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Global Leader in Allogeneic Cellular Medicines for Inflammatory Diseases

Corporate Presentation

May 2024

ASX: MSB; Nasdaq: MESO

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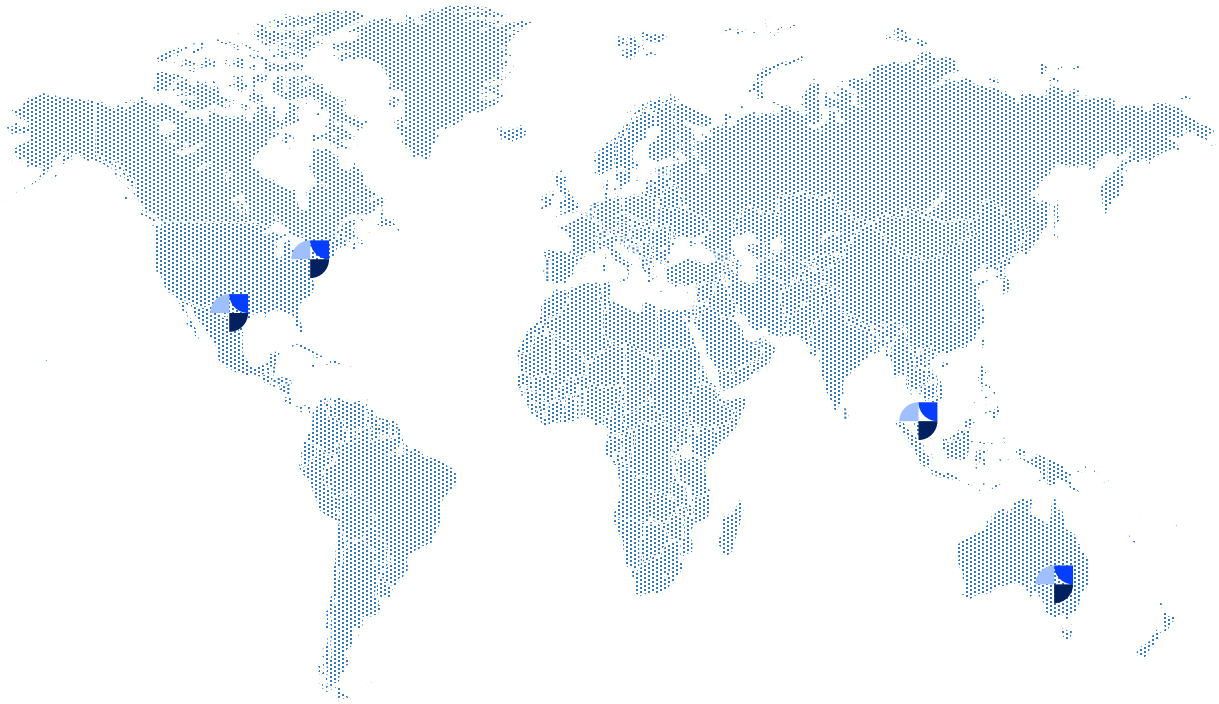
Mesoblast is committed to bringing to market innovative cellular medicines to treat serious and life-threatening illnesses

Our Mission

Global Leader in allogeneic cellular medicines for inflammatory diseases

- ✓ World leader in developing allogeneic (off-the-shelf) cellular medicines for the treatment of severe and life-threatening inflammatory conditions
- ✓ Locations in Australia, the United States and Singapore
- ✓ Listed on the ASX (MSB) and NASDAQ (MESO)
- ✓ Developing product candidates for distinct indications based on its remestemcel-L and rexlemestrocel-L stromal cell technology platforms
- ✓ Extensive global intellectual property portfolio with protection extending through to at least 2041 in all major markets
- ✓ FDA-inspected commercial scale manufacturing process and facilities



