed on the Nasdaq Global Market, or Nasdaq, under the symbol "ALRN." On April 29, 2019, the closing sale price of our common stock as reported on Nasdaq was \$1.78. You are urged to obtain current market quotations for the common stock.

We are an "emerging growth company" under applicable Securities and Exchange Commission rules and, as such, have elected to comply with certain reduced public company disclosure requirements for this prospectus and future filings. See "Prospectus Summary—Implications of Being an Emerging Growth Company."

Our business and investment in our common stock involve significant risks. These risks are described in the section titled "[Risk Factors](#)" beginning on page 5 of this prospectus.

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

The date of this prospectus is _____, 2019

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You should rely only on the information contained or incorporated by reference in this prospectus. We 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. Information contained on our website is not a part of this prospectus.

PROSPECTUS SUMMARY

This summary highlights, and is qualified in its entirety by, the more detailed information included elsewhere in this prospectus or incorporated by reference. This summary does not contain all of the information that may be important to you. You should read and carefully consider the entire prospectus, especially the “Risk Factors” section of this prospectus, before deciding to invest in our common stock.

Overview

We are a clinical-stage biopharmaceutical company that is focused on developing and commercializing a novel class of stabilized cell-permeating alpha-helical peptides to address intracellular targets in oncology and other therapeutic areas. Our lead product candidate, ALRN-6924, is a cell-permeating peptide that disrupts the interaction of p53 suppressors MDM2 and MDMX with tumor suppressor p53 to reactivate tumor suppression in non-mutant, or wild-type, p53 cancers. Based on preclinical data and preliminary evidence of safety and anti-tumor activity in our ongoing clinical trials, we believe that there may be a significant opportunity to develop ALRN-6924 in combination with other drugs for a wide variety of cancers. Our clinical development program for ALRN-6924 is currently focused on our ongoing Phase 2a clinical trial of the combination of ALRN-6924 and palbociclib (Ibrance), marketed by Pfizer, Inc., for the treatment of MDM2-amplified advanced solid tumors and our planned Phase 1b/2 clinical trial to evaluate ALRN-6924 as a myelopreservative agent, to protect against chemotherapy-induced bone marrow toxicity. Our first planned clinical trial to assess the myelopreservation opportunity will be in small cell lung cancer patients who will be treated with the chemotherapy topotecan.

We have conducted other clinical trials of ALRN-6924 as a single agent and in combination with other therapies. For instance, we have conducted a single-agent Phase 2a trial for the treatment of peripheral T-cell lymphoma, or PTCL, a single-agent Phase 1 trial for the treatment of acute myeloid leukemia, or AML, and advanced high-risk myelodysplastic syndrome, or MDS, and a Phase 1b trial testing the combination of ALRN-6924 and cytarabine, or Ara-C, in patients with MDS. We have observed anticancer activity with ALRN-6924 in each of these trials. However, despite that activity, in light of our resources, and our assessment of the commercial opportunities in these indications, as well as the changed competitive landscape in myeloid cancers where seven drugs were approved for AML in the United States in the last two years, we have determined to cease enrollment in these trials and further clinical development for these indications at this time. We plan to present data from our AML/MDS trials in the fourth quarter of 2019.

We believe that by using our proprietary stabilized cell-permeating peptide platform, we can develop first-in-class molecules, like ALRN-6924, that contain a novel set of properties. As such, our stabilized cell-permeating peptide drugs may be able to address historically undruggable targets, such as intracellular protein-protein interactions like p53 and MDM2/MDMX, that underlie many diseases with high unmet medical need. We believe that stabilized cell-permeating peptide therapeutics have the potential to become a major class of drugs, like small molecules and monoclonal antibodies, for oncology and other therapeutic areas, and may significantly improve treatment paradigms and clinical outcomes for patients. We believe that the ability of our stabilized cell-permeating peptides to target and activate or inhibit key intrinsic cellular functions, such as the p53 signaling pathway and affect key cellular functions such as cell cycle control and apoptosis, along with our scientific expertise in the design, application and development of these stabilized cell-permeating alpha-helical peptides, has the potential to positively impact patients' lives and treatment strategies for a wide variety of cancers. Our belief is based on the scientific evidence that these cellular functions play a key role in cancer formation, maintenance and treatment resistance. As such, we believe the ability to directly affect these key intrinsic cellular functions, which we are seeking to do with ALRN-6924 and p53 reactivation, may have potential advantages over approved drugs and drug candidates that are directed against other targets or systemically by stimulating

immune responses. By targeting a key signaling pathway like p53 that is critical and preserved across a multitude of different cancers, we believe our approach may allow for utility in a broader set of cancer patients

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. Our principal executive office is located at 490 Arsenal Way, Suite 210, Watertown, MA 02472, and our telephone number is (617) 995- 0900. Our website address is <https://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.

Except as otherwise indicated herein or as the context otherwise requires, references in this prospectus to “Aileron,” “the company,” “we,” “us” and “our” refer to Aileron Therapeutics, Inc.

Aileron and the other trademarks or service marks of Aileron appearing in this prospectus are the property of Aileron. All other trademarks, service marks or other trade names appearing in this Annual Report on Form 10-K are the property of their respective owners.

Implications of Being an Emerging Growth Company

As a company with less than \$1.07 billion of revenue during our last fiscal year, we qualify as an “emerging growth company” as defined in the Jumpstart Our Business Startups Act of 2012, or the JOBS Act. We may remain an emerging growth company for up to five years, or until such earlier time as we have more than \$1.07 billion in annual revenue, the market value of our stock held by non-affiliates is more than \$700 million or we issue more than \$1 billion of non-convertible debt over a three-year period. For so long as we remain an emerging growth 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 emerging growth companies.

THE OFFERING

Common stock offered by selling stockholders

26,048,752 shares of our common stock, including 14,032,064 shares of common stock issuable upon exercise of warrants.

Common stock outstanding 26,713,617 shares

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 Global Market symbol “ALRN”

The number of shares of our common stock outstanding is based on 26,713,617 shares outstanding as of April 25, 2019, and excludes:

- 12,935,323 shares of common stock issuable upon exercise of warrants held by the selling stockholders at an exercise price of \$2.00 per share that were sold pursuant to the securities purchase agreement dated March 28, 2019;
- 1,096,741 shares of common stock issuable upon exercise of warrants held by one of the selling stockholders at an exercise price of \$0.01 per share that were sold pursuant to the securities purchase agreement dated March 28, 2019;
- 3,853,304 shares of common stock issuable upon exercise of stock options outstanding as of April 25, 2019, at a weighted average exercise price of \$4.65 per share; and
- 138,650 and 150,000 shares of common stock available for future issuance, as of April 25, 2019, under our 2017 Stock Incentive Plan and our 2017 Employee Stock Purchase Plan, respectively, as well as any automatic increases in the number of shares of common stock reserved under these plans.

DESCRIPTION OF PRIVATE PLACEMENT WITH THE SELLING STOCKHOLDERS

On March 28, 2019, we entered into a securities purchase agreement with the selling stockholders for the issuance and sale of an aggregate of (i) 11,838,582 units, consisting of 11,838,582 shares of common stock and associated warrants, or the Common Warrants, to purchase an aggregate of 11,838,582 shares of common stock, for a combined price of \$2.01 per unit and (ii) 1,096,741 units, consisting of pre-funded warrants to purchase 1,096,741 shares of common stock, or the Pre-Funded Warrants, and associated Common Warrants to purchase 1,096,741 shares of common stock, for a combined price of \$2.01 per unit. The Pre-Funded Warrants are exercisable at an exercise price of \$0.01 per share and have no expiration. The Common Warrants are exercisable at an exercise price of \$2.00 per share and expire five years from the date of issuance. The closing of the issuance and sale of these securities was consummated on April 2, 2019.

