Arcturus Therapeutics Announces Positive Interim ARCT-021 (LUNAR-COV19) Phase 1/2 Study Results for Both Single Shot and Prime-boost Regimens, and Up to $220 Million in Additional Financial Commitments from Singapore

November 9, 2020

Based on interim Phase 1/2 results, a single 7.5 µg dose of ARCT-021, along with prime-boost regimens are selected to advance into later stage global clinical trials

Seroconversion in majority of participants receiving doses in the range of 5 µg to 7.5 µg; Geometric Mean Titer (GMT) levels for neutralizing antibodies in the range of convalescent plasma

Dose-dependent anti-spike IgG titers increased over time through approximately day 43; T cell reactivity to spike protein peptides, including receptor binding domain (RBD) observed

Favorable safety and tolerability profile in both younger (ages 21-55) and older (ages 56-80) subjects; no moderate or severe fevers

Singapore Economic Development Board (EDB) financial commitment includes $45 million up front to fund manufacture of ARCT-021 and up to an additional $175 million in vaccine purchases

Lyophilized drug product on track for Phase 3 implementation

SAN DIEGO--(BUSINESS WIRE)--Nov. 9, 2020-- Arcturus Therapeutics Holdings Inc. (the “Company”, “Arcturus”, Nasdaq: ARCT), a leading clinical-stage messenger RNA medicines company focused on the development of infectious disease vaccines and significant opportunities within liver and respiratory rare diseases, today announced positive interim clinical study results from its ongoing Phase 1/2 study of ARCT-021, its vaccine candidate for COVID-19. The Company also announced new manufacturing financial support and potential vaccine purchases up to $220 million from Singapore’s Economic Development Board (EDB).

ARCT-021 Phase 1/2 study overview and results

ARCT-021 is being developed in collaboration with Duke-NUS Medical School and ongoing Phase 1/2 development is being conducted in Singapore. ARCT-021 combines self-transcribing and replicating mRNA (STARR™) with LUNAR® lipid-mediated delivery technology, which is designed to enhance and extend antigen expression, enabling vaccination at lower doses. The ongoing Phase 1/2 randomized, double-blinded, placebo-controlled study is evaluating the safety, tolerability and immunogenicity of multiple dose levels of ARCT-021. Study subjects receive either placebo, or ARCT-021 at doses in the range of 1 µg to 10 µg per injection in either a single dose or prime-boost regimen.

The study is fully enrolled with 106 subjects, including older adult subjects. To date, 78 subjects have received at least one injection of ARCT-021, 36 subjects have received two injections (i.e., prime-boost), and 28 subjects have received placebo. Preliminary results are currently available from all single dose cohorts and the 5 µg younger adult prime-boost cohort up to at least day 36, with most subjects having completed day 57 post-injection.

Based on interim study results, a robust anti-spike protein IgG immune response was observed at all doses evaluated. PRNT50 GMT levels for neutralizing antibodies were within the range of titers observed in COVID-19 patient convalescent plasma. Furthermore, anti-spike IgG antibody titers have been dose-dependent, and increased through approximately day 43, confirming the effect seen in preclinical studies for STARR™ mRNA which exhibited increasing antibody titers over extended periods of time. Cytokine staining and ELISpot tests showed T cell responses to multiple peptide pools derived from the SARS-CoV-2 spike protein. The CD4+ response was Th1 dominant and the CD8+ response includes reactivity to the receptor binding domain.

ARCT-021 was generally well tolerated and had a favorable local and systemic adverse event (AE) profile. The majority of AEs have been mild; there have been no moderate (Grade 2) or severe (Grade 3) fevers at any dose and no severe (Grade 3) injection site reactions at doses being contemplated for advancement. No subjects have withdrawn from the study and there have been no serious adverse events deemed to be treatment related.

The study remains ongoing and the Company intends to provide additional results at a later date.

The Company’s lyophilized drug product remains on track for Phase 3 implementation. The novel lyophilization process technology has been successfully transferred to a cGMP manufacturing facility. Arcturus recently signed an agreement with Recipharm to support the manufacture of ARCT-021.

The Company is in discussions with the Singapore Health Sciences Authority to advance ARCT-021 into later stage clinical studies. Interactions with additional agencies are expected within the next few weeks. The current plan anticipates testing a single dose regimen at 7.5 µg, as well as prime-boost regimens.

“The promising Phase 1/2 study results indicate that ARCT-021 could be effective as a single administration, which differentiates this investigational vaccine from many other COVID-19 vaccines in development. ARCT-021 has the potential to provide important public health benefits by greatly facilitating broad administration across multiple populations worldwide,” said Professor Ooi Eng Eong, Deputy Director, Emerging Infectious Diseases

Programme, Duke-NUS Medical School and a member of Arcturus' Vaccine Platform Scientific Advisory Board.