Phase 3 trials in THREE major indications

more than 1,100 patents & applications

TWO products with clinical data sufficient for FDA regulatory review

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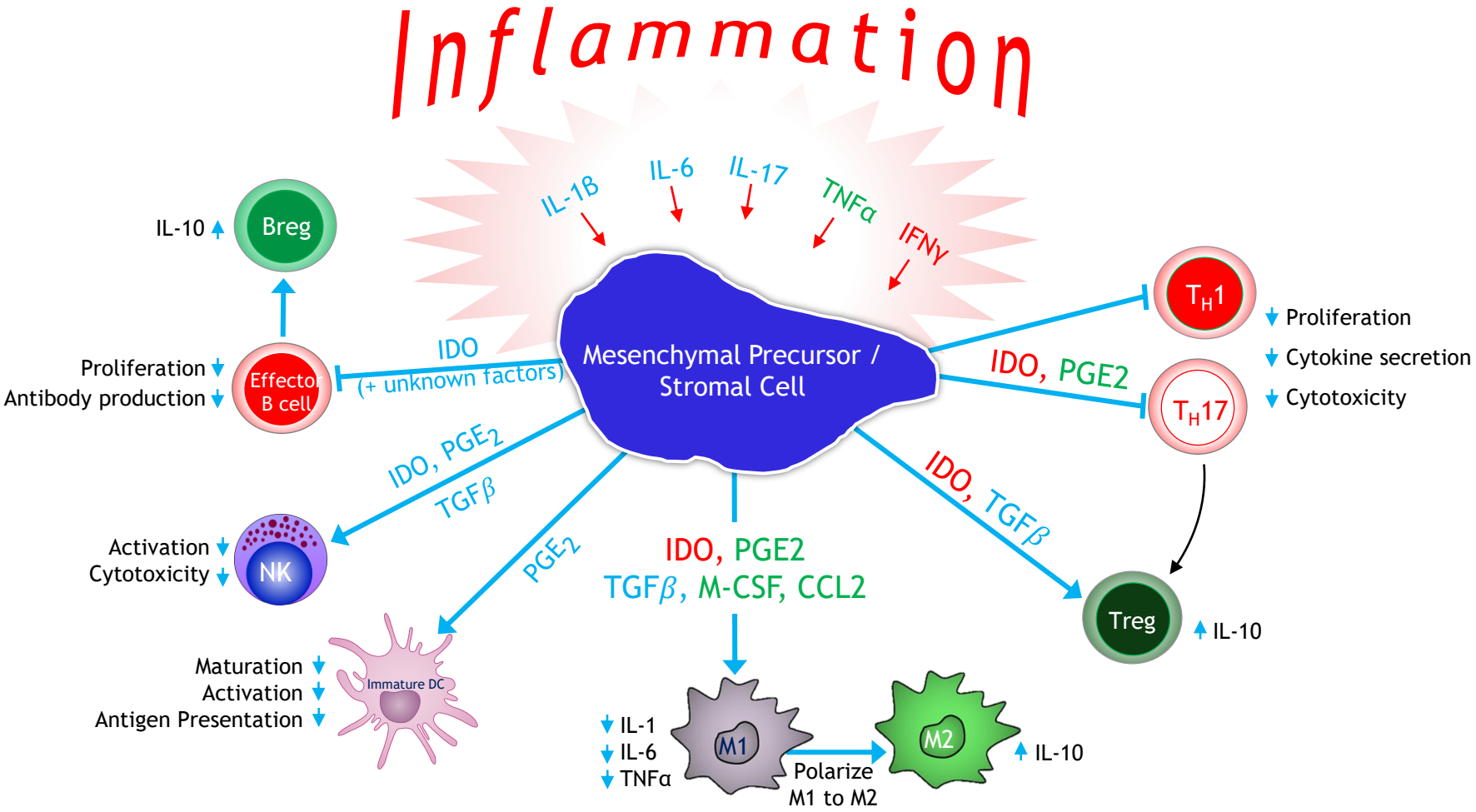
Platform Technology – shared mechanism of action across our products

Our mesenchymal precursor/stromal cells respond to and are activated by multiple inflammatory cytokines through surface receptors, resulting in orchestration of an anti-inflammatory cascade



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Late-Stage Clinical Pipeline based on proprietary allogeneic mesenchymal precursor / stromal cell platform

Product	Indication	Phase 2	Phase 3	Regulatory Filing	Approved
RYONCIL® (remestemcel-L)	Pediatric SR-aGVHD				
	Adult SR-aGVHD				
RYONCIL® (remestemcel-L)	IBD / Crohn's				
REVASCOR® (rexlemestrocel-L)	HFrEF End-stage				
	HFrEF Class II/III				
Rexlemestrocel-L	CLBP				

SR-aGVHD = Steroid-Refractory Acute Graft Versus Host Disease;
IBD = Inflammatory Bowel Disease
HFrEF = Heart Failure with Reduced Ejection Fraction;
CLBP = Chronic Low Back Pain;

This chart is figurative and does not purport to show individual trial progress within a clinical program

Notes:

- JCR Pharmaceuticals Co., Ltd. (JCR), has the right to develop mesenchymal stromal cells (MSCs) in certain fields for the Japanese market, including for the treatment of hematological malignancies, such as Graft vs Host Disease, and for hypoxic ischemic encephalopathy (HIE).
- Grünenthal has an exclusive license to develop and commercialize rexlemestrocel-L for chronic low back pain in Europe and Latin America/Caribbean.
- Tasly Pharmaceuticals has exclusive rights for rexlemestrocel-L for the treatment or prevention of chronic heart failure in China.

