Australia's Regenerative Medicine Investments Database

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Key Messages – RM Financings 2020

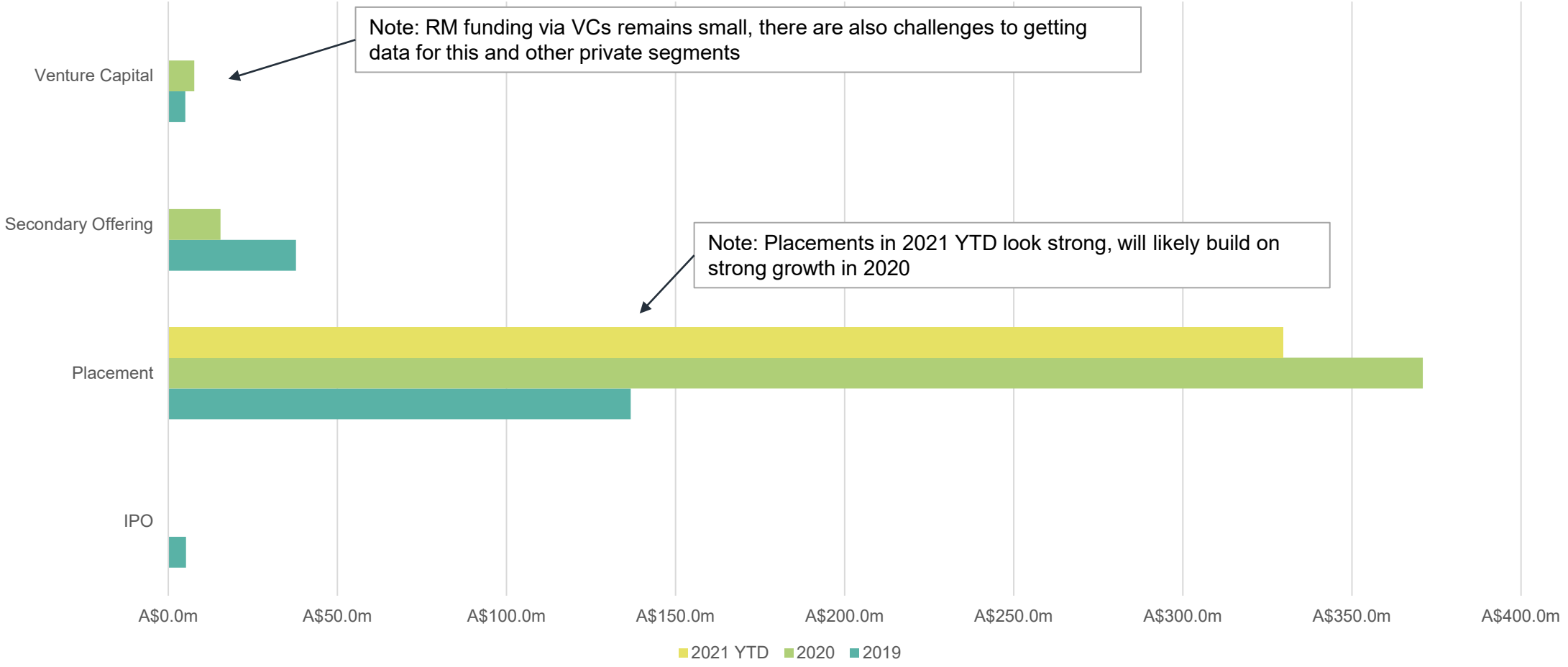
- In Australia, the signs point to increasing interest amongst investors in investing in regenerative medicine (RM) with $394.1m invested in 2020, compared with just $184.7m in 2019, a 113% increase in funding
- As a percentage of the global RM investment activity, Australia is doing comparatively well and accounts for ~1.5% of global investment (AU$26.3B in 2020[1]), despite being 0.32%[2] of the global population
- Australia is highly dependent on placements as a form of raising capital compared with the global norms
- Placements account for 94% of the capital raised by Australian RM companies in 2020 ($371.0.m). This compares with the global picture (Slide 6) which shows a spread of investment mechanisms being employed, led by Follow Ons (31%), VC funding (29 %), IPOs (19 %), Partnerships (15%) and finally Placements which only account for 6% of investment activity globally. Tracking investment patterns in the RM sector into the future will be important for understanding and supporting growth of the Australian RM sector.
- This reveals two things about the investment environment and strategies in the Australian RM sector:
    1. The importance of institutional investors to the current Australian RM sector
    2. Australian RM companies have little access to VC funding

