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

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**FORM S-8  
REGISTRATION STATEMENT**  
*UNDER*  
**THE SECURITIES ACT OF 1933**

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**Aileron Therapeutics, Inc.**

(Exact Name of Registrant as Specified in Its Charter)

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

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

**281 Albany Street**  
**Cambridge, MA**  
(Address of Principal Executive Offices)

**02139**  
(Zip Code)

**2017 Stock Incentive Plan**  
(Full Title of the Plan)

**Joseph A. Yanchik III**  
**President and Chief Executive Officer**  
**Aileron Therapeutics, Inc.**  
**281 Albany Street**  
**Cambridge, MA 02139**  
(Name and Address of Agent For Service)

**(617) 995-0900**  
(Telephone Number, Including Area Code, of Agent For Service)

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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  (Do not check if a smaller reporting company)

Smaller reporting company

Emerging growth company

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

**CALCULATION OF REGISTRATION FEE**

<b>Title of Securities to be Registered</b>	<b>Amount to be Registered(1)</b>	<b>Proposed Maximum Offering Price Per Share</b>	<b>Proposed Maximum Aggregate Offering Price</b>	<b>Amount of Registration Fee</b>
Common Stock, \$0.001 par value per share	588,953 shares(2)	\$5.25(3)	\$3,092,003.25(3)	\$384.95

- (1) In accordance with Rule 416 under the Securities Act of 1933, as amended, this registration statement shall be deemed to cover any additional securities that may from time to time be offered or issued to prevent dilution resulting from stock splits, stock dividends or similar transactions.
- (2) Consists of 588,953 additional shares issuable under the 2017 Stock Incentive Plan.
- (3) Estimated solely for the purpose of calculating the registration fee pursuant to Rules 457(c) and 457(h) of the Securities Act of 1933, as amended, and based upon the average of the high and low prices of the Registrant's Common Stock as reported on the Nasdaq Global Market on May 7, 2018.

## STATEMENT OF INCORPORATION BY REFERENCE

This registration statement on Form S-8 is being filed for the purpose of registering the offer and sale of an additional 588,953 shares of common stock, \$0.001 par value per share, of Aileron Therapeutics, Inc. (the "Registrant") to be issued under the Registrant's 2017 Stock Incentive Plan. In accordance with General Instruction E to Form S-8, this registration statement on Form S-8 registers additional securities of the same class as other securities for which a registration statement on Form S-8 has previously been filed and is effective. Accordingly, this registration statement incorporates by reference the contents of the Registrant's registration statement on Form S-8 (File No. 333-219158), filed with the Securities and Exchange Commission on July 5, 2017 by the Registrant, relating to the Registrant's 2006 Stock Incentive Plan, 2016 Stock Incentive Plan, 2017 Stock Incentive Plan and 2017 Employee Stock Purchase Plan.

### Item 8. Exhibits

<u>Exhibit Number</u>	<u>Description</u>
4.1	<a href="#"><u>Restated Certificate of Incorporation of the Registrant (incorporated by reference to Exhibit 3.1 to the Registrant's Current Report on Form 8-K (File No. 001-38130) filed with the Securities and Exchange Commission on July 5, 2017)</u></a>
4.2	<a href="#"><u>Amended and Restated By-Laws of the Registrant (incorporated by reference to Exhibit 3.2 to the Registrant's Current Report on Form 8-K (File No. 001-38130) filed with the Securities and Exchange Commission on July 5, 2017)</u></a>
5.1	<a href="#"><u>Opinion of Wilmer Cutler Pickering Hale and Dorr LLP, counsel to the Registrant</u></a>
23.1	<a href="#"><u>Consent of PricewaterhouseCoopers LLP, independent registered public accounting firm</u></a>
23.2	<a href="#"><u>Consent of Wilmer Cutler Pickering Hale and Dorr LLP (included in Exhibit 5.1)</u></a>
24.1	<a href="#"><u>Power of Attorney (included on the signature page)</u></a>
99.1	<a href="#"><u>2017 Stock Incentive Plan (incorporated by reference to Exhibit 10.8 to the Registrant's Registration Statement on Form S-1 (File No. 333-218474) filed with the Securities and Exchange Commission on June 19, 2017)</u></a>

**SIGNATURES**

Pursuant to the requirements of the Securities Act of 1933, as amended, the registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-8 and has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Cambridge, Commonwealth of Massachusetts on this 9th day of May, 2018.

