

INITIAL STATEMENT OF BENEFICIAL OWNERSHIP OF SECURITIES

OMB APPROVAL

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Filed pursuant to Section 16(a) of the Securities Exchange Act of 1934
or Section 30(h) of the Investment Company Act of 1940

1. Name and Address of Reporting Person* <u>Fiedorek Fred T.</u> (Last) (First) (Middle) <u>500 BOYLSTON STREET, 11TH FLOOR</u> (Street) <u>BOSTON MA 02116</u> (City) (State) (Zip)	2. Date of Event Requiring Statement (Month/Day/Year) <u>10/04/2017</u>	3. Issuer Name and Ticker or Trading Symbol <u>RHYTHM PHARMACEUTICALS, INC. [RYTM]</u> 4. Relationship of Reporting Person(s) to Issuer (Check all applicable) Director <input type="checkbox"/> 10% Owner <input type="checkbox"/> <input checked="" type="checkbox"/> Officer (give title below) Other (specify below) <p style="text-align: center;"><u>Chief Medical Officer</u></p>	5. If Amendment, Date of Original Filed (Month/Day/Year) 6. Individual or Joint/Group Filing (Check Applicable Line) <input checked="" type="checkbox"/> Form filed by One Reporting Person <input type="checkbox"/> Form filed by More than One Reporting Person
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Table I - Non-Derivative Securities Beneficially Owned

1. Title of Security (Instr. 4)	2. Amount of Securities Beneficially Owned (Instr. 4)	3. Ownership Form: Direct (D) or Indirect (I) (Instr. 5)	4. Nature of Indirect Beneficial Ownership (Instr. 5)
<u>Common Stock</u>	<u>131,899</u>	<u>D</u>	

Table II - Derivative Securities Beneficially Owned (e.g., puts, calls, warrants, options, convertible securities)

1. Title of Derivative Security (Instr. 4)	2. Date Exercisable and Expiration Date (Month/Day/Year)		3. Title and Amount of Securities Underlying Derivative Security (Instr. 4)	4. Conversion or Exercise Price of Derivative Security	5. Ownership Form: Direct (D) or Indirect (I) (Instr. 5)	6. Nature of Indirect Beneficial Ownership (Instr. 5)
	Date Exercisable	Expiration Date				
<u>Employee Stock Option (Right to Buy)</u>	<u>(1)</u>	<u>11/16/2025</u>	<u>Common Stock</u>	<u>79,816</u>	<u>4.59</u>	<u>D</u>
<u>Employee Stock Option (Right to Buy)</u>	<u>(2)</u>	<u>12/30/2025</u>	<u>Common Stock</u>	<u>9,814</u>	<u>7.52</u>	<u>D</u>
<u>Employee Stock Option (Right to Buy)</u>	<u>(3)</u>	<u>04/04/2027</u>	<u>Common Stock</u>	<u>10,905</u>	<u>6.14</u>	<u>D</u>

Explanation of Responses:

1. The stock options vest and become exercisable in 48 successive, equal monthly installments measured from August 3, 2015.
2. The stock options vest and become exercisable in 48 successive, equal monthly installments measured from August 3, 2015.
3. The stock options vest and become exercisable in 48 successive, equal monthly installments measured from January 6, 2017.

Remarks:

Exhibit List Exhibit 24 - Power of Attorney

/s/Keith M. Gottesdiener

10/04/2017

** Signature of Reporting Person

Date

Reminder: Report on a separate line for each class of securities beneficially owned directly or indirectly.

* If the form is filed by more than one reporting person, see Instruction 5 (b)(v).

** Intentional misstatements or omissions of facts constitute Federal Criminal Violations See 18 U.S.C. 1001 and 15 U.S.C. 78ff(a).

Note: File three copies of this Form, one of which must be manually signed. If space is insufficient, see Instruction 6 for procedure.

Persons who respond to the collection of information contained in this form are not required to respond unless the form displays a currently valid OMB Number.

POWER OF ATTORNEY

KNOW ALL BY THESE PRESENTS, that the undersigned hereby constitutes and appoints each of Keith Gottesdiener and Hunter Smith, signing singly, as his true and lawful attorney-in-fact to:

- (1) execute for and on behalf of the undersigned, in the undersigned's capacity as an officer of Rhythm Pharmaceuticals, Inc. (the "Company"), Forms 3, 4, and 5 in accordance with Section 16(a) of the Securities Exchange Act of 1934 and the rules thereunder and any other forms or reports the undersigned may be required to file in connection with the undersigned's ownership, acquisition, or disposition of securities of the Company;
- (2) do and perform any and all acts for and on behalf of the undersigned which may be necessary or desirable to complete and execute any such Form 3, 4, or 5, or other form or report, and timely file such form or report with the U.S. Securities and Exchange Commission and any stock exchange or similar authority; and
- (3) take any other action of any type whatsoever in connection with the foregoing which, in the opinion of such attorney-in-fact, may be of benefit to, in the best interest of, or legally required by, the undersigned, it being understood that the documents executed by such attorney-in-fact on behalf of the undersigned, pursuant to this Power of Attorney, shall be in such form and shall contain such terms and conditions as such attorney-in-fact may approve in his discretion.

The undersigned hereby grants to each such attorney-in-fact full power and authority to do and perform each and every act and thing whatsoever requisite, necessary, and proper to be done in the exercise of any of the rights and powers herein granted, as fully to all intents and purposes as the undersigned might or could do if personally present, with full power of substitution or revocation, hereby ratifying and confirming all that such attorney-in-fact, or his substitute or substitutes, shall lawfully do or cause to be done by virtue of this Power of Attorney and the rights and powers herein granted. The undersigned acknowledges that no such attorney-in-fact, in serving in such capacity at the request of the undersigned, is hereby assuming any of the undersigned's responsibilities to comply with Section 13 and Section 16 of the Securities Exchange Act of 1934 and the rules thereunder, as amended.

This Power of Attorney shall remain in full force and effect until revoked by the undersigned in a signed writing delivered to the foregoing attorneys-in-fact.

[Signature Page Follows]

IN WITNESS WHEREOF, the undersigned has caused this Power of Attorney to be executed as of this 2nd day of October 2017.

/s/ Fred T. Fiedorek

Fred T. Fiedorek, M.D.

[Signature Page to Power of Attorney (Fiedorek)]
