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SINGLE DOSE OF REXLEMESTROCEL-L PROVIDES SUBSTANTIAL AND DURABLE REDUCTION IN HEART ATTACKS, STROKES AND CARDIAC DEATH IN PATIENTS WITH CHRONIC HEART FAILURE

Melbourne, Australia; January 11, and New York, USA; January 10, 2021: Mesoblast Limited (ASX:MSB; Nasdaq:MESO), global leader in allogeneic cellular medicines for inflammatory diseases, today announced additional results from the landmark DREAM-HF randomized controlled Phase 3 trial in 537 treated patients with chronic heart failure with reduced left ventricular ejection fraction (HFrEF) who received rexlemestrocel-L (REVASCOR®) or control sham. A single dose of rexlemestrocel-L resulted in substantial and durable reductions in heart attacks, strokes, and cardiac deaths. Since existing therapies have only minimal or no benefit on these endpoints, these notable outcomes may signal a breakthrough in addressing the principal unmet needs in patients with chronic heart failure. The results of this trial identify New York Heart Association (NYHA) class II HFrEF patients as the optimal target population for greatest rexlemestrocel-L treatment effect, and therefore a focus for registration and commercialization of rexlemestrocel-L in the largest market in heart failure.

The incidence of heart attacks and strokes were reduced by 60% over a median follow-up period of 30 months following a single dose of rexlemestrocel-L in the population of 537 patients with New York Heart Association (NYHA) class II or III chronic heart failure (5% vs 13%, p=0.002). Patients who received rexlemestrocel-L had a 68% reduction in the rate of recurrent hospitalizations from non-fatal heart attacks or strokes compared with controls, with a hospitalization rate of 1.90 per 100 patient-years of follow-up in the rexlemestrocel-L arm versus 5.95 per 100 patient-years of follow-up in the control arm (p=0.0002).

The incidence of death from cardiovascular causes was reduced by 60% following a single dose of rexlemestrocel-L in the 206 patients with NYHA class II disease (8% vs 20%, p=0.037), a significant reduction which was evident in both ischemic and non-ischemic subgroups as well as diabetic and non-diabetic patients. Whereas NYHA class II controls progressed to cardiac death rates of NYHA class III patients after a period of approximately 20 months of disease stability, NYHA class II patients treated with a single dose of rexlemestrocel-L did not show such cardiac death progression (p=0.004 compared to Class II control patients).

The combination of the three pre-specified outcomes of cardiac death, heart attack or stroke into a single composite outcome - called the three-point Major Adverse Cardiovascular Event (MACE) is a well-established endpoint used by the United States Food and Drug Administration (FDA) to determine cardiovascular risk. Rexlemestrocel-L significantly reduced this three-point MACE by 30% compared to controls across the population of 537 patients (20.6% vs 30%, p=0.027). In the NYHA class II subgroup of 206 patients, rexlemestrocel-L reduced the three-point MACE by 55% compared to controls (13% vs 29%, p=0.009).

The ability of rexlemestrocel-L to significantly impact cardiac death, heart attacks and strokes on top of maximal HFrEF therapy reflects the unique mechanisms of action of this allogeneic cellular therapy on reduction of inflammation and improved microvasculature. The unchecked intra-cardiac inflammation in HFrEF patients causes progressive loss of heart muscle, replacement with scar tissue, and death. Persistent inflammation in the blood circulation also results in accelerated atherosclerosis with plaque progression and instability resulting in plaque rupture and potential blockage of major arteries. The net result is high rates of heart attacks and strokes in chronic HFrEF patients. Rexlemestrocel-L reduces inflammatory cytokine production by immune cells and generates an improved local network of blood vessels in the damaged heart that has the potential protect against heart muscle cell death and replacement by scar tissue. Reduction in inflammation is the likely explanation for the observed reduction in incidence of heart attacks and strokes in patients who received rexlemestrocel-L.

Based on the observed reduction in mortality and morbidity in this Phase 3 trial, Mesoblast intends to meet with the FDA to discuss a potential approval pathway.

About Chronic Heart Failure
Heart failure affects approximately 6.5 million people in the US and 26 million people globally, with increasing prevalence and incidence. Chronic heart failure is a progressive disease associated with cardiac and systemic inflammation and a high mortality rate that approaches 50% at 5 years as patients progress beyond NYHA class II disease. In addition, these patients are at high risk of recurrent heart attacks and strokes, reflecting the high degree of systemic inflammation and progressive atherosclerosis associated with chronic heart failure. The high rate of cardiac death, heart attacks and strokes accompanying disease progression continues to be the most significant unmet need in this patient population since new therapies that have reduced recurrent hospitalizations due to cardiac decompensation have not materially impacted these MACE outcomes.

About the DREAM HF Phase 3 Trial
Clinical outcomes were evaluated in 537 treated advanced HFEF patients (206 with NYHA class II disease and 331 with NYHA class III disease) randomized 1:1 to either a sham-control procedure or a transendocardial injection by catheter of rexlemestrocel-L (150 million cells). Inclusion criteria enriched the trial for patients with advanced disease by requiring a prior heart failure hospitalization over the past one-to-nine months and/or a N-terminal pro–B-type natriuretic peptide (NT-proBNP) level of at least 1000 pg/ml (at least 1200 pg/mL in patients with atrial fibrillation). All patients were continued on maximal oral agents for heart failure and were followed for at least twelve months post the index cath lab-procedure. At the end of the trial, vital status (alive or dead) was established in 100% of the randomized patients.

