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

SCHEDULE 13D

**Under the Securities Exchange Act of 1934
(Amendment No. 3)***

Rhythm Pharmaceuticals, Inc.

(Name of Issuer)

Common Stock
(Title of Class of Securities)

76243J 10 5
(CUSIP Number)

Todd Foley
MPM Asset Management
450 Kendall Street
Cambridge, MA 01242
Telephone: (617) 425-9200

(Name, Address and Telephone Number of Person Authorized to Receive Notices and Communications)

June 24, 2020
(Date of Event Which Requires Filing of This Statement)

If the filing person has previously filed a statement on Schedule 13G to report the acquisition that is the subject of this Schedule 13D, and is filing this schedule because of §§240.13d-1(e), 240.13d-1(f) or 240.13d-1(g), check the following box.

Note: Schedules filed in paper format shall include a signed original and five copies of the schedule, including all exhibits. See §240.13d-7 for other parties to whom copies are to be sent.

* The remainder of this cover page shall be filled out for a reporting person's initial filing on this form with respect to the subject class of securities, and for any subsequent amendment containing information which would alter disclosures provided in a prior cover page.

The information required on the remainder of this cover page shall not be deemed to be "filed" for the purpose of Section 18 of the Securities Exchange Act of 1934 ("Act") or otherwise subject to the liabilities of that section of the Act but shall be subject to all other provisions of the Act (however, see the Notes).

1.	Name of Reporting Persons. MPM BioVentures V, L.P.	
2.	Check the Appropriate Box if a Member of a Group (See Instructions) (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/> (1)	
3.	SEC USE ONLY	
4.	Source of Funds (See Instructions) WC	
5.	Check if Disclosure of Legal Proceedings Is Required Pursuant to Items 2(d) or 2(e) <input type="checkbox"/>	
6.	Citizenship or Place of Organization Delaware	
Number of Shares Beneficially Owned by Each Reporting Person With:	7.	Sole Voting Power 1,838,149
	8.	Shared Voting Power 0
	9.	Sole Dispositive Power 1,838,149
	10.	Shared Dispositive Power 0
11.	Aggregate Amount Beneficially Owned by Each Reporting Person 1,838,149	
12.	Check if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions) <input type="checkbox"/>	
13.	Percent of Class Represented by Amount in Row (11) 4.2%(2)	
14.	Type of Reporting Person (See Instructions) PN	

(1) This schedule is filed by MPM BioVentures V, L.P. (“BV V”), MPM Asset Management Investors BV5 LLC (“AM LLC”), MPM BioVentures V GP LLC (“BV V GP”), MPM BioVentures V LLC (“BV V LLC”) (collectively, the “MPM Entities”) and Ansbert Gadicke, Luke Evnin and Todd Foley (collectively, the “Listed Persons” and together with the MPM Entities, the “Filing Persons”). The Listed Persons are members of BV V LLC and AM LLC. The MPM Entities and the Listed Persons expressly disclaim status as a “group” for purposes of this Schedule 13D.

(2) This percentage is calculated based upon 44,091,798 outstanding shares of common stock, par value \$0.001 per share, of Rhythm Pharmaceuticals, Inc. (the “Issuer”), as disclosed in the Issuer’s Quarterly Report on Form 10-Q, filed with the Securities and Exchange Commission on May 4, 2020.

1.	Name of Reporting Persons. MPM Asset Management Investors BV5 LLC	
2.	Check the Appropriate Box if a Member of a Group (See Instructions) (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/> (1)	
3.	SEC USE ONLY	
4.	Source of Funds (See Instructions) WC	
5.	Check if Disclosure of Legal Proceedings Is Required Pursuant to Items 2(d) or 2(e) <input type="checkbox"/>	
6.	Citizenship or Place of Organization Delaware	
Number of Shares Beneficially Owned by Each Reporting Person With:	7.	Sole Voting Power 71,409
	8.	Shared Voting Power 0
	9.	Sole Dispositive Power 71,409
	10.	Shared Dispositive Power 0
11.	Aggregate Amount Beneficially Owned by Each Reporting Person 71,409	
12.	Check if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions) <input type="checkbox"/>	
13.	Percent of Class Represented by Amount in Row (11) 0.2%(2)	
14.	Type of Reporting Person (See Instructions) OO	

- (1) This Schedule is filed by the MPM Entities and the Listed Persons. The MPM Entities and the Listed Persons expressly disclaim status as a “group” for purposes of this Schedule 13D.
- (2) This percentage is calculated based upon 44,091,798 outstanding shares of common stock, par value \$0.001 per share, of Issuer, as disclosed in the Issuer’s Quarterly Report on Form 10-Q, filed with the Securities and Exchange Commission on May 4, 2020.