1. 2020: Growth & Resilience in Regenerative Medicine, Annual Report Cell & Gene State of the Industry Briefing, Alliance for Regenerative Medicine, 2021,
2. https://www.worldometers.info/world-population/australia-population/#:~:text=Australia%20population%20is%20equivalent%20to%200.33%25%20of%20the%20total%20world%20population

Total Australian RM Financings 2020

	**A$43.9m**	Gene-Based Therapies Financing 2020	↑**63%** **From 2019**
	**A$160.0m**	Cell Therapy Financing 2020	↑**103%** **From 2019**
	**A$135.1m**	Tissue Engineering Financing 2020	↑**342%** **From 2019**
	**A$55.1m**	Cell-Based IO Financing 2020	↑**14%** **From 2019**
	A$394.1m	**Total RM Financing 2020**	↑**113%** **From 2019**

Total Australian RM Financings by Type



Notes on financing types:
Venture capital (VC) is a form of private equity financing. **A secondary offering** is the sale of new or closely held shares by a company that has already made an initial public offering (IPO). **A placement** is the sale of securities to a small number of large, sophisticated investors. **An initial public offering** (IPO) refers to the process of offering shares of a private corporation to the public in a new stock issuance.

Selected Corporate Partnerships & Public Financings in 2020

Placements & Secondary Offerings

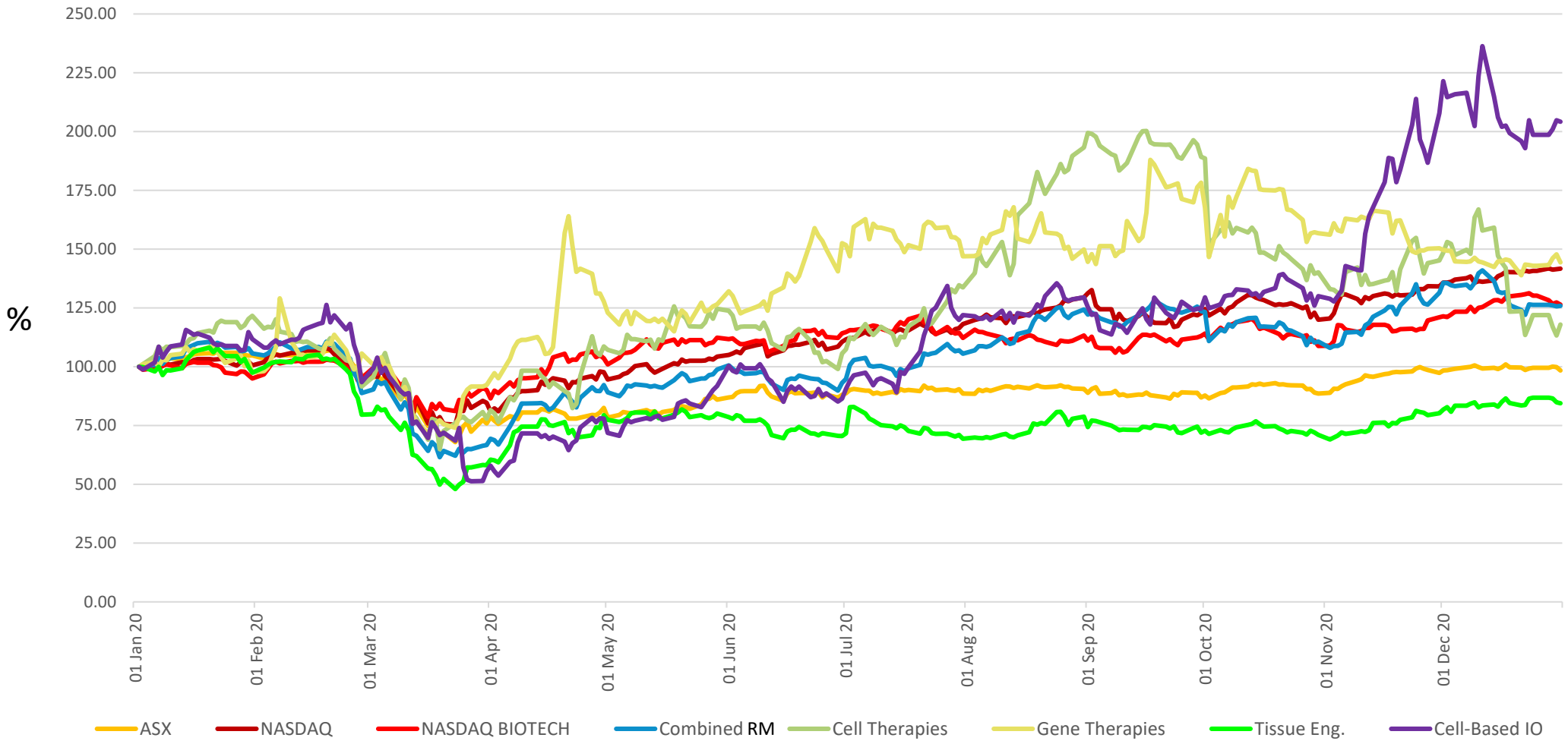
- Immutep A$29.6m placement November 2020
- PYC Therapeutics A$40.6m placement and secondary offering November 2020
- Prescient Therapeutics A$13.5m placement and secondary offering August 2020
- Osteopore A$8.5m placement August 2020
- Avita Medical A$118.9m placement June 2020
- Benitec A$3.3m placement June 2020
- Mesoblast A$136.7m placement May 2020
- Immutep A$12.0m placement April 2020
- Cynata Therapeutics A$8.3m placement April 2020