We received gross proceeds of approximately \$26.0 million from the sale of these securities, before deducting placement agent fees and offering expenses, and excluding the exercise of any warrants.

For a detailed description of the transactions contemplated by the securities purchase agreement with the selling stockholders and the securities issued pursuant thereto, see the section captioned "Selling Stockholders" in this prospectus. We filed the registration statement on Form S-1, of which this prospectus forms a part, to fulfill our contractual obligations under the registration rights agreement entered into concurrently with the securities purchase agreement with the selling stockholders to provide for the resale by the selling stockholders of the shares of common stock offered hereby.

RISK FACTORS

Investing in our common stock involves a high degree of risk. Investing in our common stock involves a high degree of risk. You should carefully consider the risks and uncertainties described in this prospectus and any accompanying prospectus supplement, including the risk factors set forth in our filings with the SEC that are incorporated by reference herein, including in the “Risk Factors” section of our Annual Report on Form 10-K for the year ended December 31, 2018, before making an investment decision.

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.

CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS AND INDUSTRY DATA

This prospectus includes and incorporates forward-looking statements that involve substantial risks and uncertainties. All statements, other than statements of historical facts, contained or incorporated by reference 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.

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 in this prospectus and in the documents incorporated by reference, particularly in the “Risk Factors” section of our Annual Report on Form 10-K for the year ended December 31, 2018, 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 and the documents that we reference herein and have filed or incorporated by reference hereto 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 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 any discounts, commissions, fees of underwriters, selling brokers or dealer managers 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. We will bear all other costs, fees and 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.

DESCRIPTION OF CAPITAL STOCK

General

The following description of our capital stock is intended as a summary only and therefore is not complete. This description is based upon, and is qualified by reference to, our certificate of incorporation and our bylaws, each as amended from time to time, and by applicable provisions of Delaware corporate law. You should read our certificate of incorporation and bylaws, which are filed as exhibits to the registration statement of which this prospectus forms a part, for the provisions that are important to you.

Our authorized capital stock consists of 150,000,000 shares of common stock, par value \$0.001 per share, and 5,000,000 shares of preferred stock, par value \$0.001 per share. The following description of our capital stock and provisions of our restated certificate of incorporation and amended and restated by-laws are summaries and are qualified by reference to our certificate of incorporation and by-laws. Copies of these documents are filed with the SEC as exhibits to our registration statement of which this prospectus forms a part. As of April 25, 2019, 26,713,617 shares of common stock were outstanding and no shares of preferred stock were outstanding.

Common Stock

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. Other matters shall 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 as otherwise disclosed below. Holders of common stock are entitled to receive proportionately any dividends as may be declared by our board of directors, subject to any preferential dividend rights of outstanding preferred stock.

In the event of our liquidation or dissolution, the holders of 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. Holders of common stock have no preemptive, subscription, redemption or conversion rights. The rights, preferences and privileges of holders of 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.

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 purpose of authorizing our board of directors to issue preferred stock and determine its rights and preferences is to eliminate delays associated with a stockholder vote on specific issuances. The issuance of preferred stock, while providing flexibility in connection with possible acquisitions, future financings and other corporate purposes, could have the effect of making it more difficult for a third party to acquire, or could discourage a third party from seeking to acquire, a majority of our outstanding voting stock.

Anti-Takeover Effects of Delaware Law and Our Charter and Bylaws

Delaware law contains, our certificate of incorporation and our bylaws 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 bylaws 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.

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 bylaws also provide that, except as otherwise required by law, special meetings of our stockholders can only be called by our chairman of the board, our chief executive officer or our board of directors.

Advance Notice Requirements for Stockholder Proposals

Our bylaws 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 General Corporation Law of the State of Delaware. Subject to certain exceptions, Section 203 prevents a publicly held Delaware corporation from engaging in a "business combination" with any "interested stockholder" for three years following the date that the person became an interested stockholder, unless the interested stockholder attained such status with the approval of our board of directors or unless the business combination is approved in a prescribed manner. A "business combination" includes, among other things, a merger or consolidation involving us and the "interested stockholder" and the sale of more than 10% of our assets. In general, an "interested stockholder" is any entity or person beneficially owning 15% or more of our outstanding voting stock and any entity or person affiliated with or controlling or controlled by such entity or person.

Amendment of Certificate of Incorporation and Bylaws

The General Corporation Law of the State of Delaware 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 bylaws, unless a corporation's certificate of incorporation or bylaws, as the case may be, requires a greater percentage. Our bylaws 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."

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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 behalf of our company, (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 our stockholders, (3) any action asserting a claim against our company arising pursuant to any provision of the General Corporation Law of the State of Delaware or our certificate of incorporation or bylaws, or (4) any action asserting a claim against our company governed by the internal affairs doctrine. 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.

Authorized but Unissued Shares

Our authorized but unissued shares of common stock and preferred stock are available for future issuance without stockholder approval, subject to any limitations imposed by the listing requirements of the Nasdaq Global Market. These additional shares may be used for a variety of corporate finance transactions, acquisitions and employee benefit plans. The existence of authorized but unissued and unreserved common stock and preferred stock could make it more difficult or discourage an attempt to obtain control of us by means of a proxy contest, tender offer, merger or otherwise.

Stock Options and Warrants

As of April 25, 2019, we had outstanding warrants to purchase 12,935,323 shares of our common stock at an exercise price of \$2.00 per share and outstanding warrants to purchase 1,096,741 shares of our common stock at an exercise price of \$0.01 per share.

As of April 25, 2019, we had outstanding options to purchase 3,853,304 shares of our common stock at a weighted average price \$4.65 per share. The stock options expire 10 years after their grant date.

Registration Rights

Resale Registration Rights

In connection with the March 2019 private placement, we entered into a registration rights agreement with the purchasers under which we have agreed to file the registration statement of which this prospectus is a part with the SEC, covering the resale of the 11,838,582 shares of common stock issued in the March 2019 private placement, 14,032,064 shares of common stock issuable upon exercise of the warrants issued in the March 2019 private placement and 178,106 shares of common stock held by one of the selling stockholders as of the date of execution of the registration rights agreement.

Investor Rights Agreement

We are a party to an investor rights agreement with certain former holders of our preferred stock, including some of our 5% stockholders and their respective affiliates and entities affiliated with our directors, the right, following the completion of this offering, to require us to register these shares under the Securities Act under specified circumstances as described below. After registration pursuant to these rights, these shares will become freely tradable without restriction under the Securities Act.

Demand Registration Rights

Subject to specified limitations set forth in the investor rights agreement, at any time the holder or holders of at least thirty percent of senior preferred registrable securities, as defined in the investor rights agreement, acting

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together, may demand in writing that we register at least twenty percent of the outstanding registrable securities, as defined in the investor rights agreement, under the Securities Act or any lesser percentage so long as the total amount of registrable shares requested to be registered has an anticipated aggregate offering price to the public of least \$10.0 million. We are not obligated to file a registration statement pursuant to this demand provision on more than two occasions, subject to specified exceptions.

In addition, at any time after we become eligible to file a registration statement on Form S-3 under the Securities Act, subject to specified limitations, a holder or holders of the senior preferred registrable securities may demand in writing that we register on Form S-3 all or part of the registrable securities held by them so long as the total amount of registrable shares requested to be registered has an anticipated aggregate offering price to the public of least \$1.0 million.

Incidental Registration Rights

If, at any time, we propose to file a registration statement to register any of our common stock under the Securities Act, either for our own account or for the account of any of our stockholders that are not holders of registrable securities, and on a form that would also permit the registration of registrable securities, the holders of our registrable securities are entitled to notice of registration and, subject to specified exceptions, we will be required to use our best efforts to register the registrable securities then held by them that they request that we register.