1.	Name of Reporting Persons. MPM BioVentures V GP LLC	
2.	Check the Appropriate Box if a Member of a Group (See Instructions) (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/> (1)	
3.	SEC USE ONLY	
4.	Source of Funds (See Instructions) WC	
5.	Check if Disclosure of Legal Proceedings Is Required Pursuant to Items 2(d) or 2(e) <input type="checkbox"/>	
6.	Citizenship or Place of Organization Delaware	
Number of Shares Beneficially Owned by Each Reporting Person With:	7.	Sole Voting Power 0
	8.	Shared Voting Power 1,838,149(2)
	9.	Sole Dispositive Power 0
	10.	Shared Dispositive Power 1,838,149(2)
11.	Aggregate Amount Beneficially Owned by Each Reporting Person 1,838,149(2)	
12.	Check if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions) <input type="checkbox"/>	
13.	Percent of Class Represented by Amount in Row (11) 4.2%(3)	
14.	Type of Reporting Person (See Instructions) OO	

- (1) This Schedule is filed by the MPM Entities and the Listed Persons. The MPM Entities and the Listed Persons expressly disclaim status as a “group” for purposes of this Schedule 13D.
- (2) Represents shares of Common Stock held by BV V. BV V GP and BV V LLC are the direct and indirect general partners of BV V.
- (3) This percentage is calculated based upon 44,091,798 outstanding shares of common stock, par value \$0.001 per share, of Issuer, as disclosed in the Issuer’s Quarterly Report on Form 10-Q, filed with the Securities and Exchange Commission on May 4, 2020.

1.	Name of Reporting Persons. MPM BioVentures V LLC	
2.	Check the Appropriate Box if a Member of a Group (See Instructions) (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/> (1)	
3.	SEC USE ONLY	
4.	Source of Funds (See Instructions) WC	
5.	Check if Disclosure of Legal Proceedings Is Required Pursuant to Items 2(d) or 2(e) <input type="checkbox"/>	
6.	Citizenship or Place of Organization Delaware	
Number of Shares Beneficially Owned by Each Reporting Person With:	7.	Sole Voting Power 0
	8.	Shared Voting Power 1,838,149(2)
	9.	Sole Dispositive Power 0
	10.	Shared Dispositive Power 1,838,149(2)
11.	Aggregate Amount Beneficially Owned by Each Reporting Person 1,838,149(2)	
12.	Check if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions) <input type="checkbox"/>	
13.	Percent of Class Represented by Amount in Row (11) 4.2%(3)	
14.	Type of Reporting Person (See Instructions) OO	

- (1) This Schedule is filed by the MPM Entities and the Listed Persons. The MPM Entities and the Listed Persons expressly disclaim status as a “group” for purposes of this Schedule 13D.
- (2) Includes shares of Common Stock held by BV V. BV V GP and BV V LLC are the direct and indirect general partners of BV V.
- (3) This percentage is calculated based upon 44,091,798 outstanding shares of common stock, par value \$0.001 per share, of Issuer, as disclosed in the Issuer’s Quarterly Report on Form 10-Q, filed with the Securities and Exchange Commission on May 4, 2020.

1.	Name of Reporting Persons. Ansbert Gadicke	
2.	Check the Appropriate Box if a Member of a Group (See Instructions) (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/> (1)	
3.	SEC USE ONLY	
4.	Source of Funds (See Instructions) OO	
5.	Check if Disclosure of Legal Proceedings Is Required Pursuant to Items 2(d) or 2(e) <input type="checkbox"/>	
6.	Citizenship or Place of Organization United States	
Number of Shares Beneficially Owned by Each Reporting Person With:	7.	Sole Voting Power 0
	8.	Shared Voting Power 1,909,558(2)
	9.	Sole Dispositive Power 0
	10.	Shared Dispositive Power 1,909,558(2)
11.	Aggregate Amount Beneficially Owned by Each Reporting Person 1,909,558(2)	
12.	Check if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions) <input type="checkbox"/>	
13.	Percent of Class Represented by Amount in Row (11) 4.3%(3)	
14.	Type of Reporting Person (See Instructions) IN	