AILERON THERAPEUTICS, INC.

By: /s/ Joseph A. Yanchik III  
Joseph A. Yanchik III  
President and Chief Executive Officer

## POWER OF ATTORNEY AND SIGNATURES

We, the undersigned officers and directors of Aileron Therapeutics, Inc., hereby severally constitute and appoint Joseph A. Yanchik III and Donald V. Dougherty and each of them singly, our true and lawful attorneys with full power to them, and each of them singly, to sign for us and in our names in the capacities indicated below, the registration statement on Form S-8 filed herewith and any and all subsequent amendments to said registration statement, and generally to do all such things in our names and on our behalf in our capacities as officers and directors to enable Aileron Therapeutics, Inc. to comply with the provisions of the Securities Act of 1933, as amended, and all requirements of the Securities and Exchange Commission, hereby ratifying and confirming our signatures as they may be signed by our said attorneys, or any of them, to said registration statement and any and all amendments thereto.

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

Signature	Title	Date
<u>/s/ Joseph A. Yanchik III</u> Joseph A. Yanchik III	President, Chief Executive Officer and Director (principal executive officer)	May 9, 2018
<u>/s/ Donald V. Dougherty</u> Donald V. Dougherty	Senior Vice President, Chief Financial Officer (principal financial officer and principal accounting officer)	May 9, 2018
<u>/s/ Jeffrey A. Bailey</u> Jeffrey A. Bailey	Chairman of the Board of Directors	May 9, 2018
<u>/s/ Reinhard J. Ambros, Ph.D.</u> Reinhard J. Ambros, Ph.D.	Director	May 9, 2018
<u>/s/ Scott B. Kapnick</u> Scott B. Kapnick	Director	May 9, 2018
<u>/s/ John H. McArthur, Ph.D.</u> John H. McArthur, Ph.D.	Director	May 9, 2018
<u>/s/ Jodie P. Morrison</u> Jodie P. Morrison	Director	May 9, 2018
<u>/s/ Armen B. Shanafelt, Ph.D.</u> Armen B. Shanafelt, Ph.D.	Director	May 9, 2018
<u>/s/ Caleb Winder</u> Caleb Winder	Director	May 9, 2018

May 9, 2018

Aileron Therapeutics, Inc.  
281 Albany Street  
Cambridge, MA 02139

Re: 2017 Stock Incentive Plan

Ladies and Gentlemen:

We have assisted in the preparation of a Registration Statement on Form S-8 (the “**Registration Statement**”) to be filed with the Securities and Exchange Commission (the “**Commission**”) under the Securities Act of 1933, as amended (the “**Securities Act**”), relating to an aggregate of 588,953 shares of common stock, \$0.001 par value per share (the “**Shares**”), of Aileron Therapeutics, Inc., a Delaware corporation (the “**Company**”), issuable under the Company’s 2017 Stock Incentive Plan (the “**Plan**”).

We have examined the Certificate of Incorporation and By-laws of the Company, each as amended and restated to date, and originals, or copies certified to our satisfaction, of all pertinent records of the meetings of the directors and stockholders of the Company, the Registration Statement and such other documents relating to the Company as we have deemed material for the purposes of this opinion.

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 certified, photostatic or other copies, the authenticity of the originals of any such documents and the legal competence of all signatories to such documents.

We assume that the appropriate action will be taken, prior to the offer and sale of the Shares in accordance with the Plan, 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.

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

Please note that we are opining only as to the matters expressly set forth herein, and no opinion should be inferred as to any other matters.

Aileron Therapeutics, Inc.

May 9, 2018

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Based on the foregoing, we are of the opinion that the Shares have been duly authorized for issuance and, when the Shares are issued and paid for in accordance with the terms and conditions of the Plan, the Shares will be validly issued, fully paid and nonassessable.

We hereby consent to the filing of this opinion with the Commission in connection with the Registration Statement in accordance with the requirements of Item 601(b)(5) of Regulation S-K under the Securities Act. 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, Partner

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in this Registration Statement on Form S-8 of Aileron Therapeutics, Inc. of our report dated April 2, 2018 relating to the financial statements, which appears in Aileron Therapeutics, Inc.'s Annual Report on Form 10-K for the year ended December 31, 2017.

/s/ PricewaterhouseCoopers LLP

Boston, Massachusetts

May 9, 2018