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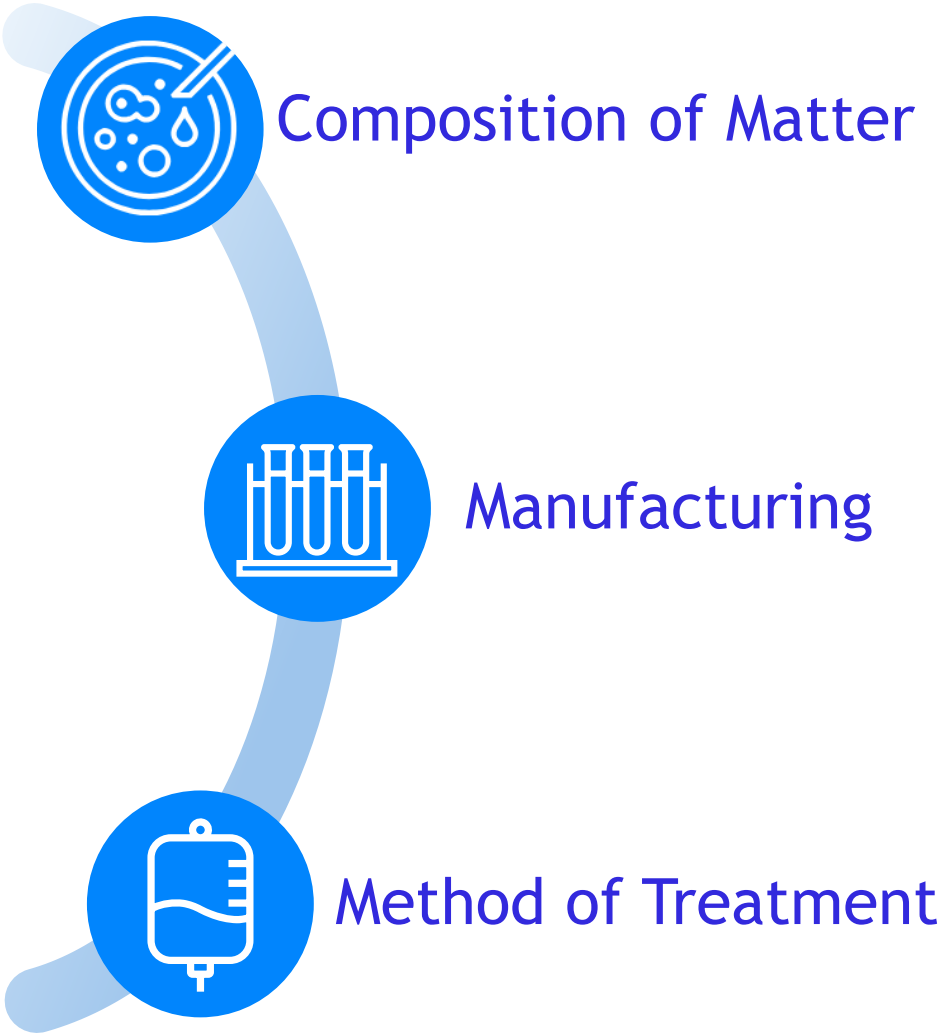
US patent exclusivity for use of mesenchymal precursor / stromal cells for all indications, and for acute GVHD specifically, provides a major commercial barrier against potential competitors

- "Composition of matter" and "method of treatment" US patents have been granted for RYONCIL and other mesenchymal precursor / stromal cell products to treat GVHD through to 2032.

  Upon FDA approval patent term may be extended up to 5 years to 2037.

- Multiple "composition of matter", "method of treatment" and "manufacturing" patent applications have recently been filed and are still undergoing examination.

  These applications have the potential to extend coverage through to 2043 for the use of various types of mesenchymal precursor / stromal cells, including bone marrow or iPS derived for the treatment of various indications including GVHD.



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Positive regulatory interactions with FDA have been the highlight of 2024 year-to-date

File BLA this quarter for approval of RYONCIL in pediatric acute graft versus host disease

FDA informed the company that following additional consideration the available clinical data from its Phase 3 study MSB-GVHD001 appears sufficient to support submission of the proposed Biologics License Application (BLA) for remestemcel-L (Ryoncil®) for treatment of pediatric patients with steroid-refractory acute graft versus host disease (SR-aGVHD).

Accelerated approval pathway established for REVASCOR in heart failure

FDA supports an accelerated approval pathway for rexlemestrocel-L (Revascor®) in patients with end-stage ischemic heart failure with reduced ejection fraction (HFrEF) and a left ventricular assist device (LVAD). FDA provided this feedback in formal minutes to the company following the Type B meeting held with FDA in February under the existing Regenerative Medicine Advanced Therapy (RMAT) designation.

Eligible to receive a Priority Review Voucher for children with hypoplastic left heart syndrome

FDA granted REVASCOR both a Rare Pediatric Disease (RPD) Designation and an Orphan-Drug Designation (ODD) following submission of results from the randomized controlled trial in children with hypoplastic left heart syndrome (HLHS), a potentially life-threatening congenital heart condition.