- (1) This Schedule is filed by the MPM Entities and the Listed Persons. The MPM Entities and the Listed Persons expressly disclaim status as a “group” for purposes of this Schedule 13D.
- (2) Includes 1,838,149 shares of Common Stock held by BV V and 71,409 shares of Common Stock held by AM LLC. BV V GP and BV V LLC are the direct and indirect general partners of BV V. The Reporting Person is a member of BV V LLC.
- (3) This percentage is calculated based upon 44,091,798 outstanding shares of common stock, par value \$0.001 per share, of Issuer, as disclosed in the Issuer’s Quarterly Report on Form 10-Q, filed with the Securities and Exchange Commission on May 4, 2020.

1.	Name of Reporting Persons. Luke Evnin	
2.	Check the Appropriate Box if a Member of a Group (See Instructions) (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/> (1)	
3.	SEC USE ONLY	
4.	Source of Funds (See Instructions) OO	
5.	Check if Disclosure of Legal Proceedings Is Required Pursuant to Items 2(d) or 2(e) <input type="checkbox"/>	
6.	Citizenship or Place of Organization United States	
Number of Shares Beneficially Owned by Each Reporting Person With:	7.	Sole Voting Power 0
	8.	Shared Voting Power 1,909,558(2)
	9.	Sole Dispositive Power 0
	10.	Shared Dispositive Power 1,909,558(2)
11.	Aggregate Amount Beneficially Owned by Each Reporting Person 1,909,558(2)	
12.	Check if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions) <input type="checkbox"/>	
13.	Percent of Class Represented by Amount in Row (11) 4.3%(3)	
14.	Type of Reporting Person (See Instructions) IN	

- (1) This Schedule is filed by the MPM Entities and the Listed Persons. The MPM Entities and Listed Persons expressly disclaim status as a "group" for purposes of this Schedule 13D.
- (2) Includes 1,838,149 shares of Common Stock held by BV V and 71,409 shares of Common Stock held by AM LLC. BV V GP and BV V LLC are the direct and indirect general partners of BV V. The Reporting Person is a member of BV V LLC.
- (3) This percentage is calculated based upon 44,091,798 outstanding shares of common stock, par value \$0.001 per share, of Issuer, as disclosed in the Issuer's Quarterly Report on Form 10-Q, filed with the Securities and Exchange Commission on May 4, 2020.

1.	Name of Reporting Persons. Todd Foley	
2.	Check the Appropriate Box if a Member of a Group (See Instructions) (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/> (1)	
3.	SEC USE ONLY	
4.	Source of Funds (See Instructions) OO	
5.	Check if Disclosure of Legal Proceedings Is Required Pursuant to Items 2(d) or 2(e) <input type="checkbox"/>	
6.	Citizenship or Place of Organization United States	
Number of Shares Beneficially Owned by Each Reporting Person With:	7.	Sole Voting Power 25,000(2)
	8.	Shared Voting Power 1,909,558(3)
	9.	Sole Dispositive Power 25,000(2)
	10.	Shared Dispositive Power 1,909,558(3)
11.	Aggregate Amount Beneficially Owned by Each Reporting Person 1,934,558(2)(3)	
12.	Check if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions) <input type="checkbox"/>	
13.	Percent of Class Represented by Amount in Row (11) 4.4%(4)	
14.	Type of Reporting Person (See Instructions) IN	

- (1) This Schedule is filed by the MPM Entities and the Listed Persons. The MPM Entities and the Listed Persons expressly disclaim status as a “group” for purposes of this Schedule 13D.
- (2) Includes shares issuable upon exercise of stock options within 60 days of June 24, 2020.
- (3) Includes 1,909,558 shares of Common Stock held by BV V and 71,409 shares of Common Stock held by AM LLC. BV V GP and BV V LLC are the direct and indirect general partners of BV V. The Reporting Person is a member of BV V LLC.
- (4) This percentage is calculated based upon 44,091,798 outstanding shares of common stock, par value \$0.001 per share, of Issuer, as disclosed in the Issuer’s Quarterly Report on Form 10-Q, filed with the Securities and Exchange Commission on May 4, 2020.

