Dicerna Presents Positive New Interim Data From PHYOX™3 Long-Term, Open-Label Extension Study of Nedosiran for Treatment of Primary Hyperoxaluria (PH)

October 22, 2020

– All Participants Receiving Nedosiran, Regardless of Subtype, Achieved Normalization or Near-Normalization of Urinary Oxalate, a Key PH Measure, by Day 180 in Ongoing, Open-Label Trial –

– Nedosiran Was Generally Well Tolerated With No Serious Safety Concerns Identified in This Ongoing Study –

LEXINGTON, Mass.--(BUSINESS WIRE)--Oct. 22, 2020-- Dicerna Pharmaceuticals, Inc. (Nasdaq: DRNA) (the "Company" or "Dicerna"), a leading developer of investigational ribonucleic acid interference (RNAi) therapeutics, today announced positive new interim data from its ongoing PHYOX™3 open-label trial of once-monthly nedosiran, an investigational candidate in development for the treatment of all three known types of primary hyperoxaluria (PH) – PH1, PH2 and PH3. PH is a family of ultra-rare, life-threatening genetic disorders that initially manifest with complications in the kidneys. These results were presented as part of the American Society of Nephrology's Kidney Week 2020 annual scientific conference.

All 13 participants (10 with PH1 and three with PH2) receiving nedosiran, who had previously completed the PHYOX1 Phase 1 trial and had reached Day 180 in the ongoing PHYOX3 trial, achieved normal (12 of 13) or near-normal (one of 13) urinary oxalate (Uox) excretions at one or more timepoints. Of these, all 10 (100%) of the participants with PH1, and two of the three (67%) participants with PH2, achieved normal Uox excretions at one or more visits. In this study, normal Uox excretions were defined as below 0.46 mmol/1.73m^2 body surface area (BSA)/24 hr, and near-normal Uox excretions were defined as ranging from 0.46 to < 0.6 mmol/1.73m^2 BSA/24 hr.

"For patients with PH, excessive oxalate production compromises kidney function and can have life-threatening consequences," said Shreeram Aradhye, M.D., executive vice president and chief medical officer at Dicerna. "We are encouraged by this latest interim analysis from our ongoing PHYOX3 trial showing that all PH1 and PH2 participants receiving nedosiran for six months reached the desired ranges of normal or near-normal urinary oxalate excretions. This is a promising outcome suggesting that nedosiran may meaningfully reduce hepatic oxalate overproduction, potentially slowing disease progression. We look forward to additional results from our ongoing PHYOX clinical development program, including our pivotal PHYOX2 trial, to support our planned New Drug Application submission next year."

Key results from the interim analysis:

- A total of 16 trial participants from the completed PHYOX1 trial entered the PHYOX3 trial. Of these, 13 who had reached 180 Days and had received six monthly doses in the PHYOX3 trial were included in this analysis. Three participants were not included in the efficacy analysis as they had not yet reached Day 180 at the time of the analysis.
- All participants in this analysis, regardless of PH subtype, achieved normal or near-normal Uox excretion by Day 180.
- 92% of all participants (12 of 13) achieved normal Uox excretion at one or more visits through Day 180:
    - 100% of participants (10 of 10) with PH1
    - 67% of participants (2 of 3) with PH2
- The single participant with PH2 who did not achieve normal Uox excretion during the analysis period reached near-normal Uox excretion rates.
- The mean 24-hour Uox excretion for all 13 participants at Day 180 was in the normal range at 0.44 mmol/1.73 m^2 BSA/24 hr.
- 62% of all participants (8 of 13) demonstrated normalized Uox excretions on at least three consecutive visits, meeting protocol-defined eligibility for gradual reduction in fluid intake requirements:
    - 70% of participants (7 of 10) with PH1
    - 33% of participants (1 of 3) with PH2
- The mean maximum reduction in Uox excretion for all participants was 70.9% (range, 54.9% to 87.5%) by Day 180.
- Nedosiran was generally well tolerated, and no serious safety concerns were identified in this ongoing study. There were no treatment discontinuations or study withdrawals during the observation period. Two participants had serious treatment-emergent adverse events (TEAEs) (pyelonephritis and nephrolithiasis) that were determined by the investigator to be unrelated to nedosiran treatment. The most common TEAEs were mild to moderate administration-site reactions. Protocol-defined injection-site reactions (ISRs) occurred in 18.8% of participants.

