

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

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

Rhythm Pharmaceuticals, Inc.
(Exact name of Registrant as specified in its charter)

Delaware
(State or other jurisdiction of
Incorporation or organization)

46-2159271
(I.R.S. Employer
Identification No.)

222 Berkeley Street, Twelfth Floor
Boston, MA 02116
(857) 264-4280
(Address of principal executive offices) (Zip code)

Rhythm Pharmaceuticals, Inc. 2017 Equity Incentive Plan
(Full title of the plans)

David P. Meeker, M.D.
Chief Executive Officer, President and Chairman of the Board
Rhythm Pharmaceuticals, Inc.
222 Berkeley Street
12th Floor
Boston, MA 02116
(857) 264-4280

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

With copies to:
Peter N. Handrinos, Esq.
Latham & Watkins LLP
John Hancock Tower
200 Clarendon Street
Boston, MA 02116
(617) 948-6060

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

Large accelerated filer Accelerated filer
Non-accelerated filer Smaller reporting company
Emerging growth company

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

CALCULATION OF REGISTRATION FEE

Title of Securities to be Registered	Amount to be Registered (1)	Proposed Maximum Offering Price per Share	Proposed Maximum Aggregate Offering Price	Amount of Registration Fee
Common Stock, par value \$0.001 per share	1,769,436 shares (2) \$	25.87(3) \$	45,775,309.32 \$	4,995

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- (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 an additional 1,769,436 shares issuable under the Rhythm Pharmaceuticals, Inc. 2017 Equity Incentive Plan (the "Plan") pursuant to the terms of the 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 Rhythm Pharmaceuticals, Inc.'s (the "Registrant") common stock as reported on The Nasdaq Global Market on February 23, 2021.
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EXPLANATORY NOTE

This Registration Statement on Form S-8 is being filed for the purpose of registering an additional 1,769,436 shares of the Registrant's common stock to be issued pursuant to the Plan and for which a Registration Statement of the Registrant on Form S-8 relating to the same employee benefit plan is effective.

INCORPORATION BY REFERENCE OF CONTENTS OF REGISTRATION STATEMENTS ON FORM S-8

The contents of the Registration Statements on Form S-8 (File Nos. [333-220925](#), [333-223647](#), [333-229642](#) and [333-236829](#)), filed with the Securities and Exchange Commission, relating to the Plan, are incorporated herein by reference.

Item 8. Exhibits

Exhibit Number	Description
4.1	Amended and Restated Certificate of Incorporation of Rhythm Pharmaceuticals, Inc., dated October 10, 2017 (incorporated by reference to Exhibit 3.1 to Rhythm Pharmaceuticals, Inc.'s Quarterly Report on Form 10-Q (File No. 001-38223) filed on May 4, 2020).
4.2	Amended and Restated Bylaws of Rhythm Pharmaceuticals, Inc. (incorporated by reference to Exhibit 3.1 to Rhythm Pharmaceuticals, Inc.'s Current Report on Form 8-K (File No. 001-38223) filed on December 11, 2020)
5.1*	Opinion of Latham & Watkins LLP
23.1*	Consent of Ernst & Young LLP, Independent Registered Public Accounting Firm
23.2*	Consent of Latham & Watkins LLP (included in Exhibit 5.1)
24.1*	Power of Attorney (included on signature page)
99.1	Rhythm Pharmaceuticals, Inc. 2017 Equity Incentive Plan (incorporated by reference to Exhibit 10.2 to Rhythm Pharmaceuticals, Inc.'s Quarterly Report on Form 10-Q (File No. 001-38223) filed on November 14, 2017)

* Filed herewith.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, 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 Boston, Commonwealth of Massachusetts, on March 1, 2021.

RHYTHM PHARMACEUTICALS, INC.

By: /s/ David P. Meeker, M.D.

David P. Meeker, M.D.

Chief Executive Officer, President and Chairman of the Board

POWER OF ATTORNEY

Each person whose signature appears below hereby constitutes and appoints David P. Meeker, M.D. and Hunter C. Smith, or each of them singly, with full power to act without the other, such person's true and lawful attorneys-in-fact and agents, with full power of substitution and re-substitution, for him or her and in his or her name, place and stead, in any and all capacities, to sign this registration statement and any and all amendments, including post-effective amendments to this registration statement, and to file the same, with exhibits and schedules thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary or desirable to be done in connection therewith as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, or any of them, or their or his or her substitute or substitutes may lawfully do or cause to be done by virtue hereof.