"We are very pleased with our preliminary ARCT-021 Phase 1/2 clinical study results, which demonstrate a favorable safety profile and both humoral and cellular immunity to the vaccine antigen, at relatively low dose levels. These results provide support for ARCT-021 having a differentiated emerging clinical profile, including as a single dose regimen. The non-viral LUNAR® delivery technology also has the ability to be dosed multiple times, if needed. We believe that our vaccine candidate could be an important contribution to controlling the global COVID-19 pandemic," said Steve Hughes, M.D., Chief Development Officer of Arcturus. "In the coming weeks, we expect to complete our discussions with regulatory authorities and we are working with urgency to advance ARCT-021 into later stage studies."

Up to $220 Million Financial commitment from Singapore's Economic Development Board (EDB)

Arcturus announced an important manufacturing support agreement with Singapore's EDB that includes a limited recourse loan of $45 million and terms for ARCT-021 vaccine purchases of up to $175 million. The EDB will provide the $45 million within 60 days contingent on delivery of certain documentations. The proceeds will be used for the purchase of equipment, materials and services related to the manufacture of our vaccine. Under the terms of the agreement, the loan will be repaid through royalties on future ARCT-021 commercial sales. If ARCT-021 does not obtain regulatory approval, the loan will be forgiven. Additionally, Arcturus and the EDB have agreed to terms providing the EDB with the right to purchase up to $175 million of ARCT-021 vaccine at pre-negotiated prices, with shipments expected to begin in the first quarter of 2021.

"These funds provide the Company with additional resources to sustain rapid scale up of ARCT-021 to meet the requirements of our existing Israeli and Singapore agreements as well as other potential supply deals in 2021. Along with our global manufacturing partners, we have laid the foundation to produce hundreds of millions of doses of ARCT-021 over the next 18 months and we believe the Company has an opportunity to positively impact the global COVID-19 pandemic," said Andy Sassine, Chief Financial Officer of Arcturus.

The Company will hold a conference call today, to further discuss the ARCT-021 vaccine candidate and other recent corporate updates as part of its third quarter announcement.

About Arcturus Therapeutics

Founded in 2013 and based in San Diego, California, Arcturus Therapeutics Holdings Inc. (Nasdaq: ARCT) is a clinical-stage mRNA medicines and vaccines company with enabling technologies: (i) LUNAR® lipid-mediated delivery, (ii) STARR™ mRNA Technology and (iii) mRNA drug substance along with drug product manufacturing expertise. Arcturus' diverse pipeline of RNA therapeutic and vaccine candidates includes self-replicating mRNA vaccine programs for SARS-CoV-2 (COVID-19) and Influenza, and other programs to potentially treat Ornithine Transcarbamylase (OTC) Deficiency, Cystic Fibrosis, Cardiovascular Disease along with partnered programs including Glycogen Storage Disease Type 3, Hepatitis B Virus, and non-alcoholic steatohepatitis (NASH). Arcturus' versatile RNA therapeutics platforms can be applied toward multiple types of nucleic acid medicines including messenger RNA, small interfering RNA, replicon RNA, antisense RNA, microRNA, DNA, and gene editing therapeutics. Arcturus' technologies are covered by its extensive patent portfolio (200 patents and patent applications, issued in the U.S., Europe, Japan, China and other countries). Arcturus' commitment to the development of novel RNA therapeutics has led to collaborations with Janssen Pharmaceuticals, Inc., part of the Janssen Pharmaceutical Companies of Johnson & Johnson, Ultragenyx Pharmaceutical, Inc., Takeda Pharmaceutical Company Limited, CureVac AG, Synthetic Genomics Inc., Duke-NUS, and the Cystic Fibrosis Foundation. For more information visit www.ArcturusRx.com. In addition, please connect with us on Twitter and LinkedIn.

Forward Looking Statements

This press release contains forward-looking statements that involve substantial risks and uncertainties for purposes of the safe harbor provided by the Private Securities Litigation Reform Act of 1995. Any statements, other than statements of historical fact included in this press release, including those regarding strategy, future operations, collaborations, the likelihood of success, and the efficacy or safety of, ARCT-021, the ability to initiate or complete preclinical and clinical development programs, including as a result of the COVID-19 pandemic, the supply and delivery of any product or substance, the likelihood that any clinical data will be predictive of future clinical results or sufficient for regulatory approval, the ability to enroll subjects in clinical trials, the Company's efforts to develop a vaccine against COVID-19 and therapeutic potential thereof based on the Company's mRNA therapeutics, the timing of initiation of dosing in human trials of a vaccine against COVID-19, the ability of the Company to scale up manufacturing of vaccine doses, the potential manufacturing capabilities of the Company, the amount and timing of any draw down of loan amounts with the EDB, and the impact of general business and economic conditions are forward-looking statements. Arcturus may not actually achieve the plans, carry out the intentions or meet the expectations or projections disclosed in any forward-looking statements such as the foregoing and you should not place undue reliance on such forward-looking statements. Such statements are based on management's current expectations and involve risks and uncertainties, including those discussed under the heading "Risk Factors" in Arcturus' Annual Report on Form 10-K for the fiscal year ended December 31, 2019, filed with the SEC on March 16, 2020 and in subsequent filings with, or submissions to, the SEC. Except as otherwise required by law, Arcturus disclaims any intention or obligation to update or revise any forward-looking statements, which speak only as of the date they were made, whether as a result of new information, future events or circumstances or otherwise.

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