Mesoblast expects to substantially advance its multiple product pipeline toward FDA approvals over the next six to twelve months

	Program	Key Objectives
1	**RYONCIL** **Steroid-Refractory Acute-Graft versus Host Disease**	*On-track to submit BLA for approval in pediatric patients this quarter with FDA review expected to take 2 to 6 months* *Study in adult patients for label extension to follow pediatric approval*
2	**REVASCOR** **Heart Failure reduced Ejection Fraction (HFrEF)**	*FDA pre-BLA meeting to discuss data presentation and timing for an accelerated approval filing in end-stage ischemic HFrEF patients*
3	**Rexlemestrocel-L for Chronic Low Back Pain**	*CLBP Phase 3 trial start-up activities with investigators, trial sites & contract research organization (CRO) complete* *Patient screening/enrollment initiated with first-dosing this quarter*

Financials

- Last quarter we completed the entitlement offer and institutional placement raising A$97 million.
- Cash balance at March 31, 2024 was A$117.0 million (US$76.4 million).[1]
- Net operating cash spend of US$11.7 million for the quarter ended March 31, 2024.
- 28% reduction in net operating cash spend from the comparative quarter in FY2023.
- We will maintain our focus on cutting costs and preserving cash in the remainder of the year whilst we continue to work on corporate and strategic initiatives to access commercial distribution channels, supplement costs of development, and strengthen our balance sheet.

1. Using Reserve Bank of Australia (RBA) published exchange rate from March 31, 2024 of 1A$:0.6532US$.

Remestemcel-L

Steroid-Refractory Acute Graft Versus Host Disease (SR-aGVHD)

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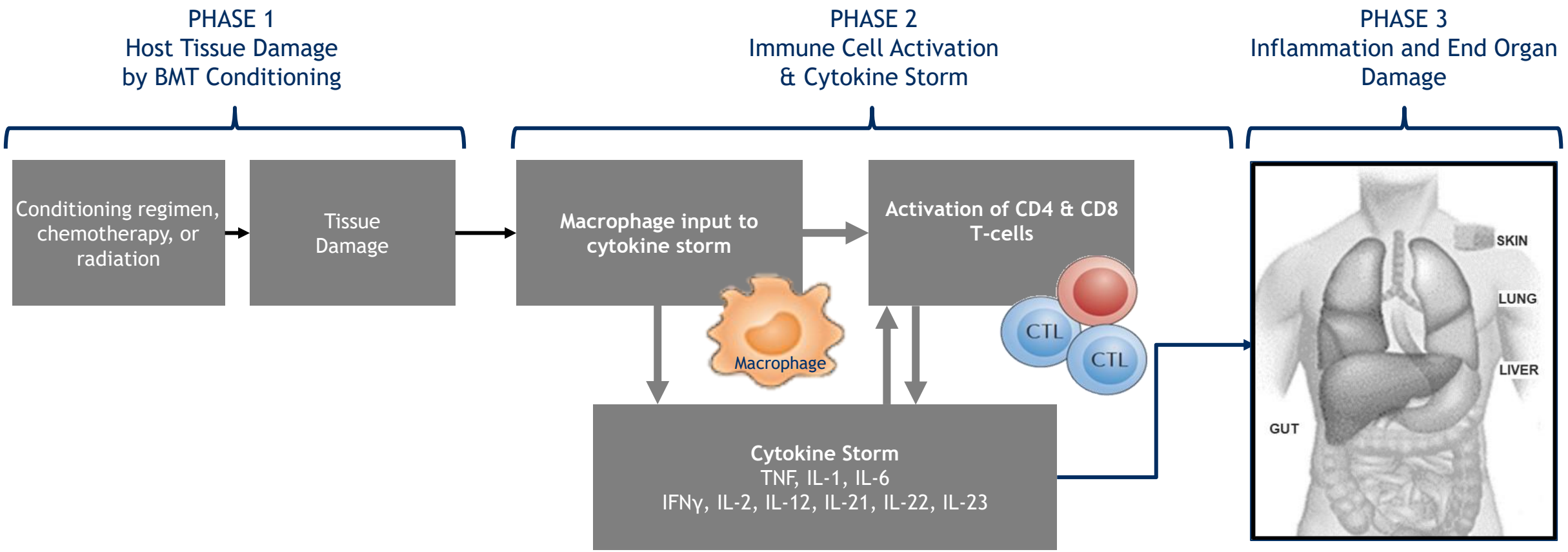
Acute Graft Versus Host Disease (aGVHD) is a serious and potentially fatal complication of allogeneic bone marrow transplantation (BMT)



Modified from Blazar et al., Nature Reviews Immunology 12: 443 – 458

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Steroid-Refractory Acute Graft Versus Host Disease (SR-aGVHD) is associated with mortality rates as high as 90%

