Dicerna Announces Dosing of First Volunteer in Phase 1 Clinical Trial of DCR-HBVS Designed for the Treatment of Chronic Hepatitis B Virus

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— Clinical Proof-of-Concept Data Expected in Second Half of 2019 —

CAMBRIDGE, Mass.--(BUSINESS WIRE)--Jan. 28, 2019-- Dicerna Pharmaceuticals, Inc. (NASDAQ: DRNA), (the "Company") a leading developer of RNA interference (RNAi) therapeutics, today announced the dosing of the first human volunteer in its Phase 1 clinical trial of DCR-HBVS, the Company's investigational GalXC ™-based therapy for the treatment of chronic hepatitis B virus (HBV) infection in adults. The Company anticipates human proof-of-concept data from the Phase 1 trial, which is known as DCR-HBVS-101, in the second half of 2019.

"The dosing of the first human in the DCR-HBVS-101 trial brings us a step closer to the potential availability of an innovative therapy for patients with chronic hepatitis B, a serious liver infection that can lead to advanced hepatic disease or liver cancer if not treated effectively," said Ralf Rosskamp, M.D., chief medical officer of Dicerna. "We are hopeful that this three-part Phase 1 trial will validate RNA interference as a viable clinical strategy against chronic hepatitis B infection, based upon our encouraging preclinical data on DCR-HBVS."

DCR-HBVS is comprised of a single GalXC molecule that targets HBV messenger RNAs (mRNAs) within the hepatitis B surface antigen (HBsAg) gene sequence region. Preclinical studies with a standard mouse model of HBV infection showed DCR-HBVS led to greater than 99% reduction in circulating HBsAg, suggesting superior HBsAg suppression (both in magnitude and duration of suppression), compared to targeting within the X gene sequence region.

"RNAi-based therapy has the potential to change the treatment paradigm for patients with chronic HBV infection. By silencing not only the S antigen but also other viral genes, through a powerful and long-acting mechanism, RNAi-based therapy could tip the balance toward allowing the patient's own immune system to mount an effective immune response. This approach could help eradicate HBV and remove the need for life-long therapy," said principal investigator Edward Gane, MBCHB, M.D., deputy director and hepatologist of the New Zealand Liver Transplant Unit at Auckland City Hospital and clinical professor of Medicine at the University of Auckland School of Medicine. "Given the encouraging inhibitory activity of DCR-HBVS in animal studies, as well as its favorable preclinical safety profile, we eagerly anticipate the first results from healthy volunteers in the DCR-HBVS-101 trial, and then in the second part of the study, from patients with chronic hepatitis B."

About the DCR-HBVS-101 Trial

The DCR-HBVS-101 clinical trial is a randomized, placebo-controlled study designed to evaluate the safety and tolerability of DCR-HBVS in normal healthy volunteers (NHVs) and in patients with non-cirrhotic chronic HBV. Secondary objectives are to characterize the pharmacokinetic (PK) profile of DCR-HBVS and to evaluate preliminary pharmacodynamics (PD) and antiviral efficacy on plasma levels of HBsAg and HBV in blood. The study is divided into three phases or groups:

- In Group A, 30 NHVs are to receive a single ascending-dose of DCR-HBVS (0.1, 1, 1.5, 3, 6, or 12 mg/kg), with a four-week follow-up period.
- Group B is a single-dose study of DCR-HBVS (3 mg/kg) in eight patients with HBV who are naïve to nucleoside analog therapy; these patients will be followed for at least 12 weeks. The Company expects to initiate Group B dosing in the third quarter of 2019.
- Group C is a multiple ascending-dose study of DCR-HBVS (1.5, 3, or 6 mg/kg) in 18 patients with HBV previously treated with nucleoside analogs with a follow-up period of 24 weeks or more. The Company expects to initiate Group C dosing in the second quarter of 2019.