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

Signature	Title	Date
<u>/s/ David P. Meeker, M.D.</u> David P. Meeker, M.D.	Chief Executive Officer, President and Director (Principal Executive Officer)	March 1, 2021
<u>/s/ Hunter C. Smith</u> Hunter C. Smith	Chief Financial Officer (Principal Financial and Accounting Officer)	March 1, 2021
<u>/s/ Edward T. Mathers</u> Edward T. Mathers	Lead Director	March 1, 2021
<u>/s/ Stuart Arbuckle</u> Stuart Arbuckle	Director	March 1, 2021
<u>/s/ Camille L. Bedrosian, M.D.</u> Camille L. Bedrosian, M.D.	Director	March 1, 2021
<u>/s/ Todd Foley</u> Todd Foley	Director	March 1, 2021
<u>/s/ Jennifer L. Good</u> Jennifer L. Good	Director	March 1, 2021
<u>/s/ Christophe R. Jean</u> Christophe R. Jean	Director	March 1, 2021
<u>/s/ David W. J. McGirr</u> David W. J. McGirr	Director	March 1, 2021
<u>/s/ Lynn A. Tetrault, J.D.</u> Lynn A. Tetrault, J.D.	Director	March 1, 2021

LATHAM & WATKINS LLP

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 Boston, Massachusetts 02116
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March 1, 2021

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Hong Kong	Shanghai
Houston	Silicon Valley
London	Singapore
Los Angeles	Tokyo
Madrid	Washington, D.C.
Milan	

Rhythm Pharmaceuticals, Inc.
 222 Berkley Street, 12th Floor
 Boston, Massachusetts 02116

Re: Registration Statement on Form S-8; 1,769,436 shares of Common Stock, par value \$0.001 per share, of Rhythm Pharmaceuticals, Inc.

Ladies and Gentlemen:

We have acted as special counsel to Rhythm Pharmaceuticals, Inc., a Delaware corporation (the “Company”), in connection with the preparation and filing by the Company with the Securities and Exchange Commission of a registration statement on Form S-8 (the “Registration Statement”) under the Securities Act of 1933, as amended (the “Securities Act”), relating to the issuance of up to 1,769,436 shares of the Company’s common stock, par value \$0.001 per share (the “Shares”), which may be issued pursuant to the Rhythm Pharmaceuticals, Inc. 2017 Equity Incentive Plan (the “Plan”). This opinion is being furnished in connection with the requirements of Item 601(b)(5) of Regulation S-K under the Securities Act, and no opinion is expressed herein as to any matter pertaining to the contents of the Registration Statement or the prospectus forming a part thereof, other than as expressly stated herein with respect to the issuance of the Shares.

As such counsel, we have examined such matters of fact and questions of law as we have considered appropriate for purposes of this letter. With your consent, we have relied upon the foregoing and upon certificates and other assurances of officers of the Company and others as to factual matters without having independently verified such factual matters. We are opining herein only as to the General Corporation Law of the State of Delaware, as amended (the “DCGL”), and we express no opinion with respect to any other laws.

Subject to the foregoing and the other matters set forth herein, it is our opinion that, as of the date hereof, when the Shares shall have been duly registered on the books of the transfer agent and registrar therefor in the name or on behalf of the recipients thereof, and have been issued by the Company for legal consideration in excess of par value in the circumstances contemplated by the Plan, assuming in each case that the individual grants or awards under the Plan are duly authorized by all necessary corporate action and duly granted or awarded and exercised in accordance with the requirements of law and the Plan (and the agreements and awards duly adopted thereunder and in accordance therewith), the issue and sale of the Shares will have been duly authorized by all necessary corporate action of the Company, and the Shares will be validly issued, fully paid and nonassessable. In rendering the foregoing opinion, we have assumed that the Company will comply with all applicable notice requirements regarding uncertificated shares provided in the DGCL.

LATHAM & WATKINS^{LLP}

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

Very truly yours,

/s/ Latham & Watkins LLP

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the Registration Statement (Form S-8) pertaining to the Rhythm Pharmaceuticals, Inc. 2017 Equity Incentive Plan of our reports dated March 1, 2021, with respect to the consolidated financial statements of Rhythm Pharmaceuticals, Inc. and the effectiveness of internal control over financial reporting of Rhythm Pharmaceuticals, Inc. included in its Annual Report (Form 10-K) for the year ended December 31, 2020, filed with the Securities and Exchange Commission.

/s/ Ernst & Young LLP

Boston, Massachusetts
March 1, 2021