Venture Capital

- Tessara Therapeutics A$2.7m Round 1 capital raise May 2020
- Tetratherix A$5.0m Series A capital raise March 2020

RM Financing by Type – Australia and Global

Australian RM Public Company Performance 2020



Final Values

ASX: 98.5
NASDAQ: 141.8
NASDAQ Bio: 126.5
Combined RM: 125.9
Cell Therapies: 118.0
Gene Therapies: 144.4
Tissue Eng: 84.5
Cell-Based IO: 204.2

Notes: All indices and composites rebased to 100 as at 1/1/20. Cell Therapies includes Mesoblast (ASX:MSB), Cynata Therapeutics (ASX:CYP) and Regeneus (ASX:RGS). Gene Therapies includes Benitec Biopharma (NasdaqCM:BNTC) and PYC Therapeutics (ASX:PYC). Tissue Eng. includes Avita (ASX:AVH), Living Cell Technologies (ASX:LCT), Orthocell (ASX:OCC), Anteris Technologies (ASX:AVR), Osteopore (ASX:OSX) and PolyNovo (ASX:PNV). Cell-Based IO includes Immutep (ASX:IMM), Imugene (ASX:IMU) and Prescient Therapeutics (ASX:PTX). Combined RM includes all the previously listed companies.

Key Messages – RM Public Company Performance

- Public performance for biotech globally was strong in 2020 but even stronger for Cell Based Immuno-oncology, Gene Therapy and Cell Therapy in the Australian RM sector. The final values for the NASDAQ Biotech Index for 2020 was up 26%, Australian Cell Based Immuno- oncology was up 104%, Gene Therapy up 44% and Cell Therapy up 18%. Australian Tissue Engineered Products were down 15%.
- Initial losses in March due to the pandemic quickly reversed, and stock performance for RM companies were above the ASX and tracked or rose above overall NASDAQ Biotech Index, except for Tissue Engineered Products.

Notes to Financing Analysis

- The financial analysis has drawn from a number of financial databases, including Capital IQ and Crunchbase, in addition to desktop research and contacting select private Australian RM companies to build its public and private RM dataset
- Future updates of this analysis may seek to contact additional private companies seeking to further build the private fundraising component of the dataset, in addition to seeking updates from public information sources, relevant financial databases and further desktop research
- Further details on the therapeutic categorisation of constituents is included in Appendix 1

About the Regenerative Medicine Catalyst Project

- This *Australia's Regenerative Medicine Investments Database* project was conducted between September 2020 and September 2021 as a key part of the Regenerative Medicine Catalyst Project. The project has been supported by a consortium of seven members that hold extensive insight and experience in the life sciences and RM landscape in Australia: AusBiotech, Medicines Australia, Cell Therapies Pty Ltd, Novartis Pharmaceuticals Australia Pty Ltd, Biointelect Pty Ltd, Research Strategies Australia and Australia's Industry Growth Centre, MTPConnect.
- The Regenerative Medicine Catalyst Project is funded through MTPConnect's Growth Centre Project Fund Program, an Australian Government initiative supported by the Department of Industry, Science, Energy and Resources. It is a competitive matched funding program that aims to invest in ideas to boost the innovation, productivity and competitiveness of Australia's MTP sector. Six consortium members provided matched funding.
- Requests and inquiries pertaining to the report, including copyright permissions, should be directed to the consortium via AusBiotech.
- The Regenerative Medicine Catalyst Project has brought together the seven partners in a consortium to build the foundations for a national RM sector 'catalyst' collaboration body. The Regenerative Medicine Catalyst Project will address priority action areas including: workforce capabilities, collaboration, funding, regulation and policy infrastructure, and Australian manufacturing capability. The Catalyst Consortium and the subsequent Catalyst Body aim to support the Australian RM industry to see it thrive and drive benefits to the health of its people and Australia's economy.