Expenses

Pursuant to the investor rights agreement, we are required to pay all registration expenses, including registration fees, printing expenses, fees and disbursements of our counsel and accountants and reasonable fees and disbursements not to exceed \$30,000 of one counsel representing the selling stockholders, other than any underwriting discounts and commissions, related to any demand or incidental registration.

The investor rights agreement contains customary cross-indemnification provisions, pursuant to which we are obligated to indemnify the selling stockholders in the event of material misstatements or omissions in the registration statement attributable to us, and they are obligated to indemnify us for material misstatements or omissions in the registration statement attributable to them.

Anti-Takeover Effects of Delaware Law and Our Charter and Bylaws

Delaware law and our restated certificate of incorporation and our amended and restated bylaws 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 restated certificate of incorporation and our amended and restated bylaws divide our board of directors into three classes with staggered three-year terms. In addition, a director may only be removed 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 only be filled 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 restated 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 restated certificate of incorporation and our amended and restated bylaws also provide that, except as otherwise required by law, special meetings of our stockholders can only be called by our chairman of the board, our chief executive officer or our board of directors.

Advance Notice Requirements for Stockholder Proposals

Our amended and restated bylaws 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 only 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 General Corporation Law of the State of Delaware. Subject to certain exceptions, Section 203 prevents a publicly held Delaware corporation from engaging in a "business combination" with any "interested stockholder" for three years following the date that the person became an interested stockholder, unless the interested stockholder attained such status with the approval of our board of directors or unless the business combination is approved in a prescribed manner. A "business combination" includes, among other things, a merger or consolidation involving us and the "interested stockholder" and a sale involving us and the "interested stockholder" of 10% or more of our assets. In general, an "interested stockholder" is any entity or person beneficially owning 15% or more of our outstanding voting stock and any entity or person affiliated with or controlling or controlled by such entity or person.

Amendment of Certificate of Incorporation and Bylaws

The General Corporation Law of the State of Delaware 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 bylaws, unless a corporation's certificate of incorporation or bylaws, as the case may be, requires a greater percentage. Our bylaws 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 restated 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 behalf of our company, (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 our stockholders, (3) any action asserting a claim against our company arising pursuant to any provision of the

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General Corporation Law of the State of Delaware or our restated certificate of incorporation or amended and restated bylaws, or (4) any action asserting a claim against our company governed by the internal affairs doctrine. Although our restated 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.

Listing on the Nasdaq Global Market

Our common stock is listed on the Nasdaq Global Market under the symbol “ALRN.”

Authorized but Unissued Shares

The authorized but unissued shares of common stock and preferred stock are available for future issuance without stockholder approval, subject to any limitations imposed by the listing requirements of the Nasdaq Global Market. These additional shares may be used for a variety of corporate finance transactions, acquisitions and employee benefit plans. The existence of authorized but unissued and unreserved common stock and preferred stock could make it more difficult or discourage an attempt to obtain control of us by means of a proxy contest, tender offer, merger or otherwise.

Transfer Agent and Registrar

The transfer agent and registrar for our common stock is Computershare Trust Company, N.A.

SELLING STOCKHOLDERS

On March 28, 2019, we entered into a securities purchase agreement with the selling stockholders, pursuant to which we issued and sold an aggregate of (i) 11,838,582 units, consisting of 11,838,582 shares of common stock, par value \$0.001 per share and associated warrants, or the common stock warrants, to purchase an aggregate of 11,838,582 shares of common stock and (ii) 1,096,741 units, consisting of pre-funded warrants to purchase 1,096,741 shares of common stock and associated common stock warrants to purchase an aggregate of 1,096,741 shares of common stock. The pre-funded warrants are exercisable at an exercise price of \$0.01 per share and have no expiration. The common stock warrants are exercisable at an exercise price of \$2.00 per share and expire five years from the date of issuance. The closing of the issuance and sale of these securities was consummated on April 2, 2019.

The table below sets forth, to our knowledge, information concerning the beneficial ownership of shares of our common stock by the selling stockholders as of April 25, 2019. The information in the table below with respect to the selling stockholders has been obtained from the selling stockholders. The selling stockholders may sell all, some or none of the shares of common stock subject to this prospectus. See “Plan of Distribution.”

Beneficial ownership is determined in accordance with the rules of the SEC and includes voting or investment power with respect to shares. Unless otherwise indicated below, to our knowledge, all persons named in the table have sole voting and investment power with respect to their shares of common stock. The inclusion of any shares in this table does not constitute an admission of beneficial ownership for the person named below.

The number of shares of common stock beneficially owned prior to the offering for each selling stockholder includes (i) all shares of common stock held by such selling stockholder as of April 25, 2019, (ii) all shares of common stock purchased by such selling stockholder in the March 2019 private placement and (iii) all shares of common stock issuable upon exercise of warrants purchased by such selling stockholder in the March 2019 private placement that are exercisable within 60 days of April 25, 2019. The percentages of shares owned before and after the offering are based on 26,713,617 shares of common stock outstanding as of April 25, 2019, which includes the outstanding shares of common stock offered by this prospectus. In computing the number of shares of common stock beneficially owned by a person and the percentage ownership of that person, we deemed outstanding shares of common stock issuable upon the exercise of warrants held by that selling stockholder. We did not deem these shares outstanding, however, for the purpose of computing the percentage ownership of any other person.

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Throughout this prospectus, when we refer to the shares of common stock being offered by this prospectus on behalf of the selling stockholders, we are referring to the shares of common stock sold in the March 2019 private placement, the shares of common stock issuable upon exercise of the warrants sold in the March 2019 private placement and the 178,106 shares of common stock held by one of the selling stockholders as of March 28, 2019 unless otherwise indicated.

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(1)	
	Number	Percentage		Number	Percentage
Satter Medical Technology Partners, L.P.(2)	5,519,373	19.4%	7,462,686	—	—
Entities affiliated with Jennison Associates, LLC(3)	2,741,180	9.9%	3,084,576	—	—
Armistice Capital Master Fund Ltd.(4)	2,137,089	8.0%	6,467,660	—	—
Scott B. Kapnick(5)	2,013,586	7.6%	2,985,074	—	—
Sabby Volatility Warrant Master Fund, Ltd.(6)	1,353,325	4.9%	1,990,048	—	—
Sigma Emerging Markets Ltd.(7)	1,243,780	4.6%	1,243,780	—	—
CVF, LLC(8)	1,094,536	4.0%	1,094,536	—	—
Entities affiliated with Empery Asset Management, LP(9)	497,512	1.8%	497,512	—	—
Lincoln Park Capital Fund, LLC(10)	398,008	1.5%	398,008	—	—
Entities affiliated with DAFNA(11)	199,004	*	199,004	—	—
Trusts and other entities affiliated with Muneer A. Satter(12)	178,106	*	178,106	—	—
Intracoastal Capital LLC(13)	149,252	*	149,252	—	—
CVI Investments Inc.(14)	149,252	*	149,252	—	—
Josef von Rickenback(15)	99,504	*	99,504	—	—
Terry Gottlieb Revocable Trust(16)	49,754	*	49,754	—	—
Total			26,048,752	—	—

* Less than one percent.

- (1) 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 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 exercise of the warrants sold in the March 2019 private placement.
- (2) Consists of (a) 3,731,343 shares of common stock that are held by Satter Medical Technology Partners, L.P., or SMTP, for which Muneer A. Satter has sole voting and dispositive power over all such shares and (b) 1,788,030 shares of common stock which may be acquired upon the exercise of warrants within 60 days of April 25, 2019 for which Mr. Satter has sole voting and dispositive power. As a result of the application of a beneficial ownership cap in the warrants issued to SMTP, the table above under the heading “Shares of Common Stock Beneficially Owned Prior to the Offering” does not include 1,943,313 shares of common stock issuable upon exercise of warrants to purchase common stock held by SMTP. While such shares are being registered under the registration statement of which this prospectus forms a part, under the terms of the warrants, SMTP is not permitted to exercise such warrants to purchase common stock to the extent that such exercise would result in SMTP and its affiliates beneficially owning more than 19.99% of the number of shares of our common stock outstanding immediately after giving effect to the issuance of shares of common stock issuable upon exercise of such warrants to purchase common stock. The address for SMTP is c/o Satter Management Co., L.P., 676 N. Michigan Avenue, Suite 4000, Chicago, IL 60611.