Also presented at ASN Kidney Week were the results of a retrospective claims analysis of commercial plan data (excluding Medicare and Medicaid lives) from IQVIA PharMetrics® Plus (1/2014-12/2019). The analysis included a 5:1 ratio of a random 5% sample of patients without PH or secondary hyperoxaluria (SH), matched to patients diagnosed with PH (subtype specificity not available). This analysis showed that the median cost of care for patients with PH (n=324) was approximately seven times higher than patients who did not have PH (n=1,620) (p<0.001).

"The observations from this claims analysis highlight some of the higher health care costs associated with having PH," said Thomas Koenig, vice president, global market access at Dicerna. "This analysis suggests that, even excluding patients who are on Medicare and Medicaid who may have more advanced disease, patients with PH bear higher healthcare-related costs while still facing the potential for chronic kidney stones, declining kidney health, systemic oxalosis impacting other organs and the possibility of end-stage renal disease that may require dual liver-kidney transplantation. This analysis is the first known published insight into healthcare costs associated with PH and emphasizes the need for more research

into the clinical and cost burden associated with this disease."

Both posters were presented during the "Genetic Diseases of the Kidneys: Non-Cystic – 1" session at the Kidney Week conference and will be posted in the Events & Presentations section of Dicerna's corporate website.

About the Nedosiran PHYOX™3 Trial

The PHYOX™3 trial (ClinicalTrials.gov: NCT04042402) is an ongoing, open-label extension study evaluating nedosiran's long-term safety and efficacy in participants with primary hyperoxaluria (PH), a family of ultra-rare, life-threatening genetic disorders that initially manifest with recurrent renal stones and can lead to kidney failure. The PHYOX3 trial is open to participants six years of age or older with PH1 or PH2 who have participated in any previous PHYOX clinical development program trial, as well as their siblings with PH between the ages of six to 18. The study's primary endpoint will evaluate annual rate of decline in estimated glomerular filtration rate (eGFR), a measure of kidney function and nedosiran's ability to preserve remaining kidney function. The PHYOX3 trial also will evaluate nedosiran's long-term safety and effect on new stone formation, nephrocalcinosis, and the durability of reducing Uox levels, as well as its potential to enable the gradual decrease or elimination of their disease management practices.

About Primary Hyperoxaluria (PH)

Primary hyperoxaluria (PH) is a family of ultra-rare, life-threatening genetic disorders that initially manifest with complications in the kidneys. There are three known types of PH (PH1, PH2 and PH3), each resulting from a mutation in one of three different genes. These genetic mutations cause enzyme deficiencies that result in the overproduction of a substrate called oxalate. Abnormal production and accumulation of oxalate leads to recurrent kidney stones, nephrocalcinosis and chronic kidney disease that may progress to end-stage renal disease requiring intensive dialysis. Compromised renal function eventually results in the accumulation of oxalate in a wide range of organs including the skin, bones, eyes and heart. In the most severe cases, symptoms start in the first year of life. A combined liver-kidney transplant may be undertaken to resolve PH1 or PH2, but it is an invasive solution with limited availability and high morbidity that requires lifelong immune suppression to prevent organ rejection. There are currently no approved medications for the treatment of PH. Patients are limited to using hyperhydration and medication to attempt to increase solubility of oxalate in urine. Despite these interventions, oxalate may continue to accumulate in the kidneys and other organs, causing damage.

About Nedosiran

Nedosiran is the only RNAi drug candidate in development for primary hyperoxaluria (PH) types 1, 2 and 3 and is Dicerna's most advanced product candidate utilizing the proprietary GalXC™ RNAi technology platform. Nedosiran is designed to inhibit the lactate dehydrogenase (LDH) enzyme – an enzyme that catalyzes the final step in a common pathway resulting in oxalate overproduction in patients with PH1, PH2 and PH3. Dicerna is evaluating the safety and efficacy of nedosiran in patients with all known forms of PH as part of its PHYOX™ clinical development program.

