REDHILL BIOPHARMA LTD.

FORM 6-K
(Report of Foreign Issuer)

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

FORM 6-K

Report of Foreign Private Issuer
Pursuant to Rule 13a-16 or 15d-16
of the Securities Exchange Act of 1934

For the month of April 2017
Commission File No.: 001-35773

REDHILL BIOPHARMA LTD.
(Translation of registrant's name into English)

21 Ha'arba'a Street, Tel Aviv, 64739, Israel
(Address of principal executive office)

Indicate by check mark whether the registrant files or will file annual reports under cover of Form 20-F or Form 40-F.
Form 20-F [X] Form 40-F [ ]

Indicate by check mark if the registrant is submitting the Form 6-K in paper as permitted by Regulation S-T Rule 101(b)(1):

Indicate by check mark if the registrant is submitting the Form 6-K in paper as permitted by Regulation S-T Rule 101(b)(7):

Attached hereto and incorporated by reference herein is a press release issued by the Registrant entitled: *"RedHill Biopharma Announces Peer-Reviewed Publication of the Positive YELIVA ® Phase I Study Results in Advanced Solid Tumors"*

This Form 6-K is incorporated by reference into the Company's Registration Statements on Form S-8 filed with the Securities and Exchange Commission on May 2, 2013 (Registration No. 333-188286) and on October 29, 2015 (Registration No. 333-207654) and its Registration Statement on Form F-3 filed with the Securities and Exchange Commission on February 25, 2016 (Registration No. 333- 209702).

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

REDHILL BIOPHARMA LTD.
(Registrant)

Date: April 20, 2017

By: /s/ Dror Ben-Asher
Dror Ben-Asher
Chief Executive Officer

Exhibit 99.1

RedHill Biopharma Announces Peer-Reviewed Publication of the Positive YELIVA® Phase I Study Results in Advanced Solid Tumors

- **The article was authored by scientists from the Medical University of South Carolina (MUSC) Hollings Cancer Center and Apogee Biotechnology and was published in *Clinical Cancer Research***
- **The Phase I study with YELIVA ® in patients with advanced solid tumors successfully met its primary and secondary endpoints**
- **Results demonstrated that the drug is well-tolerated and can be safely administered to cancer patients; Six of the 21 patients treated in the Phase I study had stable disease as their best response and one patient with cholangiocarcinoma developed a partial response**
- **The administration of YELIVA ® resulted in a rapid and pronounced decrease in S1P levels over the first 12 hours, with return to baseline at 24 hours, which is consistent with clearance of the drug**
- **RedHill is pursuing several Phase I/II clinical studies with YELIVA ® , targeting multiple oncology and inflammatory indications, some of which are supported by National Cancer Institute (NCI) grants awarded to Apogee Biotechnology and U.S. universities**

TEL-AVIV, Israel, April 20, 2017 (GLOBE NEWSWIRE) -- RedHill Biopharma Ltd. (NASDAQ:RDHL) (Tel-Aviv Stock Exchange:RDHL) ("RedHill" or the "Company"), a specialty biopharmaceutical company primarily focused on the development and commercialization of late clinical-stage, proprietary, orally-administered, small molecule drugs for gastrointestinal and inflammatory diseases and cancer, today announced the publication of an article describing the positive results from the Phase I clinical study with YELIVA ® (ABC294640) [1] in advanced solid tumors.

The article [2] , entitled " *A Phase I Study of ABC294640, a First-in-Class Sphingosine Kinase-2 Inhibitor, in Patients with Advanced Solid Tumors"* , was authored by scientists from the Medical University of South Carolina (MUSC) Hollings Cancer Center and Apogee Biotechnology and was published in *Clinical Cancer Research* . The article is available online on the journal's website [3] .

YELIVA ® is a Phase II-stage, proprietary, first-in-class, orally-administered sphingosine kinase-2 (SK2) selective inhibitor with anticancer and anti-inflammatory activities, targeting multiple oncology, inflammatory and gastrointestinal indications. By inhibiting the SK2 enzyme, YELIVA ® blocks the synthesis of sphingosine 1-phosphate (S1P), a lipid signaling molecule that promotes cancer growth and pathological inflammation.

The open-label, dose-escalation, pharmacokinetic (PK) and pharmacodynamic (PD) first-in-human Phase I study with YELIVA ® treated 21 patients with advanced solid tumors, most of whom were gastrointestinal cancer patients, including pancreatic, colorectal and cholangiocarcinoma cancers. The Phase I study was conducted at the MUSC Hollings Cancer Center and led by Principal Investigators Melanie Thomas, MD, and Carolyn Britten, MD.