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- (3) Consists of (i) 2,040,255 shares of common stock held by funds managed by Jennison Associates LLC's, or Jennison and (ii) 700,925 shares of common stock which may be acquired upon the exercise of warrants within 60 days of April 25, 2019. As a result of the application of a beneficial ownership cap in the warrants issued to funds managed by Jennison, the table above under the heading "Shares of Common Stock Beneficially Owned Prior to the Offering" does not include 841,363 shares of common stock issuable upon exercise of warrants to purchase common stock beneficially held by funds managed by Jennison. While such shares are being registered under the registration statement of which this prospectus forms a part, under the terms of the warrants, Jennison is not permitted to exercise such warrants to purchase common stock to the extent that such exercise would result in Jennison and its affiliates beneficially owning more than 9.999% of the number of shares of our common stock outstanding immediately after giving effect to the issuance of shares of common stock issuable upon exercise of such warrants to purchase common stock. Jennison has the right to increase this beneficial ownership limitation in its discretion on 61 days' prior written notice to us, provided that in no event is Jennison permitted to exercise such warrants to purchase common stock to the extent that such exercise would result in Jennison and its affiliates beneficially owning in the aggregate more than 14.999% of the number of shares of our common stock outstanding or the combined voting power of our securities outstanding immediately after giving effect to the issuance of shares of common stock issuable upon exercise of such warrants to purchase common stock. Jennison, as the sub-advisor of Prudential Sector Funds, Inc.—PGIM Jennison Health Sciences Fund, or PGIM, and as investment manager of Jennison Global Healthcare Master Fund, Ltd., or the Jennison Fund, and Jenop Global Healthcare Fund Limited, or the Jenop Fund, has voting and dispositive power over the shares and warrants held by PGIM, the Jennison Fund and the Jenop Fund, collectively, the Managed Funds, and may be deemed to beneficially own the shares and warrants held by the Managed Funds. Jennison expressly disclaims ownership of such shares. Jennison is an indirect wholly owned subsidiary of Prudential Financial, Inc., which is a publicly-traded financial services firm. By virtue of his position with Jennison, David Chan, Managing Director of Jennison, and Portfolio Manager of each of the Managed Funds, has authority to vote or dispose of the securities held by the Managed Funds. David Chan expressly disclaims beneficial ownership of such shares. The address for Jennison is 466 Lexington Avenue, New York, New York 10017.
- (4) Consists of 2,137,089 shares of common stock held by Armistice Capital Master Fund Ltd, or Armistice. As a result of the application of a beneficial ownership cap in the warrants issued to Armistice, the table above under the heading "Shares of Common Stock Beneficially Owned Prior to the Offering" does not include 4,330,571 shares of common stock issuable upon exercise of warrants to purchase common stock held by Armistice. While such shares are being registered under the registration statement of which this prospectus forms a part, under the terms of the warrants, Armistice is not permitted to exercise such warrants to purchase common stock to the extent that such exercise would result in Armistice and its affiliates beneficially owning more than 9.999% of the number of shares of our common stock outstanding immediately after giving effect to the issuance of shares of common stock issuable upon exercise of such warrants to purchase common stock. Armistice has the right to increase this beneficial ownership limitation in its discretion on 61 days' prior written notice to us, provided that in no event is Armistice permitted to exercise such warrants to purchase common stock to the extent that such exercise would result in Armistice and its affiliates beneficially owning in the aggregate more than 19.99% of the number of shares of our common stock outstanding or the combined voting power of our securities outstanding immediately after giving effect to the issuance of shares of common stock issuable upon exercise of such warrants to purchase common stock. Armistice Capital, LLC, the investment manager of Armistice, and Steven J. Boyd, the managing member of Armistice Capital, LLC hold shared voting and dispositive power over the shares of common stock and warrants held by Armistice. The address for Armistice is 510 Madison Avenue, 7th Floor, New York, NY 10017.
- (5) Consists of (i) 1,946,920 shares of common stock held of record by Scott B. Kapnick, (ii) 66,666 shares of common stock held by Jake86 LLC, for which Mr. Kapnick serves as investment manager and (iii) 27,951 shares of common stock underlying options that are exercisable as of April 25, 2019 or will become exercisable within 60 days after such date. As a result of the application of a beneficial ownership cap in the warrants issued to Mr. Kapnick, the table above under the heading "Shares of Common Stock Beneficially Owned Prior to the Offering" does not include 1,492,537 shares of common stock issuable upon exercise of

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warrants to purchase common stock held by Mr. Kapnick. While such shares are being registered under the registration statement of which this prospectus forms a part, under the terms of the warrants, Mr. Kapnick is not permitted to exercise such warrants to purchase common stock to the extent that such exercise would result in Mr. Kapnick and his affiliates beneficially owning more than 4.999% of the number of shares of our common stock outstanding immediately after giving effect to the issuance of shares of common stock issuable upon exercise of such warrants to purchase common stock. Mr. Kapnick has the right to increase this beneficial ownership limitation in his discretion on 61 days' prior written notice to us. Mr. Kapnick disclaims beneficial ownership of the shares held by Jake86 LLC. Mr. Kapnick is a former member of our board of directors. The address for Mr. Kapnick is 20 East 73rd St, New York, New York 10021.

