

Rhythm Pharmaceuticals, Inc.
500 Boylston Street, 11th Floor
Boston, MA 02116

October 2, 2017

VIA EDGAR AND E-MAIL

United States Securities and Exchange Commission
Division of Corporation Finance
100 F Street, N.E.
Washington, D.C. 20549-6010

Attention: Suzanne Hayes
Mary Beth Breslin
Christine Westbrook
James Peklenk
James Rosenberg

Re: Rhythm Pharmaceuticals, Inc. Registration Statement on Form S-1 (Registration No. 333-220337)

Ladies and Gentlemen:

In accordance with Rule 461 of Regulation C of the General Rules and Regulations under the Securities Act of 1933, as amended, we hereby request acceleration of the effective date of the Registration Statement on Form S-1 (File No. 333-220337) (the "**Registration Statement**") of Rhythm Pharmaceuticals, Inc. (the "**Company**"). We respectfully request that the Registration Statement become effective as of 4:00 p.m., Eastern time, on October 4, 2017, or as soon as practicable thereafter. Once the Registration Statement has been declared effective, please orally confirm that event with our counsel, Morgan, Lewis & Bockius LLP, by calling Laurie Cerveney at (617) 951-8527.

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Very truly yours,

Rhythm Pharmaceuticals, Inc.

By: /s/Keith M. Gottesdiener
Keith M. Gottesdiener,
Chief Executive Officer and President

CC: Hunter Smith, Rhythm Pharmaceuticals, Inc.
Julio Vega, Morgan, Lewis & Bockius LLP
Laurie A Cerveney, Morgan, Lewis & Bockius LLP
Lisa Firenze, Wilmer Cutler Pickering Hale and Dorr LLP
Craig Hilts, Wilmer Cutler Pickering Hale and Dorr LLP

[Rhythm Pharmaceuticals, Inc. – Signature Page to Request for Acceleration]