Treatment Options

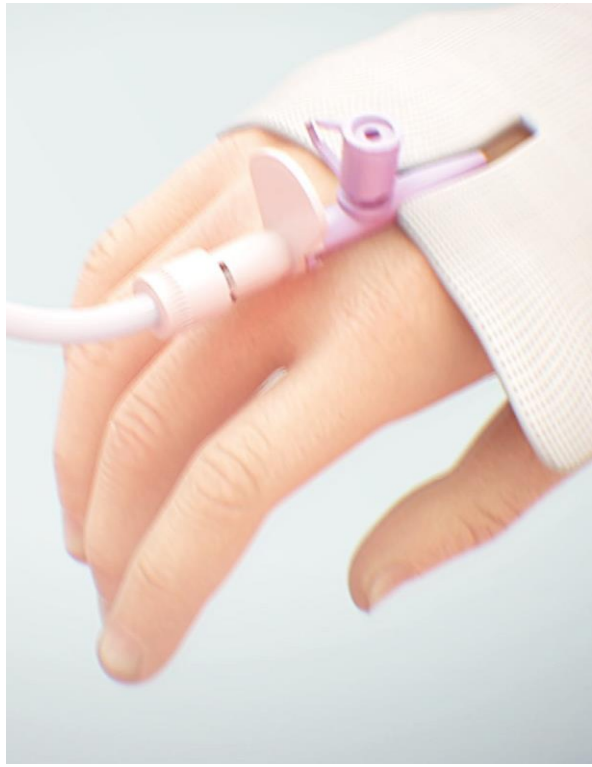
- Corticosteroids are first-line therapy for aGVHD
- There is only one approved treatment for disease refractory to steroids and no approved treatment in the US for children under 12 years old
- In Japan, Mesoblast's licensee received the first product approval for SR-aGVHD in both children and adults

Burden of Illness

- Acute GVHD is a life-threatening complication that occurs in ~50% of patients receiving allogeneic bone marrow transplants (BMTs)[1]
- Acute GVHD primarily affects skin, GI tract, and liver
- Steroid-refractory aGVHD is associated with mortality rates as high as 90%[1,4] and significant extended hospital stay costs[2]

Market Opportunity

- More than 30,000 allogeneic BMTs performed globally (>20K US/EU) annually, ~20% pediatric[2,3]
- Approx. 9,000 -10,000 allogeneic BMTs performed in the US annually
- Approx. 1,500 allogenic BMTs are in children and adolescents in US[3]



1. Westin, J., Saliba, RM., Lima, M. (2011) Steroid-refractory acute GVHD: predictors and outcomes. Advances in Hematology. 2. Niederwieser D, Baldomero H, Szer J. (2016) Hematopoietic stem cell transplantation activity worldwide in 2012 and a SWOT analysis of the Worldwide Network for Blood and Marrow Transplantation Group including the global survey. 3. HRSA Transplant Activity Report, CIBMTR, 2020 4. Axt L, Naumann A, Toennies J (2019) Retrospective single center analysis of outcome, risk factors and therapy in steroid refractory graft-versus-host disease after allogeneic hematopoietic cell transplantation. Bone Marrow Transplantation.

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Regulatory Status for RYONCIL in pediatric patients with SR-aGVHD

- FDA informed Mesoblast after its Type C meeting during the quarter that following additional consideration the available clinical data from its Phase 3 study MSB-GVHD001 appears sufficient to support submission of the proposed Biologics License Application (BLA) for remestemcel-L for treatment of pediatric patients with steroid-refractory acute graft versus host disease (SR-aGVHD).

- Mesoblast intends to file the resubmission this quarter, potentially resulting in an approval for Ryoncil® (remestemcel-L) in the second half of CY2024.

- Mesoblast will now focus on its original strategy to first gain pediatric approval for RYONCIL, followed by label extension in the larger adult population.

Potential Pathway to Approval for RYONCIL in adult patients with SR-aGVHD

- Survival in adults with SR-aGVHD who have failed at least one additional agent, such as ruxolitinib, remains as low as 20-30% by 100 days, a patient population with no approved therapies.[1,2]
- In contrast, 100-day survival was 67% after RYONCIL treatment was used under expanded access in 51 adults and children with SR-aGVHD who failed to respond to at least one additional agent, such as ruxolitinib.
- Following approval in pediatric patients, Mesoblast intends to commence a Phase 3 trial of RYONCIL in adults and adolescents, a market approx. 5-fold larger than pediatric, who are refractory to both corticosteroids and a second line agent such as ruxolitinib, for whom there are no approved therapies.
- Mesoblast is collaborating with the Blood and Marrow Transplant Clinical Trials Network (BMT CTN), a body responsible for approximately 80% of all US transplants, to conduct the trial.

1. Jagasia M et al. Ruxolitinib for the treatment of steroid-refractory acute GVHD (REACH1): a multicenter, open-label phase 2 trial. Blood. 2020 May 14; 135(20): 1739–1749.
2. Abedin S, et al. Ruxolitinib resistance or intolerance in steroid-refractory acute graft versus-host disease — a real-world outcomes analysis. British Journal of Haematology, 2021;195:429–43.