- (6) Consists of (i) 995,024 shares held by Sabby Volatility Warrant Master Fund, Ltd., or Sabby, and (ii) 995,024 shares of common stock which may be acquired upon the exercise of warrants within 60 days of April 25, 2019. As a result of the application of a beneficial ownership cap in the warrants issued to Sabby, the table above under the heading "Shares of Common Stock Beneficially Owned Prior to the Offering" does not include 358,301 shares of common stock issuable upon exercise of warrants to purchase common stock held by Sabby. While such shares are being registered under the registration statement of which this prospectus forms a part, under the terms of the warrants, Sabby is not permitted to exercise such warrants to purchase common stock to the extent that such exercise would result in Sabby and its affiliates beneficially owning more than 4.999% of the number of shares of our common stock outstanding immediately after giving effect to the issuance of shares of common stock issuable upon exercise of such warrants to purchase common stock. Sabby has the right to increase this beneficial ownership limitation in its discretion on 61 days' prior written notice to us, provided that in no event is Sabby permitted to exercise such warrants to purchase common stock to the extent that such exercise would result in Sabby and its affiliates beneficially owning in the aggregate more than 9.999% of the number of shares of our common stock outstanding or the combined voting power of our securities outstanding immediately after giving effect to the issuance of shares of common stock issuable upon exercise of such warrants to purchase common stock. Sabby Management, LLC, the investment manager of Sabby, and Hal Mintz, manager of Sabby Management, LLC, share voting and investment power with respect to these securities. Each of Sabby Management, LLC and Hal Mintz disclaims beneficial ownership over the securities. The address of Sabby is 10 Mountainview Road, Suite 205, Upper Saddle River, NJ 07458.
- (7) Consists of (i) 621,890 shares held by Sigma Emerging Markets Ltd., or Sigma, and (ii) 621,890 shares of common stock which may be acquired upon the exercise of warrants within 60 days of April 25, 2019. Jaime Javier Montealegre Lacayo has investment discretion and voting power over the shares and warrants held by Sigma. The address for Sigma is OMC Chambers, Wickhams Cay 1, Road Town, Tortola, British Virgin Islands.
- (8) Consists of (i) 547,268 shares held by CVF, LLC and (ii) 547,628 shares of common stock which may be acquired upon the exercise of warrants within 60 days of April 25, 2019. Richard H. Robb, manager of CVF, LLC, exercises voting and investment power with respect to shares held by CVF, LLC. Mr. Robb disclaims beneficial ownership of all shares and warrants held by CVF, LLC. The address of CVF, LLC is 222 N. LaSalle Street, Suite 2000, Chicago, IL 60601.
- (9) Consists of (i) 148,404 shares held by Empery Tax Efficient II, LP, (ii) 148,404 shares of common stock which may be acquired by Empery Tax Efficient II, LP upon the exercise of warrants within 60 days of April 25, 2019, (iii) 82,944 shares held by Empery Asset Master, Ltd., (iv) 82,944 shares of common stock which may be acquired by Empery Asset Master, Ltd. upon the exercise of warrants within 60 days of April 25, 2019, (v) 17,408 shares held by Empery Tax Efficient, LP and (vi) 17,408 shares of common stock which may be acquired by Empery Tax Efficient, LP upon the exercise of warrants within 60 days of April 25, 2019. Empery Asset Management LP, the authorized agent of each of Empery Tax Efficient II, LP, Empery Asset Master, Ltd. and Empery Tax Efficient, LP, collectively, the Empery Entities, has discretionary authority to vote and dispose of the shares and warrants held by the Empery Entities and may be deemed to be the beneficial owner of these shares. Martin Hoe and Ryan Lane, in their capacity as investment managers of Empery Asset Management LP, may also be deemed to have investment discretion and voting power over the shares and warrants held by the Empery Entities. Empery Asset Management LP, Mr. Hoe and Mr. Lane each disclaim any beneficial ownership of these shares. The address of Empery Asset Management LP is One Rockefeller Plaza, Suite 1205, New York, NY 10020.

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- (10) Consists of (i) 199,004 shares held by Lincoln Park Capital Fund, LLC, or Lincoln Park, and (ii) 199,004 shares of common stock which may be acquired upon the exercise of warrants within 60 days of April 25, 2019. Josh Scheinfeld and Jonathan Cope, the Managing Members of Lincoln Park Capital, LLC, are deemed to be beneficial owners of all of the shares of common stock held by Lincoln Park Capital Fund, LLC. Messrs. Cope and Scheinfeld have shared voting and investment power over the shares. The address for Lincoln Park is 440 North Wells Street, Suite 410, Chicago, IL 60654.
- (11) Consists of (i) 69,652 shares held by DAFNA LifeScience, LP, (ii) 69,652 shares of common stock which may be acquired by DAFNA LifeScience, LP upon the exercise of warrants within 60 days of April 25, 2019, (iii) 29,850 shares held by DAFNA LifeScience Select, LP and (iv) 29,850 shares of common stock which may be acquired by DAFNA LifeScience Select, LP upon the exercise of warrants within 60 days of April 25, 2019. DAFNA Capital Management LLC is the sole general partner of DAFNA LifeScience, LP and DAFNA LifeScience Select, LP. The Chief Executive Officer and Chief Investment Officer of DAFNA Capital Management LLC are Dr. Nathan Fischel and Dr. Fariba Ghodsian, respectively. These individuals may be deemed to have shared voting and investment power of the shares and warrants held by DAFNA LifeScience, LP and DAFNA LifeScience Select, LP. Each of Dr. Fischel and Dr. Fariba disclaim beneficial ownership of such shares. The address for DAFNA Capital Management LLC is 10990 Wilshire Boulevard, Suite 1400, Los Angeles, CA 90024.
- (12) Consists of (i) 161,440 shares of common stock that are held by Muneer A. Satter Revocable Trust for which Mr. Satter serves as trustee and, in such capacity, has sole voting and dispositive power over all such shares, and (b) 16,666 shares of common stock that are held by various other trusts and other entities for which Mr. Satter serves as trustee, investment advisor or manager and, in such capacity, has sole voting and dispositive power over all such shares. The address for Mr. Satter is c/o Satter Management Co., L.P., 676 N. Michigan Avenue, Suite 4000, Chicago, IL 60611.
- (13) Consists of (i) 74,626 shares held by Intracoastal Capital LLC, or Intracoastal, and (ii) 74,626 shares of common stock which may be acquired upon the exercise of warrants within 60 days of April 25, 2019. Mitchell P. Kopin and Daniel B. Asher, each of whom are managers of Intracoastal have shared voting control and investment discretion over the securities reported herein that are held by Intracoastal. As a result, each of Mr. Kopin and Mr. Asher may be deemed to have beneficial ownership of the securities reported herein that are held by Intracoastal. The address of Intracoastal is 245 Palm Trail, Delray Beach, FL 33483.
- (14) Consists of (i) 74,626 shares held by CVI Investments Inc., or CVI, and (ii) 74,626 shares of common stock which may be acquired upon the exercise of warrants within 60 days of April 25, 2019. Heights Capital Management, Inc., the authorized agent of CVI, has discretionary authority to vote and dispose of the shares held by CVI and may be deemed to be the beneficial owner of these shares. Martin Kobinger, in his capacity as Investment Manager of Heights Capital Management, Inc., may also be deemed to have investment discretion and voting power over the shares and warrants held by CVI. Mr. Kobinger disclaims any such beneficial ownership of the shares. The address for CVI Investments, Inc. is c/o Heights Capital Management, Inc., 101 California Street, Suite 3250, San Francisco, California 94111.
- (15) Consists of (i) 49,752 shares held by Josef von Rickenbach and (ii) 49,752 shares of common stock which may be acquired upon the exercise of warrants within 60 days of April 25, 2019. The address for Mr. Rickenbach is 28 Brent Road, Lexington, MA 02420.
- (16) Consists of (i) 24,877 shares held by the Terry J. Gottlieb Revocable Trust, or the Gottlieb Trust, and (ii) 24,877 shares of common stock which may be acquired upon the exercise of warrants within 60 days of April 25, 2019. Terry J. Gottlieb has investment discretion and voting power over the shares and warrants held by the Gottlieb Trust. The address for Mr. Gottlieb is 9913 Casabella Way, Bonita Springs, FL 34135

Scott B. Kapnick served on our board of directors until his resignation, which was effective on February 28, 2019. Mr. Kapnick was the chairman of the board of directors until March 15, 2018. Other than Mr. Kapnick, none of the selling stockholders has held any position or office, or has otherwise had a material relationship, with us within the past three years.

PLAN OF DISTRIBUTION

The selling stockholders, which as used herein includes donees, pledgees, transferees or other successors-in-interest selling shares of common stock or interests in shares of common stock received after the date of this prospectus from a selling stockholder as a gift, pledge, partnership distribution or other transfer, may, from time to time, sell, transfer or otherwise dispose of any or all of their shares of common stock or interests in shares of common stock on any stock exchange, market or trading facility on which the shares are traded or in private transactions. These dispositions may be at fixed prices, at prevailing market prices at the time of sale, at prices related to the prevailing market price, at varying prices determined at the time of sale, or at negotiated prices.

The selling stockholders may use any one or more of the following methods when disposing of shares or interests therein:

- 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;
- short sales effected after the date the registration statement of which this prospectus is a part is declared effective by the SEC;
- through the writing or settlement of options or other hedging transactions, whether through an options exchange or otherwise;
- broker-dealers may agree with the selling stockholders to sell a specified number of such shares at a stipulated price per share;
- a combination of any such methods of sale; and
- any other method permitted by applicable law.