The primary objectives of the study were to identify the maximum tolerated dose (MTD) and the dose-limiting toxicities (DLTs) and to evaluate the safety of YELIVA ® . The secondary objectives of the study were to determine the pharmacokinetic (PK) and pharmacodynamic (PD) properties of YELIVA ® and to assess its antitumor activity.

Final results from the Phase I study with YELIVA ® in patients with advanced solid tumors confirmed that the study successfully met its primary and secondary endpoints, demonstrating that the drug is well-tolerated and can be safely administered to cancer patients. There was one partial response in a patient with cholangiocarcinoma and six patients had stable disease as their best response.

The study included the first-ever longitudinal analyses of plasma S1P levels as a potential PD biomarker for activity of a sphingolipid-targeted drug. The administration of YELIVA ® resulted in a rapid and pronounced decrease in S1P levels over the first 12 hours, with return to baseline at 24 hours, which is consistent with clearance of the drug.

A Phase II study with YELIVA ® for the treatment of advanced hepatocellular carcinoma (HCC) is ongoing at MUSC Hollings Cancer Center. The study is supported by a grant from the NCI, awarded to MUSC, which is intended to fund a broad range of studies on the feasibility of targeting sphingolipid metabolism for the treatment of a variety of solid tumor cancers, with additional support from RedHill.

A Phase Ib/II study with YELIVA ® for the treatment of refractory or relapsed multiple myeloma is ongoing at Duke University Medical Center. The study is supported by a $2 million grant from the NCI Small Business Innovation Research Program (SBIR) awarded to Apogee, in conjunction with Duke University, with additional support from RedHill.

A Phase I/II clinical study evaluating YELIVA ® in patients with refractory/relapsed diffuse large B-cell lymphoma and Kaposi sarcoma patients is ongoing at the Louisiana State University Health Sciences Center. The study is supported by a grant from the NCI awarded to Apogee, with additional support from RedHill.

A Phase Ib study to evaluate YELIVA ® as a radioprotectant for prevention of mucositis in head and neck cancer patients undergoing therapeutic radiotherapy is planned to be initiated in the third quarter of 2017.

YELIVA ® recently received FDA Orphan Drug designation for the treatment of cholangiocarcinoma. RedHill plans to initiate a Phase IIa clinical study with YELIVA ® in patients with advanced, unresectable, intrahepatic and extrahepatic cholangiocarcinoma in the third quarter of 2017.

A Phase II study to evaluate the efficacy of YELIVA ® in patients with moderate to severe ulcerative colitis is planned to be initiated in the second half of 2017.

About YELIVA ® (ABC294640):

YELIVA ® (ABC294640) is a Phase II-stage, proprietary, first-in-class, orally-administered, sphingosine kinase-2 (SK2) selective inhibitor with anticancer and anti-inflammatory activities. RedHill is pursuing with YELIVA ® multiple clinical programs in oncology, inflammatory and gastrointestinal indications. By inhibiting SK2, YELIVA ® blocks the synthesis of sphingosine 1-phosphate (S1P), a lipid-signaling molecule that promotes cancer growth and pathological inflammation. SK2 is an innovative molecular target for anticancer therapy because of its critical role in catalyzing the formation of S1P, which is known to

regulate cell proliferation and activation of inflammatory pathways. YELIVA ® was originally developed by U.S.-based Apogee Biotechnology Corp. and completed multiple successful pre-clinical studies in oncology, inflammation, GI and radioprotection models, as well as the ABC-101 Phase I clinical study in cancer patients with advanced solid tumors. The Phase I study included the first-ever longitudinal analysis of plasma S1P levels as a potential pharmacodynamic (PD) biomarker for activity of a sphingolipid-targeted drug. The administration of YELIVA ® resulted in a rapid and pronounced decrease in S1P levels, with several patients having prolonged stabilization of disease. YELIVA ® received Orphan Drug designation from the U.S. FDA for the treatment of cholangiocarcinoma. The development of YELIVA ® was funded to date primarily by grants and contracts from U.S. federal and state government agencies awarded to Apogee Biotechnology Corp., including the U.S. National Cancer Institute, the U.S. Department of Health and Human Services' Biomedical Advanced Research and Development Authority (BARDA), the U.S. Department of Defense and the FDA Office of Orphan Products Development.