This Amendment No. 3 to Schedule 13D (“Amendment No. 2”) is being filed as an amendment to the initial statement on Schedule 13D relating to the Common Stock, par value \$0.001 per share (the “Common Stock”), of Rhythm Pharmaceuticals, Inc. (the “Issuer”), as filed with the Securities and Exchange Commission (the “SEC”) on October 24, 2017, as amended by Amendment No. 1 filed February 12, 2019 and Amendment No. 2 filed February 5, 2020 (as amended, the “Original Schedule 13D”). This Amendment No. 3 is being filed by the Filing Persons to report the open market sales of shares of the Issuer’s Common Stock by certain Filing Persons.

Items 4, 5 and 7 of the Original Schedule 13D are hereby amended and supplemented to the extent hereinafter expressly set forth and, except as amended and supplemented hereby, the Original Schedule 13D remains in full force and effect. All capitalized terms used in this Amendment No. 3 but not defined herein shall have the meanings ascribed thereto in the Original Schedule 13D.

Item 4. Purpose of Transaction

Item 4 of the Original Schedule 13D is hereby amended and supplemented by adding the following paragraph at the end of Item 4:

The MPM Entities sold an aggregate of 483,939 shares of the Issuer’s Common Stock in open market transactions pursuant to a 10b5-1 Plan from March 17, 2020 through June 25, 2020 for aggregate proceeds of \$10,203,493.34.

Item 5. Interest in Securities of the Issuer

Item 5. Interest in Securities of the Issuer is hereby amended and restated in its entirety as follows:

(a) – (b) The following information with respect to the ownership of the Common Stock of the Issuer by the Filing Persons is provided as of the date of this filing:

<u>Reporting Person</u>	<u>Shares Held Directly</u>	<u>Sole Voting Power</u>	<u>Shared Voting Power</u>	<u>Sole Dispositive Power</u>	<u>Shared Dispositive Power</u>	<u>Beneficial Ownership</u>	<u>Percentage of Class (1)</u>
BV V	1,838,149	1,838,149	0	1,838,149	0	1,838,149	4.2%
AM LLC	71,409	71,409	0	71,409	0	71,409	0.2%
BV V GP(2)	0	0	1,838,149	0	1,838,149	1,838,149	4.2%
BV V LLC(2)	0	0	1,838,149	0	1,838,149	1,838,149	4.2%
Ansbert Gadicke(3)	0	0	1,909,558	0	1,909,558	1,909,558	4.3%
Luke Evnin(3)	0	0	1,909,558	0	1,909,558	1,909,558	4.3%
Todd Foley(3)(4)	25,000	0	1,909,558	25,000	1,909,558	1,934,558	4.4%

- (1) This percentage is calculated based upon 44,091,798 outstanding shares of common stock, par value \$0.001 per share, of Issuer, as disclosed in the Issuer’s Quarterly Report on Form 10-Q, filed with the Securities and Exchange Commission on May 4, 2020.
- (2) Includes securities held by BV V. BV V GP and BV V LLC are the direct and indirect general partners of BV V.
- (3) Includes securities held by BV V and AM LLC. The Reporting Person is a member of BV V LLC.
- (4) Includes shares issuable upon exercise of stock options within 60 days of June 24, 2020.

(c) The Reporting Persons sold the following shares of Common Stock in the open market in the sixty days preceding the date of this filing:

<u>Date</u>	<u>Price Range</u>	<u>Average Price</u>	<u>BV V Sold</u>	<u>AM LLC Sold</u>
4/28/2020	\$20.00 - \$20.225	\$20.07	15,234	592
4/29/2020	\$ 20.00 - \$20.30	\$20.12	19,634	763
5/6/2020	\$ 20.00	\$20.00	1,565	61
5/7/2020	\$ 20.00 - \$20.01	\$20.01	193	7
5/8/2020	\$ 20.00 - \$20.21	\$20.05	6,385	248
5/11/2020	\$ 20.00 - \$20.55	\$20.34	21,326	829
5/12/2020	\$ 20.00 - \$20.48	\$20.23	23,432	910
5/13/2020	\$20.00 - \$20.135	\$20.04	1,768	69
5/18/2020	\$ 20.00 - \$20.04	\$20.00	20,551	798
5/19/2020	\$ 20.00 - \$20.02	\$20.00	2,535	98
5/20/2020	\$ 20.00 - \$20.05	\$20.01	10,133	394
5/21/2020	\$ 20.00 - \$20.50	\$20.25	24,637	957
5/22/2020	\$ 20.00 - \$20.29	\$20.13	25,900	1,006
5/26/2020	\$ 20.12 - \$20.74	\$20.47	42,760	1,661
5/27/2020	\$ 20.00 - \$20.24	\$20.13	9,768	380
5/28/2020	\$ 20.00 - \$20.35	\$20.19	18,436	716
6/1/2020	\$ 20.00 - \$20.14	\$20.08	10,141	394
6/2/2020	\$ 20.00 - \$20.53	\$20.23	14,995	583
6/3/2020	\$ 20.00 - \$20.88	\$20.27	17,563	682
6/5/2020	\$ 20.00	\$20.00	1,825	71
6/24/2020	\$25.00 - \$25.545	\$25.34	93,746	3,642
6/25/2020	\$ 25.00 - \$25.71	\$25.41	17,276	671