Rexlemestrocel-L

Chronic Heart Failure Reduced Ejection Fraction (HFrEF)

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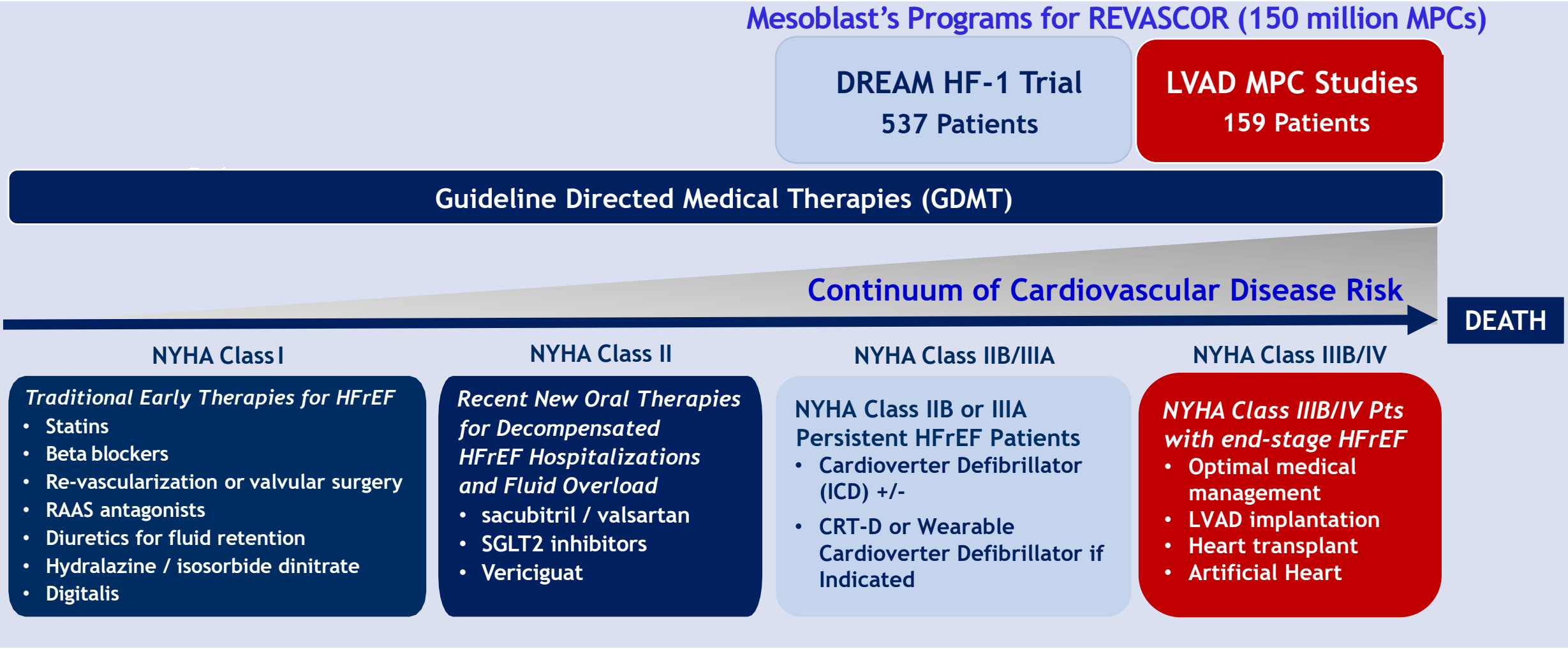
Heart failure with low ejection fraction (HFrEF) and underlying ischemia is increasing in prevalence and associated with high risk of mortality, heart attacks and strokes

- Heart failure affects 6.5 million patients in the US alone, with prevalence increasing[1]
- Chronic heart failure (CHF) is a progressive disease with a high mortality that approaches 50% at 5 years[1,2] and at least 75% after an initial hospitalization[3]
- Heart failure with low ejection fraction (HFrEF) is associated with greater mortality, occurs in approximately 50% of all patients
- Over 60% of HFrEF patients have underlying ischemia and these are at highest risk of recurrent major adverse cardiac events involving large vessels (heart attacks / strokes)

1. United States Food & Drug Administration. Treatment for Heart Failure: Endpoints for Drug Development. Draft Guidance. June 2019. 2. Taylor CJ, et al. Trends in survival after a diagnosis of heart failure in the United Kingdom 2000-2017: population based cohort study. BMJ. 2019;364:l223. 3. Shah KS, et al. Heart Failure with Preserve, Borderline, and Reduced Ejection Fraction; 5-Year Outcomes. JACC. 2017;Nov12.