The selling stockholders may, from time to time, pledge or grant a security interest in some or all of the shares of common stock 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 of common stock, from time to time, under this prospectus, or under an amendment to this prospectus under Rule 424(b)(3) or other applicable provision of the Securities Act amending 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 the shares of common stock in other circumstances, in which case the transferees, pledgees or other successors in interest will be the selling beneficial owners for purposes of this prospectus.

In connection with the sale of our common stock or interests therein, the selling stockholders may enter into hedging transactions with broker-dealers or other financial institutions, which may in turn engage in short sales of the common stock in the course of hedging the positions they assume. The selling stockholders may also sell shares of our common stock short and deliver these securities to close out their short positions, or loan or pledge the common stock to broker-dealers that in turn may sell these securities. The selling stockholders may also enter into option or other transactions with broker-dealers or other financial institutions or 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).

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The aggregate proceeds to the selling stockholders from the sale of the common stock offered by them will be the purchase price of the common stock less discounts or commissions, if any. Each of the selling stockholders reserves the right to accept and, together with their agents from time to time, to reject, in whole or in part, any proposed purchase of common stock to be made directly or through agents. We will not receive any of the proceeds from this offering. Upon any exercise of the warrants by payment of cash, however, we will receive the exercise price of the warrants.

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 of 1933, provided that they meet the criteria and conform to the requirements of that rule.

The selling stockholders and any underwriters, broker-dealers or agents that participate in the sale of the common stock or interests therein may be “underwriters” within the meaning of Section 2(11) of the Securities Act. Any discounts, commissions, concessions or profit they earn on any resale of the shares may be underwriting discounts and commissions under the Securities Act. Selling stockholders who are “underwriters” within the meaning of Section 2(11) of the Securities Act will be subject to the prospectus delivery requirements of the Securities Act.

To the extent required, the shares of our common stock to be sold, the names of the selling stockholders, the respective purchase prices and public offering prices, the names of any agents, dealer or underwriter, any applicable commissions or discounts with respect to a particular offer will be set forth in an accompanying prospectus supplement or, if appropriate, a post-effective amendment to the registration statement that includes this prospectus.

In order to comply with the securities laws of some states, if applicable, the common stock may be sold in these jurisdictions only through registered or licensed brokers or dealers. In addition, in some states the common stock may not be sold unless it has been registered or qualified for sale or an exemption from registration or qualification requirements is available and is complied with.

We have advised the selling stockholders that the anti-manipulation rules of Regulation M under the Exchange Act may apply to sales of shares in the market and to the activities of the selling stockholders and their affiliates. In addition, to the extent applicable we will make copies of this prospectus (as it may be supplemented or amended from time to time) available to the selling stockholders for the purpose of satisfying the prospectus delivery requirements of the Securities Act. The selling stockholders may indemnify any broker-dealer that participates in transactions involving the sale of the shares against certain liabilities, including liabilities arising under the Securities Act.

We have agreed to indemnify the selling stockholders against liabilities, including liabilities under the Securities Act and state securities laws, relating to the registration of the shares offered by this prospectus.

We have agreed with the selling stockholders to keep the registration statement of which this prospectus constitutes a part effective until the earlier of (1) such time as all of the shares covered by this prospectus have been disposed of pursuant to and in accordance with such registration statement or (2) the date on which all of the shares may be sold without restriction pursuant to Rule 144 of the Securities Act.

We have advised the selling stockholders that the anti-manipulation rules of Regulation M under the Exchange Act may apply to sales of shares in the market and to the activities of the selling stockholders and their affiliates. In addition, we will make copies of this prospectus available to the selling stockholders for the purpose of satisfying the prospectus delivery requirements of the Securities Act. The selling stockholders may indemnify any broker-dealer that participates in transactions involving the sale of the shares against certain liabilities, including liabilities arising under the Securities Act.

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At the time a particular offer of shares is made, if required, a prospectus supplement will be distributed that will set forth the number of shares being offered and the terms of the offering, including the name of any underwriter, dealer or agent, the purchase price paid by any underwriter, any discount, commission and other item constituting compensation, any discount, commission or concession allowed or reallocated or paid to any dealer, and the proposed selling price to the public.

We have agreed to indemnify the selling stockholders against certain liabilities, including certain liabilities under the Securities Act.

We have agreed with the selling stockholders to keep the registration statement of which this prospectus constitutes a part effective until the earlier of (i) such time as all of the shares covered by this prospectus have been disposed of pursuant to and in accordance with the registration statement or (ii) the date on which all of the shares may be sold without restriction pursuant to Rule 144 of the Securities Act.

LEGAL MATTERS

The validity of the shares of our common stock offered hereby is being passed upon for us by Wilmer Cutler Pickering Hale and Dorr LLP.

EXPERTS

The financial statements incorporated in this prospectus by reference to the Annual Report on Form 10-K for the year ended December 31, 2018 have been so incorporated in reliance on the report (which contains an explanatory paragraph relating to 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.

WHERE YOU CAN FIND MORE INFORMATION

We file annual, quarterly and current reports, proxy statements and other documents 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 <http://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 subsidiary 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. 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 it, 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. Any statement contained in a previously filed document incorporated by reference will be deemed to be modified or superseded for purposes of this prospectus to the extent that a statement contained in this prospectus modifies or replaces that statement. 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 after the date of this prospectus and prior to the sale of all the shares covered by this prospectus, other than the portions of those documents not deemed to be filed.

1. Our Annual Report on Form 10-K for the year ended December 31, 2018, including the information specifically incorporated by reference into the Annual Report on Form 10-K from our definitive proxy statement for the 2019 Annual Meeting of Stockholders;
2. Our Current Reports on Form 8-K filed with the SEC on March 1, 2019, April 1, 2019 and April 3, 2019;
3. The description of our common stock contained in our Registration Statement on Form 8-A filed on June 23, 2017, including any amendments or reports filed for the purpose of updating such description; and
4. any other filings we make pursuant to the Exchange Act after the date of filing the initial registration statement and prior to effectiveness of the registration statement.

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.
490 Arsenal Way, Suite 210
Watertown, Massachusetts, 02472
(617) 995-0900

26,048,752 Shares

Common Stock

PROSPECTUS

, 2019

PART II
INFORMATION NOT REQUIRED IN PROSPECTUS

Item 13. 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 us (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.

	Amount
SEC registration fee	\$ 5,367
Accounting fees and expenses	\$20,000
Legal fees and expenses	\$40,000
Miscellaneous fees and expenses	\$20,000
Total expenses	\$85,367

Item 14. Indemnification of Directors and Officers.

Section 102 of the General Corporation Law of the State of Delaware permits a corporation to eliminate the personal liability of its directors for monetary damages for a breach of fiduciary duty as a director, except where the director breached his or her duty of loyalty, failed to act in good faith, engaged in intentional misconduct or knowingly violated a law, authorized the payment of a dividend or approved a stock repurchase in violation of Delaware corporate law or obtained an improper personal benefit. 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 General Corporation Law of the State of Delaware prohibits the elimination or limitation of liability of directors for breaches of fiduciary duty.

Section 145 of the General Corporation Law of the State of Delaware 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

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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 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 15. Recent Sales of Unregistered Securities.

Set forth below is information regarding shares of our common stock and shares of our preferred stock, and stock options granted, by us within the past three years that were not registered under the Securities Act. Included is the consideration, if any, we received for such shares and options and information relating to the section of the Securities Act, or rule of the SEC, under which exemption from registration was claimed.

(a) Issuance of Shares of Preferred Stock

In December 2016, we issued and sold an aggregate of 13,949,357 shares of our Series F preferred stock at a purchase price of \$1.36 for an aggregate purchase price of approximately \$18,971,000.