About the GalXC™ RNAi Technology Platform

Dicerna's proprietary RNA interference (RNAi) technology platform, called GalXC™, aims to advance the development of next-generation RNAi-based therapies designed to silence disease-driving genes in the liver. GalXC-based compounds enable subcutaneous delivery of RNAi therapies that are designed to bind specifically to receptors on liver cells, leading to internalization and access to the RNAi machinery within the cells. The GalXC approach seeks to optimize the activity of the RNAi pathway so that it operates in the most specific and potent fashion.

About Dicerna Pharmaceuticals, Inc.

Dicerna Pharmaceuticals, Inc. (Nasdaq: DRNA) is a biopharmaceutical company focused on discovering, developing and commercializing medicines that are designed to leverage ribonucleic acid interference (RNAi) to selectively silence genes that cause or contribute to disease. Using our proprietary RNAi technology platform called GalXC™, Dicerna is committed to developing RNAi-based therapies with the potential to treat both rare and more prevalent diseases. By silencing disease-causing genes, Dicerna's GalXC platform has the potential to address conditions that are difficult to treat with other modalities. Initially focused on hepatocytes, Dicerna has continued to innovate and is exploring new applications of its RNAi technology beyond the liver, targeting additional tissues and enabling new therapeutic applications. In addition to our own pipeline of core discovery and clinical candidates, Dicerna has established collaborative relationships with some of the world's leading pharmaceutical companies, including Novo Nordisk A/S, Roche, Eli Lilly and Company, Alexion Pharmaceuticals, Inc., Boehringer Ingelheim International GmbH and Alnylam Pharmaceuticals, Inc. Between Dicerna and our collaborative partners, we currently have more than 20 active discovery, preclinical or clinical programs focused on rare, cardiometabolic, viral, chronic liver and complement-mediated diseases, as well as neurodegeneration and pain. At Dicerna, our mission is to interfere – to silence genes, to fight disease, to restore health. 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 our product candidates and the development thereof, including interim results from the Company's PHYOX3 trial of nedosiran, results from future trials of the Company's PHYOX clinical development program, the therapeutic potential of our product candidates, including nedosiran, the planned submission of the New Drug Application for nedosiran, as well as to our business and operations, including the discovery, development and commercialization of our product candidates and technology platform, and the therapeutic potential thereof, our collaboration with partners and any potential future collaborations. The process by which investigational therapies, such as nedosiran, could potentially lead to an approved product is long and subject to highly significant risks. Applicable risks and uncertainties include those relating to Dicerna's clinical research and other risks identified under the heading "Risk Factors" included in the Company's most recent filings on Forms 10-K and 10-Q and in other future filings with the Securities and Exchange Commission. These risks and uncertainties include, among others, the cost, timing and results of preclinical studies and clinical trials and other development activities by us and our collaborative partners; the likelihood of Dicerna's clinical programs being executed on timelines provided and reliance on the Company's contract research organizations and predictability of timely enrollment of subjects and patients to advance Dicerna's clinical trials; the reliance of Dicerna on contract manufacturers to supply its products for research and development and the risk of supply interruption from a contract manufacturer; the potential for future data to alter initial and preliminary results of early-stage clinical trials; the impact of the ongoing COVID-19 pandemic on our business operations, including the conduct of our research and development activities; the regulatory review and unpredictability of the duration and results of the regulatory review of Investigational New Drug applications (INDs) and Clinical Trial Applications (CTAs) that are necessary to continue to advance and progress the Company's clinical programs; the timing, plans and reviews by regulatory authorities of marketing applications such as New Drug Applications (NDAs) and comparable foreign

applications for one or more of Dicerna’s product candidates; continued alignment with the FDA on the regulatory pathway to approval for nedosiran; the ability to secure, maintain and realize the intended benefits of collaborations with partners; market acceptance for approved products and innovative therapeutic treatments; competition; the possible impairment of, inability to obtain, and costs to obtain intellectual property rights; possible safety or efficacy concerns that could emerge as new data are generated in R&D; and 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.

View source version on businesswire.com: https://www.businesswire.com/news/home/20201022005764/en/

Media:
Amy Trevvett
+1 617-612-6253
atrevvett@dicerna.com

Investors:
Lauren Stival
+1 617-514-0461
lstival@dicerna.com

Source: Dicerna Pharmaceuticals, Inc.