REVASCOR has the potential to improve endothelial dysfunction in HFrEF patients across the spectrum of disease from mild-moderate to end-stage patients with a left ventricular assist device (LVAD)



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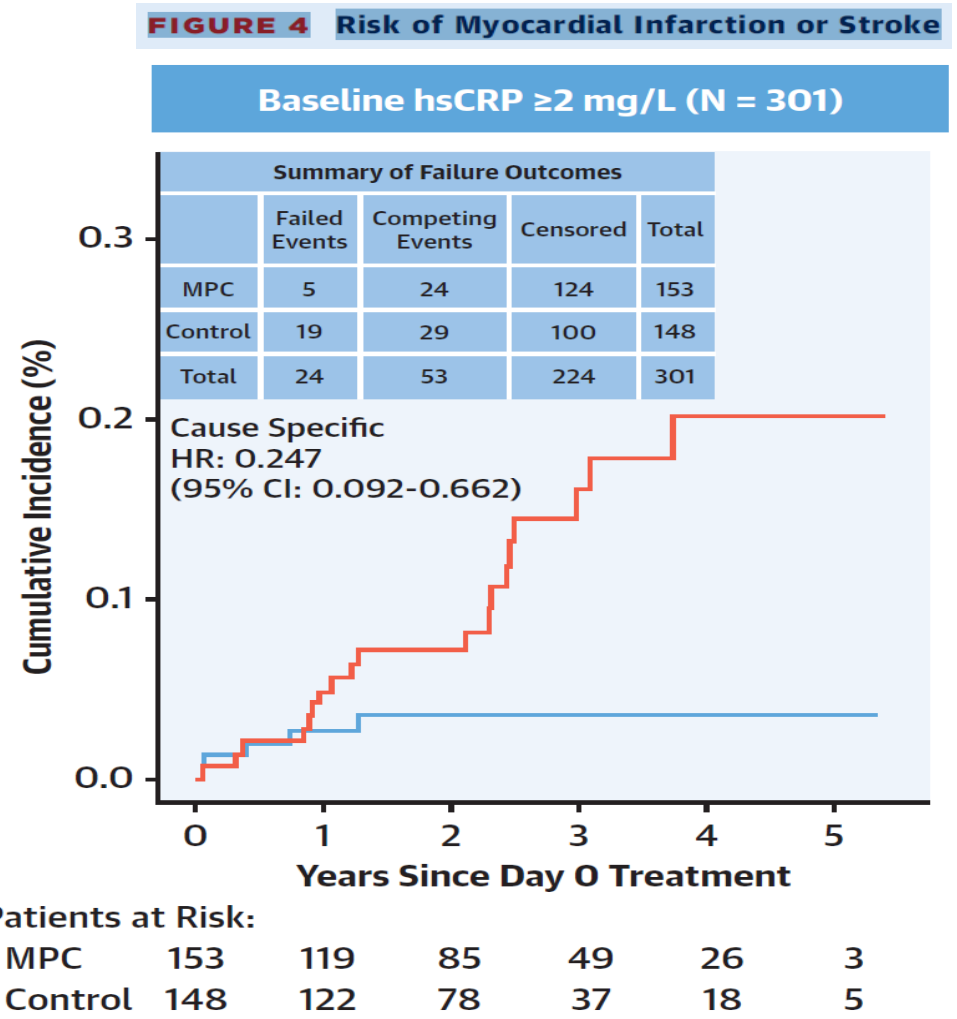
ORIGINAL INVESTIGATIONS

Randomized Trial of Targeted Transendocardial Mesenchymal Precursor Cell Therapy in Patients With Heart Failure

Perin EC, Borow KM, Henry TD, et al. Randomized Trial of Targeted Transendocardial Mesenchymal Precursor Cell Therapy in Patients With Heart Failure. Journal of the American College of Cardiology. 2023;81(9):849-863.

- Randomized, double-blind, controlled, 537 patient Phase 3 trial of rexlemestrocel-L over mean follow-up of 30 months showed:
- Improved LVEF from baseline to 12 months in all patients - maximal benefit seen in patients with active inflammation
- Reduced risk of MI or stroke by 57% in all treated patients, and by 75% in patients with inflammation
- Reduced risk for time-to-first Major Adverse Cardiac Event (MACE), defined as cardiovascular death, MI or stroke, by 28% in all patients, and by 37% in patients with inflammation



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Results of a single intra-myocardial administration of REVASCOR (150 million MPCs) in patients with ischemic HFrEF which support Accelerated Approval

- LVAD-MPC Study #2, over 12 months of follow-up:
  - Increased proportion of LVAD recipients with ischemic HFrEF etiology successfully weaned with MPC administration vs controls (p=0.02).
  - Reduced mortality by 82% (p=0.008) in LVAD recipients with ischemic HFrEF etiology, all of whom also had persistent inflammation (n=70).
- DREAM-HF Trial over a mean follow-up of 30 months:
  - For patients with an ischemic HFrEF etiology and inflammation (n=158), MPCs resulted in 88% risk reduction for 2-Point MACE (MI or stroke; hazard ratio 0.12, p=0.005) and 52% risk reduction for 3-Point MACE (hazard ratio 0.477, p=0.018).
- Mesoblast intends to request a pre-BLA meeting with FDA to discuss data presentation, timing and FDA expectations for an accelerated approval filing in ischemic HFrEF patients with end-stage heart failure