About RedHill Biopharma Ltd.:
RedHill Biopharma Ltd. (NASDAQ:RDHL) (Tel-Aviv Stock Exchange:RDHL) is a specialty biopharmaceutical company headquartered in Israel, primarily focused on the development and commercialization of late clinical-stage, proprietary, orally-administered, small molecule drugs for the treatment of gastrointestinal and inflammatory diseases and cancer. RedHill has a U.S. co-promotion agreement with Concordia for **Donnatal ®**, a prescription oral adjunctive drug used in the treatment of IBS and acute enterocolitis, as well as an exclusive license agreement with Entera Health for **EnteraGam ®**, a medical food intended for the dietary management, under medical supervision, of chronic diarrhea and loose stools. RedHill's clinical-stage pipeline includes: (i) **RHB-105 -** an oral combination therapy for the treatment of *Helicobacter pylori* infection with successful results from a first Phase III study; (ii) **RHB-104 -** an oral combination therapy for the treatment of Crohn's disease with an ongoing first Phase III study, a completed proof-of-concept Phase IIa study for multiple sclerosis and QIDP status for nontuberculous mycobacteria (NTM) infections; (iii) **BEKINDA ® (RHB-102) -** a once-daily oral pill formulation of ondansetron with an ongoing Phase III study for acute gastroenteritis and gastritis and an ongoing Phase II study for IBS-D; (iv) **RHB-106 -** an encapsulated bowel preparation licensed to Salix Pharmaceuticals, Ltd.; (v) **YELIVA ® (ABC294640) -** a Phase II-stage, orally-administered, first-in-class SK2 selective inhibitor targeting multiple oncology, inflammatory and gastrointestinal indications; (vi) **MESUPRON -** a Phase II-stage first-in-class, orally-administered protease inhibitor, targeting pancreatic cancer and other solid tumors and (vii) **RIZAPORT ® (RHB-103) -** an oral thin film formulation of rizatriptan for acute migraines, with a U.S. NDA currently under discussion with the FDA and marketing authorization received in two EU member states under the European Decentralized Procedure (DCP). More information about the Company is available at: www.redhillbio.com.

[1] YELIVA ® is an investigational new drug, not available for commercial distribution.

[2] The article was authored by Carolyn D. Britten, Melanie B. Thomas, Elizabeth Garrett-Mayer, Steven H. Chin, Keisuke Shirai, Besim Ogretmen, Tricia A. Bentz, Alan Brisendine, Kate Anderton, Susan L. Cusack, Lynn W. Maines, Yan Zhuang and Charles D. Smith.

[3] http://clincancerres.aacrjournals.org/content/early/2017/04/18/1078-0432.CCR-16-2363

This press release contains "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995. Such statements may be preceded by the words "intends," "may," "will," "plans," "expects," "anticipates," "projects," "predicts," "estimates," "aims," "believes," "hopes," "potential" or similar words. Forward-looking statements are based on certain assumptions and are subject to various known and unknown risks and uncertainties, many of which are beyond the Company's control, and cannot be predicted or quantified and consequently, actual results may differ materially from those expressed or implied by such forward-looking statements. Such risks and uncertainties include, without limitation, risks and uncertainties associated with (i) the initiation, timing, progress and results of the Company's research, manufacturing, preclinical studies, clinical trials, and other therapeutic candidate development efforts; (ii) the Company's ability to advance its therapeutic candidates into clinical trials or to successfully complete its preclinical studies or clinical trials; (iii) the extent and number of additional studies that the Company may be required to conduct and the Company's receipt of regulatory approvals for its therapeutic candidates, and the timing of other regulatory filings, approvals and feedback; (iv) the manufacturing, clinical development, commercialization, and market acceptance of the Company's therapeutic candidates; (v) the Company's ability to successfully market Donnatal ® and EnteraGam ®, (vi) the Company's ability to establish and maintain corporate collaborations; (vii) the Company's ability to acquire products approved for marketing in the U.S. that achieve commercial success and build its own marketing and commercialization capabilities; (viii) the interpretation of the properties and characteristics of the Company's therapeutic candidates and of the results obtained with its therapeutic candidates in research, preclinical studies or clinical trials; (ix) the implementation of the Company's business model, strategic plans for its business and therapeutic candidates; (x) the scope of protection the Company is able to establish and maintain for intellectual property rights covering its therapeutic candidates and its ability to operate its business without infringing the intellectual property rights of others; (xi) parties from whom the Company licenses its intellectual property defaulting in their obligations to the Company; and (xii) estimates of the Company's expenses, future revenues capital requirements and the Company's needs for additional financing; (xiii) competitive companies and technologies within the Company's industry. More detailed information about the Company and the risk factors that may affect the realization of forward-looking statements is set forth in the Company's filings with the Securities and Exchange Commission (SEC), including the Company's Annual Report on Form 20-F filed with the SEC on February 23, 2017. All forward-looking statements included in this Press Release are made only as of the date of this Press Release. We assume no obligation to update any written or oral forward-looking statement unless required by law.

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