For more information about the DCR-HBVS clinical study, please visit clinicaltrials.gov and use the identifier NCT03772249.

About Chronic Hepatitis B Virus (HBV) Infection

Hepatitis B virus (HBV) is the world's most common serious liver infection, with more than 292 million patients chronically infected, according to an estimate by the World Health Organization. Chronic HBV infection, a condition characterized by the presence of the HBV surface antigen (HBsAg) for six months or more, claims approximately 780,000 lives annually; an estimated 650,000 of these deaths are caused by cirrhosis and liver cancer as a result of chronic hepatitis B, and 130,000 of these deaths result from complications associated with acute disease.[1]

About DCR-HBVS

DCR-HBVS is an investigational drug in development for the treatment of chronic hepatitis B virus (HBV) infection. Current therapies for HBV, such as nucleoside analogs and pegylated interferon, aim to suppress the virus; however, although these treatments can provide long-term viral suppression if taken continuously, they rarely lead to a long-term immunological cure, as measured by the clearance of HBV surface antigen (HBsAg) and sustained HBV deoxyribonucleic acid (DNA) suppression in patient plasma or blood. By contrast, DCR-HBVS targets HBV messenger RNA (mRNA) and leads to greater than 99% reduction in circulating HBsAg, as observed in mouse models of HBV infection. Those data suggest that DCR-HBVS may induce long-term clearance of intrahepatic and serum HBsAg, as well as sustained HBV DNA suppression.

About Dicerna Pharmaceuticals, Inc.

Dicerna Pharmaceuticals, Inc., is a biopharmaceutical company focused on the discovery and development of innovative, subcutaneously delivered RNAi-based therapeutics for the treatment of diseases involving the liver, including rare diseases, chronic liver diseases, cardiovascular diseases, and

viral infectious diseases. Dicerna is leveraging its proprietary GalXC™ RNAi technology platform to build a broad pipeline in these core therapeutic areas, focusing on target genes where connections between target gene and diseases are well understood and documented. Dicerna intends to discover, develop and commercialize novel therapeutics either on its own or in collaboration with pharmaceutical partners. Dicerna has strategic collaborations with Boehringer Ingelheim, Eli Lilly and Company, and Alexion Pharmaceuticals. For more information, please visit www.dicerna.com.

Cautionary Note on Forward-Looking Statements

This press release includes forward-looking statements. Such forward-looking statements are subject to risks and uncertainties that could cause actual results to differ materially from those expressed or implied in such statements. Examples of forward-looking statements include, among others, statements we make regarding: (i) the therapeutic and commercial potential of the GalXC™ platform, including DCR-HBVS; (ii) research and development plans and timelines related to GalXC, including DCR-HBVS; and (iii) the potential of our technology and drug candidates in our research and development pipeline. The process by which an early stage investigational therapy such as DCR-HBVS and an early stage platform such as GalXC could potentially lead to an approved product is long and subject to highly significant risks. Applicable risks and uncertainties include those relating to our clinical research and other risks identified under the heading "Risk Factors" included in our most recent Form 10-Q filing and in other future filings with the Securities and Exchange Commission (SEC). These risks and uncertainties include, among others, the cost, timing and results of preclinical studies and clinical trials and other development activities; the unpredictability of the duration and results of regulatory review of New Drug Applications and Investigational NDAs; market acceptance for approved products and innovative therapeutic treatments; competition; the possible impairment of, inability to obtain and costs of obtaining intellectual property rights; and possible safety or efficacy concerns, general business, financial and accounting risks and litigation. The forward-looking statements contained in this press release reflect Dicerna's current views with respect to future events, and Dicerna does not undertake and specifically disclaims any obligation to update any forward-looking statements.

References

1. Hepatitis B Foundation. Facts and Figures. 2019. Available at: http://www.hepb.org/what-is-hepatitis-b/what-is-hepb/facts-and-figures/. Accessed on January 17, 2019.

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