

**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>RA CAPITAL MANAGEMENT, LLC</u> <hr/> (Last) (First) (Middle) <u>200 BERKELEY STREET, 18TH FLOOR</u> <hr/> (Street) <u>BOSTON MA 02116</u> <hr/> (City) (State) (Zip)	2. Date of Event Requiring Statement (Month/Day/Year) <u>10/16/2019</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 checked="" type="checkbox"/> Officer (give title below) <input type="checkbox"/> Other (specify below) <input type="checkbox"/>	5. If Amendment, Date of Original Filed (Month/Day/Year)  6. Individual or Joint/Group Filing (Check Applicable Line) Form filed by One Reporting Person <input type="checkbox"/> X Form filed by More than One Reporting Person

**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)
Common Stock	5,422,312 <sup>(1)</sup>	I	See Footnote <sup>(2)(3)</sup>

**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	Title	Amount or Number of Shares			

1. Name and Address of Reporting Person * <u>RA CAPITAL MANAGEMENT, LLC</u> <hr/> (Last) (First) (Middle) <u>200 BERKELEY STREET, 18TH FLOOR</u> <hr/> (Street) <u>BOSTON MA 02116</u> <hr/> (City) (State) (Zip)
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1. Name and Address of Reporting Person * <u>RA Capital Healthcare Fund LP</u> <hr/> (Last) (First) (Middle) <u>200 BERKELEY STREET, 18TH FLOOR</u> <hr/> (Street) <u>BOSTON MA 02116</u> <hr/> (City) (State) (Zip)
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1. Name and Address of Reporting Person *		
<a href="#">Kolchinsky Peter</a>		
(Last)	(First)	(Middle)
<a href="#">200 BERKELEY STREET, 18TH FLOOR</a>		
(Street)		
<a href="#">BOSTON</a>	<a href="#">MA</a>	<a href="#">02116</a>
(City)	(State)	(Zip)

**Explanation of Responses:**

1. These securities include 4,599,403 shares held by RA Capital Healthcare Fund, L.P. (the "Fund") and 822,909 shares held in a separately managed account (the "Account").
2. RA Capital Management, LLC (the "Adviser") is the general partner of the Fund and the investment adviser for the Account. Peter Kolchinsky is the sole manager of the Adviser. The Adviser and Dr. Kolchinsky may be deemed indirect beneficial owners of the securities for purposes of Section 13(d) of the Securities Exchange Act of 1934 (the "Act"). They disclaim beneficial ownership of any of the reported securities for the purpose of determining whether they are subject to Section 16 of the Act, however, in reliance on Rule 16a-1(a)(1)(v) and (vii). To the extent that they might be deemed subject to Section 16, they disclaim beneficial ownership of securities held by the Fund for purposes of Rule 16a-1(a)(2), except to the extent of their pecuniary interest therein, and disclaim any pecuniary interest in securities held in the Account.
3. The filing of this Form 3 shall not be construed as an admission that either the Adviser or Dr. Kolchinsky is or was for the purposes of Section 16(a), or otherwise, the beneficial owner of any of the securities held in the Account.

<a href="#">/s/ Peter Kolchinsky, Manager of RA Capital Management, LLC</a>	<a href="#">10/18/2019</a>
<a href="#">/s/ Peter Kolchinsky, Manager of RA Capital Management, LLC, the General Partner of RA Capital Healthcare Fund, L.P.</a>	<a href="#">10/18/2019</a>
<a href="#">/s/ Peter Kolchinsky, individually</a>	<a href="#">10/18/2019</a>
** 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.**