Disclaimer

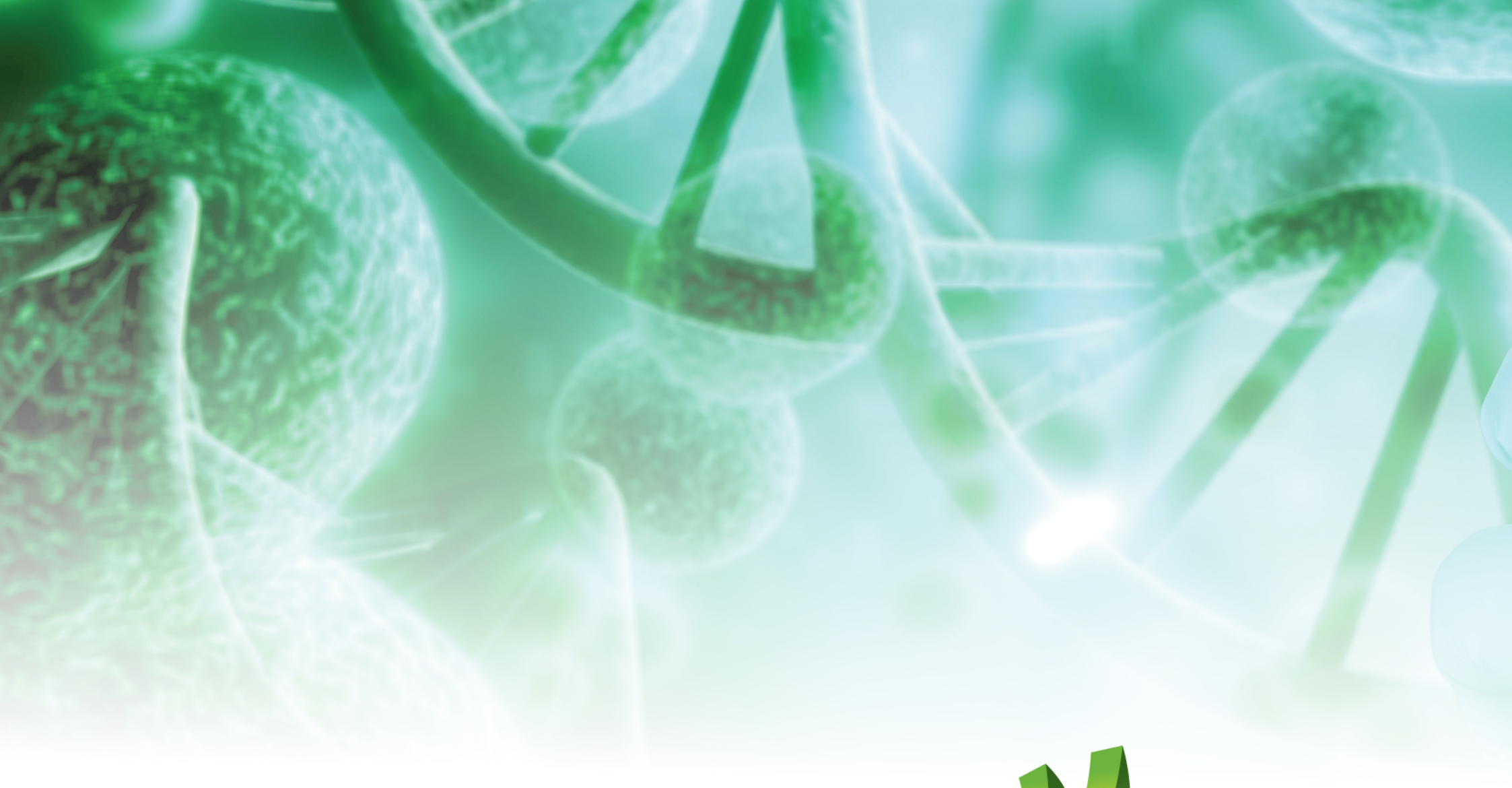
While the Regenerative Medicine Catalyst Project consortium has taken all due care to ensure that the information contained in this work is accurate at the time of publication, it provides no express or implied warranties or makes any representations in relation to this work or any content. The information contained in this work is provided ‘as is’ and without any guarantees as to its accuracy, currency, completeness or reliability. To the extent permitted by law, the Regenerative Medicine Catalyst Project consortium excludes all liability for any loss or damage occasioned by use of this work or information contained in this work. The Regenerative Medicine Catalyst Project consortium is not responsible for decisions or actions taken on the basis of the content of this work and you use the information in this work at your own discretion and risk.