In December 2016, we issued an aggregate of 8,927,582 shares of our Series E-2 preferred stock and 16,567,108 shares of our Series E-3 preferred stock in exchange for an aggregate of 8,927,582 shares of our Series E preferred stock and 16,567,108 shares of our Series E-1 preferred stock, respectively.

In February 2017, we issued and sold 483,501 shares of our Series F preferred stock at a purchase price per share of \$1.36 per share for an aggregate purchase price of approximately \$658,000, and a holder of 4,411,765 shares of our Series E-1 preferred stock exchanged these shares for 4,411,765 shares of our Series E-3 preferred stock.

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All outstanding shares of Series F preferred stock converted into an aggregate of 1,452,436 shares of common stock upon completion of our initial public offering. All outstanding shares of Series E-3 preferred stock converted into an aggregate of 2,111,187 shares of common stock upon completion of our initial public offering. All outstanding shares of Series E-2 preferred stock converted into an aggregate of 898,418 shares of common stock upon completion of this our initial public offering. All outstanding shares of Series E-1 preferred stock converted into an aggregate of 330,666 shares of common stock upon completion of our initial public offering.

On March 28, 2019, we entered into a securities purchase agreement with certain accredited investors pursuant to which we, in a private placement, agreed to issue and sell to the investors an aggregate of (i) 11,838,582 units, consisting of 11,838,582 shares of common stock and associated warrants to purchase an aggregate of 11,838,582 shares of common stock, for a combined price of \$2.01 per unit and (ii) 1,096,741 units, consisting of pre-funded warrants to purchase 1,096,741 shares of the common stock and associated warrants to purchase an aggregate of 1,096,741 shares of common stock, for a combined price of \$2.01 per unit. The aggregate purchase price paid by the investors was approximately \$26.0 million.

No underwriters were involved in the foregoing issuances of securities. The securities described in this section (a) of Item 15 were issued to investors in reliance upon the exemption from the registration requirements of the Securities Act, as set forth in Section 4(a)(2) under the Securities Act and/or Regulation D promulgated thereunder relative to transactions by an issuer not involving any public offering, to the extent an exemption from such registration was required. The recipients of securities in the transactions described above represented that they were accredited investors and were acquiring the securities for their own account for investment purposes only and not with a view to, or for sale in connection with, any distribution thereof and that they could bear the risks of the investment and could hold the securities for an indefinite period of time and appropriate legends were affixed to the instruments representing such securities issued in such transactions.

(b) Stock option grants and option exercises

Between April 30, 2016 and April 30, 2019, we granted options to purchase an aggregate of 3,768,277 shares of common stock, with exercise prices ranging from \$1.47 to \$15.00 per share, to employees, directors, consultants and advisors pursuant to our 2006 stock incentive plan, as amended, our 2016 stock incentive plan and our 2017 stock incentive plan. From April 25, 2016 through the filing of our registration statement on Form S-8 on July 5, 2017, we issued an aggregate of 28,341 shares of common stock upon the exercise of options for aggregate consideration of \$106,326.

No underwriters were involved in the foregoing issuances of securities. The issuances of stock options and the shares of our common stock issued upon the exercise of the options described in this paragraph (b) of Item 15 were issued pursuant to written compensatory plans or arrangements with our employees, directors and consultants, in reliance on the exemption provided by Rule 701 promulgated under the Securities Act, or pursuant to Section 4(a)(2) under the Securities Act, relative to transactions by an issuer not involving any public offering, to the extent an exemption from such registration was required. All recipients either received adequate information about us or had access, through employment or other relationships, to such information.

Item 16. Exhibits and Financial Statement Schedules.

(a) Exhibits.

The exhibits to the registration statement are listed in the Exhibit Index attached hereto and incorporated by reference herein.

(b) Financial Statement Schedules.

No financial statement schedules are provided because the information called for is not required or is shown either in the financial statements or notes.

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 (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 the volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the Commission pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than 20 percent change in the maximum aggregate offering price set forth in the “Calculation of Registration Fee” table in the effective Registration Statement; and
 - (iii) To include any material information with respect to the plan of distribution not previously disclosed in 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 periodic 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 (the “Exchange Act”), that are incorporated by reference in 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.
- (4) That, for the purpose of determining liability under the Securities Act of 1933 to any purchaser, each prospectus filed pursuant to Rule 424(b) as part of a registration statement relating to an offering, other than registration statements relying on Rule 430B or other than prospectuses filed in reliance on Rule 430A, shall be deemed to be part of and included in the registration statement as of the date it is first used after effectiveness; provided, however, that no statement made in a registration statement or prospectus that is part of the registration statement or made in a document incorporated or deemed incorporated by reference into the registration statement or prospectus that is part of the registration statement will, as to a purchaser with a time of contract of sale prior to such first use, supersede or modify any statement that was made in the registration statement or prospectus that was part of the registration statement or made in any such document immediately prior to such date of first use.

(b) The 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.

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

EXHIBIT INDEX

Exhibit No.	Description	Incorporation by Reference			Filed with this Registration Statement
		Form	SEC Filing Date	Exhibit Number	
3.1	Restated Certificate Incorporation of the Registration	8-K	7/5/2017	3.1	
3.2	Amended and Restated Bylaws of the Registrant	8-K	7/5/2017	3.2	
4.1	Specimen stock certificate evidencing shares of common stock	S-1^	6/19/2017	4.1	
4.2	Seventh Amended and Restated Investor Rights Agreement, dated as of December 23, 2016, among the Registrant and the other parties thereto	S-1^	6/2/2017	4.2	
5.1	Opinion of Wilmer Cutler Pickering Hale and Dorr LLP	S-1			X
10.1*	2006 Stock Incentive Plan, as amended	S-1^	6/2/2017	10.1	
10.2*	Form of Incentive Stock Option Agreement under 2006 Stock Incentive Plan	S-1^	6/2/2017	10.2	
10.3*	Form of Nonstatutory Stock Option Agreement under 2006 Stock Incentive Plan	S-1^	6/2/2017	10.3	
10.4*	2016 Stock Incentive Plan	S-1^	6/2/2017	10.4	
10.5*	Form of Incentive Stock Option Agreement under 2016 Stock Incentive Plan	S-1^	6/2/2017	10.5	
10.6*	Form of Nonstatutory Stock Option Agreement under 2016 Stock Incentive Plan	S-1^	6/2/2017	10.6	
10.7*	2017 Stock Incentive Plan	S-1^	6/19/2017	10.8	
10.8*	Form of Incentive Stock Option Agreement under 2017 Stock Incentive Plan	S-1^	6/19/2017	10.9	
10.9*	Form of Nonstatutory Stock Option Agreement under 2017 Stock Incentive Plan	S-1^	6/19/2017	10.10	
10.10*	2017 Employee Stock Purchase Plan	S-1^	6/19/2017	10.11	
10.11*	Form of Director and Officer Indemnification Agreement	S-1^	6/19/2017	10.12	
10.12+	License Agreement, dated as of December 31, 2006, by and between the Registrant and Matera, Inc. (now Umicore Precious Metals Chemistry USA, LLC)	S-1^	6/2/2017	10.13	