FDA awarded Rare Pediatric Disease Designation (RPDD) and Orphan Drug Designation (ODD) to REVASCOR for pediatric congenital heart disease - hypoplastic left heart syndrome (HLHS)

- FDA granted Mesoblast's cardiovascular investigational product, REVASCOR, both RPDD and ODD this year. This followed submission of results from the randomized controlled trial in children with hypoplastic left heart syndrome (HLHS), a potentially life-threatening congenital heart condition.

- On FDA approval of a BLA for REVASCOR for the treatment of HLHS, Mesoblast may be eligible to receive a Priority Review Voucher (PRV) that can be redeemed for any subsequent marketing application or may be sold or transferred to a third party.

- Mesoblast plans to meet with FDA to discuss the regulatory path to approval for REVASCOR in children with this life-threatening condition.

Rexlemestrocel-L

Chronic Low Back Pain due to Degenerative Disc Disease (CLBP)

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Chronic low back pain due to degenerative disc disease (CLBP) impacts 7M+

Burden of Illness

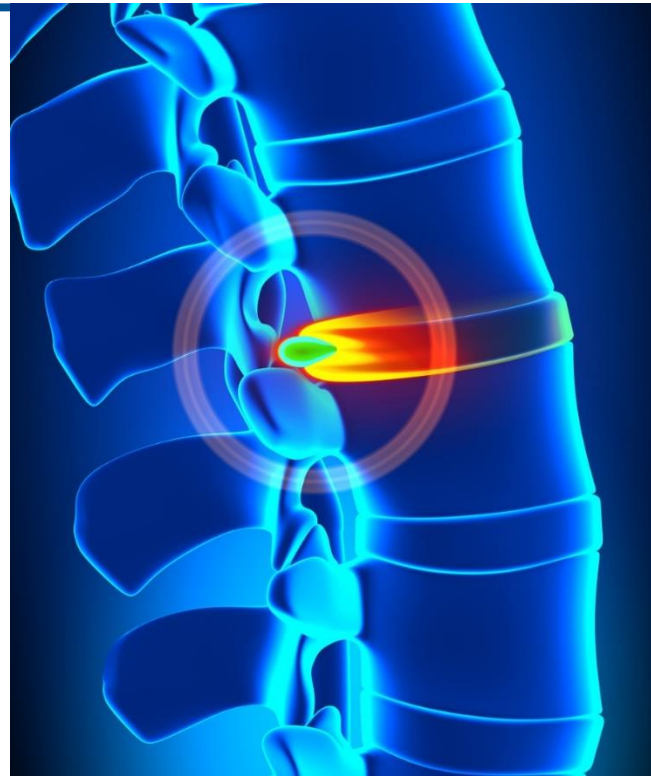
- Back pain causes more disability than any other condition[1]
- Inflicts substantial direct and indirect costs on the healthcare system,[1] including excessive use of opioids in this patient population

Treatment Options

- Minimal treatment options for patients with chronic low back pain (CLBP) who fail conservative therapy include opioids and surgery
- 50% of opioid prescriptions are for CLBP[2]
- Durable improvement in pain has potential to reduce opioid use and prevent surgical intervention

Market Opportunity

- Over 7m patients are estimated to suffer from CLBP due to degenerative disc disease (DDD) in each of the U.S. and E.U.5 [2-4]



1. Williams, J., NG, Nawi, Pelzter, K. (2015) Risk factors and disability associated with low back pain in older adults in low-and middle-income countries. Results from the WHO Study on global ageing and adult health (SAGE). PloS One. 2015; 10(6): e0127880., 2.Decision Resources: Chronic Pain December 2015., 3. LEK & NCI opinion leader interviews, and secondary analysis., 4. Navigant: Commercial Assessment for a Proprietary Cell-Based Therapy for DDD in the U.S. and the EU3 – August 2014.

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Rexlemestrocel-L / CLBP – program summary

Regulatory Alignment

Gained alignment with the FDA on the appropriate pivotal Phase 3 study

Seeks to replicate the significant reduction in pain seen at 12 and 24 months in our first Phase 3 trial

Phase 3 Protocol

FDA has agreed with Mesoblast plans for mean **pain reduction at 12 months as the primary endpoint** of the pivotal trial

Functional improvement and reduction in opioid use as secondary endpoints

Product Manufacturing

Product has been manufactured for use in the second Phase 3 study

Potency assays are in place for product release

Pivotal P3 Trial

RMAT designation for CLBP received from FDA

Second Phase 3 trial underway

Thank You