Baseline characteristics for the 537 treated patient population showed that patient groups with baseline NYHA class II or NYHA class III clinical grades had advanced disease, but those with NYHA class III disease had significantly greater severity (mean NT-proBNP 2390 pg/ml for NYHA class III vs 1809 pg/ml for NYHA class II; p=0.001).

Recurrent non-fatal decompensated heart failure hospitalization events, incidence of heart attacks, strokes, and death from cardiac causes, and recurrent hospitalizations from these outcomes were evaluated for the 537 HFrEF patients over a median follow-up period of approximately 30 months.

About Mesoblast
Mesoblast is a world leader in developing allogeneic (off-the-shelf) cellular medicines for the treatment of severe and life-threatening inflammatory conditions. The Company has leveraged its proprietary mesenchymal lineage cell therapy technology platform to establish a broad portfolio of commercial products and late-stage product candidates which respond to severe inflammation by releasing anti-inflammatory factors that counter and modulate multiple effector arms of the immune system, resulting in significant reduction of the damaging inflammatory process.

Mesoblast has a strong and extensive global intellectual property portfolio with protection extending through to at least 2040 in all major markets. The Company's proprietary manufacturing processes yield industrial-scale, cryopreserved, off-the-shelf, cellular medicines. These cell therapies, with defined pharmaceutical release criteria, are planned to be readily available to patients worldwide.

Remestemcel-L is being developed for inflammatory diseases in children and adults including steroid refractory acute graft versus host disease and moderate to severe acute respiratory distress syndrome. Mesoblast has completed Phase 3 trials of rexlemestrocel-L for advanced chronic heart failure and chronic low back pain. Two products have been commercialized in Japan and Europe by Mesoblast's licensees, and the Company has established commercial partnerships in Europe and China for certain Phase 3 assets.

Mesoblast has locations in Australia, the United States and Singapore and is listed on the Australian Securities Exchange (MSB) and on the Nasdaq (MESO). For more information, please see www.mesoblast.com, LinkedIn: Mesoblast Limited and Twitter: @Mesoblast

Forward-Looking Statements
This announcement includes forward-looking statements that relate to future events or our future financial performance and involve known and unknown risks, uncertainties and other factors that may cause our actual results, levels of activity, performance or achievements to differ materially from any

Mesoblast Limited
ABN 68 109 431 870
www.mesoblast.com

Corporate Headquarters
Level 38
55 Collins Street
Melbourne 3000
Victoria Australia
T +61 3 9639 6036
F +61 3 9639 6030

United States Operations
505 Fifth Avenue
Third Floor
New York, NY 10017
USA
T +1 212 880 2060
F +1 212 880 2061

Asia
21 Biopolis Road
#01-22 Nucleos (South Tower)
SINGAPORE 138567
T +65 6570 0635
F +65 6570 0176

future results, levels of activity, performance or achievements expressed or implied by these forward-looking statements. All statements other than statements of historical fact, including our intention to discuss potential pathways to potential approval with the FDA, are forward-looking statements, which are often indicated by terms such as “anticipate,” “believe,” “could,” “estimate,” “expect,” “goal,” “intend,” “likely,” “look forward to,” “may,” “plan,” “potential,” “predict,” “project,” “should,” “will,” “would” and similar expressions and variations thereof. We make such forward-looking statements pursuant to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995 and other federal securities laws. Forward-looking statements should not be read as a guarantee of future performance or results, and actual results may differ from the results anticipated in these forward-looking statements, and the differences may be material and adverse. The risks, uncertainties and other factors that may impact our forward-looking statements include, but are not limited to: the timing, progress and results of Mesoblast’s preclinical and clinical studies; Mesoblast’s ability to advance product candidates into, enroll and successfully complete, clinical studies; the timing or likelihood of regulatory filings and approvals; whether the FDA agrees to a potential approval pathway; and the pricing and reimbursement of Mesoblast’s product candidates, if approved; Mesoblast’s ability to establish and maintain intellectual property on its product candidates and Mesoblast’s ability to successfully defend these in cases of alleged infringement. You should read this press release together with our risk factors, in our most recently filed reports with the SEC or on our website. Uncertainties and risks that may cause Mesoblast’s actual results, performance or achievements to be materially different from those which may be expressed or implied by such statements, and accordingly, you should not place undue reliance on these forward-looking statements. Unless required by law, we do not undertake any obligations to publicly update or revise any forward-looking statements, whether as a result of new information, future developments or otherwise.

Release authorized by the Chief Executive.

For more information, please contact:

Corporate Communications / Investors
Schond Greenway
T: +1 212 880 2060
E: schond.greenway@mesoblast.com

Paul Hughes
T: +61 3 9639 6036
E: paul.hughes@mesoblast.com

Media
Kristen Bothwell
T: +1 917 613 5434
E: kbothwell@rubenstein.com