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<u>Exhibit No.</u>	<u>Description</u>	<u>Incorporation by Reference</u>			<u>Filed with this Registration Statement</u>
		<u>Form</u>	<u>SEC Filing Date</u>	<u>Exhibit Number</u>	
10.13+	<u>Amended and Restated License Agreement, dated as of February 19, 2010, by and among the Registrant, President and Fellows of Harvard College and Dana-Farber Cancer Institute, Inc.</u>	S-1^	6/2/2017	10.14	
10.14	<u>Lease Agreement, effective as of April 4, 2018, between the Registrant and 480 Arsenal Group LLC</u>	10-Q	8/7/2018	10.1	
10.15	<u>Amendment to Lease Agreement, dated as of August 23, 2018, between the Registrant and 480 Arsenal Group LLC</u>	10-Q	8/7/2018	10.1	
10.16*	<u>Amended and Restated Employment Agreement, dated as of September 6, 2018, between the Registrant and Manuel C. Alves Aivado, M.D., Ph.D.</u>	10-Q	11/7/2018	10.2	
10.17*	<u>Severance Agreement, dated as of September 6, 2018, between the Registrant and Manuel C. Alves Aivado, M.D., Ph.D.</u>	10-Q	11/7/2018	10.3	
10.18*	<u>Employment Agreement, dated as of June 5, 2017, between the Registrant and Donald V. Dougherty</u>	S-1^	6/19/2017	10.20	
10.19*	<u>Severance Agreement, dated as of October 1, 2018, between the Registrant and Donald V. Dougherty</u>	10-K	3/29/2017	10.19	
10.20*	<u>Offer Letter and Severance Agreement, dated as of November 1, 2018, between the Registrant and Vojislav Vukovic, M.D., Ph.D.</u>	10-K	3/29/2017	10.20	
10.21*	<u>Offer Letter, dated as of November 15, 2007, between the Registrant and D. Allen Annis, Ph.D.</u>	10-K	3/29/2017	10.21	
10.22*	<u>Severance Agreement, dated as of November 5, 2018, between the Registrant and D. Allen Annis, Ph.D.</u>	10-K	3/29/2017	10.22	
10.23*	<u>Offer Letter and Severance Agreement, dated as of February 15, 2019, between the Registrant and Kathryn Gregory</u>	10-K	3/29/2017	10.23	
10.24*	<u>Employment Agreement, dated as of May 15, 2018, between the Registrant and John P. Longenecker</u>	10-Q	8/7/2018	10.3	

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<u>Exhibit No.</u>	<u>Description</u>	<u>Incorporation by Reference</u>			<u>Filed with this Registration Statement</u>
		<u>Form</u>	<u>SEC Filing Date</u>	<u>Exhibit Number</u>	
10.25*	Consulting Agreement, dated as of September 30, 2018, between the Registrant and John P. Longenecker, as subsequently amended on December 17, 2018	10-K	3/29/2017	10.25	
10.26*	Employment Agreement, dated as of March 1, 2008, between the Registrant and Joseph A. Yanchik III, as amended on December 31, 2008	S-1^	6/2/2017	10.16	
10.27*	Separation and Release of Claims Agreement, dated as of May 15, 2018, between the Registrant and Joseph A. Yanchik III.	10-Q	8/7/2018	10.2	
10.28	Securities Purchase Agreement, dated March 28, 2019, by and among Registrant and the persons party thereto	8-K	3/29/2019	10.1	
10.29	Form of Pre-Funded Warrant to Purchase Common Stock	8-K	3/29/2019	10.2	
10.30	Form of Warrant to Purchase Common Stock	8-K	3/29/2019	10.3	
10.31	Registration Rights Agreement, dated March 28, 2019, by and among the Registrant and the persons party thereto	8-K	3/29/2019	10.4	
23.1	Consent of PricewaterhouseCoopers LLP, independent registered public accounting firm				X
23.2	Consent of Wilmer Cutler Pickering Hale and Dorr LLP (included in Exhibit 5.1)				X
24.1	Power of Attorney (included on signature page)				X

* Indicates management contract or compensatory plan.

+ Confidential treatment has been requested and/or granted as to certain portions, which portions have been omitted and filed separately with the U.S. Securities and Exchange Commission.

^ SEC File No. 333-218474

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, as amended, the registrant has duly caused this Registration Statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Watertown, Commonwealth of Massachusetts on April 30, 2019.

AILERON THERAPEUTICS, INC.

By: /s/ Donald V. Dougherty
Donald V. Dougherty
Senior Vice President, Chief Financial Officer

SIGNATURES AND POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below hereby constitutes and appoints Manuel C. Alves Aivado, Donald V. Dougherty and Richard J. Wanstall, and each of them, as his or her true and lawful attorney-in-fact and agent with full power of substitution, for him or her in any and all capacities, to sign any and all amendments to this registration statement (including post-effective amendments or any abbreviated registration statement and any amendments thereto filed pursuant to Rule 462(b) increasing the number of securities for which registration is sought), and to file the same, with all exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorney-in-fact and agent full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully for all intents and purposes as he or she might or could do in person, hereby ratifying and confirming all that said attorney-in-fact and agent, or his substitute, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act, this Registration Statement has been signed below 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, M.D., Ph.D.</u> Manuel C. Alves Aivado, M.D., Ph.D.	President, Chief Executive Officer and Director (principal executive officer)	April 30, 2019
<u>/s/ Donald V. Dougherty</u> Donald V. Dougherty	Senior Vice President, Chief Financial Officer (principal financial officer)	April 30, 2019
<u>/s/ Richard J. Wanstall</u> Richard J. Wanstall	Vice President, Finance and Operations (principal accounting officer)	April 30, 2019
<u>/s/ Jeffrey A. Bailey</u> Jeffrey A. Bailey	Director	April 30, 2019
<u>/s/ Reinhard J. Ambros, Ph.D.</u> Reinhard J. Ambros, Ph.D.	Director	April 30, 2019
<u>/s/ John H. McArthur, D.B.A.</u> John H. McArthur, D.B.A.	Director	April 30, 2019
<u>/s/ Jodie P. Morrison</u> Jodie P. Morrison	Director	April 30, 2019
<u>/s/ Armen B. Shanafelt, Ph.D.</u> Armen B. Shanafelt, Ph.D.	Director	April 30, 2019
<u>/s/ Nolan Sigal, M.D.</u> Nolan Sigal, M.D.	Director	April 30, 2019
<u>/s/ Caleb Winder</u> Caleb Winder	Director	April 30, 2019

WILMERHALE

+1 617 526 6000 (t)
+1 617 526 5000 (f)
wilmerhale.com

April 30, 2019

Aileron Therapeutics, Inc.
490 Arsenal Way
Watertown, Massachusetts 02472

Re: Registration Statement on Form S-1

Ladies and Gentlemen:

This opinion is furnished to you in connection with a Registration Statement on Form S-1 (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 an aggregate of 26,048,752 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 for resale on behalf of certain stockholders of the Company (the "Selling Stockholders"). The Shares consist of 12,016,688 outstanding shares of Common Stock (the "Outstanding Shares") that are held by the Selling Stockholders and 14,032,064 additional shares of Common Stock (the "Warrant Shares") issuable upon the exercise of warrants (the "Warrants") that are held by the Selling Stockholders.

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, stock record books of the Company as provided to us by the Company, the Certificate of Incorporation and By-Laws of the Company, 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 Outstanding Shares being fully paid, is based solely on a certificate of the 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 Outstanding Shares.

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 state laws of the Commonwealth of Massachusetts, the General Corporation Law of the State of Delaware and the federal laws of the United States of America.

Based upon and subject to the foregoing, we are of the opinion that the Shares have been duly authorized, the Outstanding Shares are validly issued, fully paid and nonassessable, and the Warrant Shares, when issued and paid for in accordance with the terms of the Warrants, 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.

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 Washington

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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,

WILMER CUTLER PICKERING
HALE AND DORR LLP

By: /s/ Stuart M. Falber
Stuart M. Falber, a Partner

[Signature Page to WilmerHale 5.1 Opinion]

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in this Registration Statement on Form S-1 of Aileron Therapeutics, Inc. of our report dated March 29, 2019 relating to the financial statements, which appears in Aileron Therapeutics, Inc.'s Annual Report on Form 10-K for the year ended December 31, 2018. We also consent to the reference to us under the heading "Experts" in such Registration Statement.

/s/ PricewaterhouseCoopers LLP
Boston, Massachusetts
April 30, 2019