The information provided and incorporated by reference in Item 3 and Item 6 is hereby incorporated by reference in this Item 5.

(d) Not applicable.

(e) The Reporting Persons ceased to be the beneficial owners of more than five percent of the class of securities on May 20, 2020.

Item 7. Material to Be Filed as Exhibits

A. Agreement regarding filing of joint Schedule 13D.

Signatures

After reasonable inquiry and to the best of my knowledge and belief, I certify that the information set forth in this statement is true, complete and correct.

Date: June 26, 2020

MPM BIOVENTURES V GP LLC

By: MPM BioVentures V LLC,
its Managing Member

By: /s/ Todd Foley
Name: Todd Foley
Title: Member

MPM BIOVENTURES V LLC

By: /s/ Todd Foley
Name: Todd Foley
Title: Member

MPM BIOVENTURES V, L.P.

By: MPM BioVentures V GP LLC, its General Partner
By: MPM BioVentures V LLC, its Managing Member

By: /s/ Todd Foley
Name: Todd Foley
Title: Member

MPM ASSET MANAGEMENT INVESTORS BV5 LLC

By: /s/ Howard Rubin
Name: Howard Rubin
Title: Authorized Signatory

By: /s/ Todd Foley
Name: Todd Foley

By: /s/ Luke Evnin
Name: Luke Evnin

By: /s/ Ansbert Gadicke
Name: Ansbert Gadicke

Schedule I

General Partners/Members

Ansbert Gadicke

c/o MPM Asset Management

450 Kendall Street

Cambridge, MA 02142

Principal Occupation: Member of the managing member of the general partner of MPM BioVentures V, L.P. Citizenship: USA

Luke Evin

c/o MPM Asset Management

450 Kendall Street

Cambridge, MA 02142

Principal Occupation: Member of the managing member of the general partner of MPM BioVentures V, L.P.

Citizenship: USA

Todd Foley

c/o MPM Asset Management

450 Kendall Street

Cambridge, MA 02142

Principal Occupation: Member of the managing member of the general partner of MPM BioVentures V, L.P.

Citizenship: USA

A. Agreement regarding filing of joint Schedule 13D.

Exhibit A

Joint Filing Statement

I, the undersigned, hereby express my agreement that the attached Schedule 13D (and any amendments thereto) relating to the beneficial ownership by the undersigned of the equity securities of Rhythm Pharmaceuticals, Inc. is filed on behalf of each of the undersigned.

Date: June 26, 2020

MPM BIOVENTURES V GP LLC

By: MPM BioVentures V LLC,
its Managing Member

By: /s/ Todd Foley

Name: Todd Foley

Title: Member

MPM BIOVENTURES V LLC

By: /s/ Todd Foley

Name: Todd Foley

Title: Member

MPM BIOVENTURES V, L.P.

By: MPM BioVentures V GP LLC, its General Partner

By: MPM BioVentures V LLC, its Managing Member

By: /s/ Todd Foley

Name: Todd Foley

Title: Member

MPM ASSET MANAGEMENT INVESTORS BV5 LLC

By: /s/ Howard Rubin

Name: Howard Rubin

Title: Authorized Signatory

By: /s/ Todd Foley

Name: Todd Foley

By: /s/ Luke Evnin

Name: Luke Evnin

By: /s/ Ansbert Gadicke

Name: Ansbert Gadicke