Appendix 1 – Therapeutic Categorisations (1/2)

ARM Categories	Definitions	Examples
Cell Therapy	Cell therapy is the administration of viable, often purified cells into a patient's body to grow, replace, or repair damaged tissue for the treatment of a disease. A variety of different types of cells can be used in cell therapy, including hematopoietic (blood-forming) stem cells, skeletal muscle stem cells, neural stem cells, mesenchymal stem cells (adult stem cells that differentiate into structures as connective tissues, blood, lymphatics, bone, and cartilage), lymphocytes, dendritic cells, and pancreatic islet cells. Cell therapies may be autologous, meaning that the patient receives cells from their own body, or they may be allogenic, meaning the patient receives cells from a donor. Allogeneic cell therapies are often referred to as "off-the-shelf" therapies, as they are derived from a donor who is not the patient, enabling advance preparation and available to the patient immediately at the time of need. Many cell-based therapies currently being developed utilize induced pluripotent stem cells (iPSCs). Unlike embryonically-derived pluripotent stem cells, these are adult cells that have been genetically reprogrammed back into a pluripotent state, capable of becoming one of many types of cells inside a patient's body. This technology may enable the development of an unlimited type of a specific type of human cells needed for therapeutic purposes.	- Hematopoietic (blood-forming) stem cells - Skeletal muscle stem cells - Neural stem cells - Mesenchymal stem cells (adult stem cells that differentiate into structures as connective tissues, blood, lymphatics, bone, and cartilage) - Lymphocytes - Dendritic cells - Pancreatic islet cells - Cytotoxic T Lymphocyte - Embryonic - Natural killer cell - Pluripotent stem cell - Regulatory T Cell - TCR - Tumor Infiltrating Lymphocyte - Vaccine; δT cell - Other Stem Cell; Other Cell
Gene Therapy	Gene therapy seeks to modify or introduce genes into a patient's body with the goal of durably treating, preventing or potentially even curing disease, including several types of cancer, viral diseases, and inherited disorders. Gene therapy approaches include replacing a mutated gene that causes disease with a functional copy; or introducing a new, correct copy of a gene into the body in order to fight disease. Gene therapy may be performed in vivo, in which a gene is transferred to cells inside the patient's body, or ex vivo, in which a gene is delivered to cells outside of the body, which are then transferred back into the body. Typically, gene therapy developers introduce new or corrected genes into patient cells using vectors, which are often deactivated viruses. Deactivated viruses are unable to make patients sick, but rather serve as the vehicle to transfer the new genetic material into the cell. Viruses that have been used for human gene therapy include retroviruses, adenoviruses, herpes simplex, vaccinia, and adeno-associated virus (AAV). Other ways of introducing new genetic material into cells include non-viral vectors, such as nanoparticles and nanospheres. Genome editing is a technique by which DNA is inserted, replaced, removed, or modified at particular locations in the human genome for therapeutic benefit in order to treat cancer, rare inherited disorders, HIV, or other diseases. Several approaches rely on the use of "molecular scissors," often an engineered nuclease, to make precise cuts in the patient's DNA at a specific location in the genome. The breaks are then repaired to create the desired edit and result in a corrected gene. Genome editing nucleases that are currently used in genome editing include: meganucleases, zinc finger nucleases (ZFNs), transcription activator-like effector-based nucleases (TALEN), and nucleases such as Cas9 and Cas 12a that derive from the Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR/Cas). Alternatively, genome editing can also be performed by homologous recombination of adeno-associated virus (AAV)-derived sequences into the patient's DNA.	- RNAi - Antisense - Viral vector: Retroviruses, adenoviruses, herpes simplex, vaccinia, and adeno-associated virus (AAV) - Non-viral vectors, such as nanoparticles and nanospheres - Meganucleases - Zinc finger nucleases (ZFNs) - Transcription activator-like effector-based nucleases (TALEN) - Nucleases such as Cas9 and Cas 12a that derive from the Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR/Cas) - Homologous recombination of adeno-associated virus (AAV)-derived sequences

Appendix 1 – Therapeutic Categorisations (2/2)

ARM Categories	Definitions	Examples
Cell-Based IO (Immuno-Oncology)	Gene therapy techniques can also be used to genetically modify patient cells ex vivo, which are then re-introduced into the patient's body in order to fight disease, an approach known as Cell-Based IO. This approach includes a number of cell-based immunotherapy techniques, such as chimeric antigen receptors (CAR) T cell therapies, T cell receptor (TCR) therapies, natural killer (NK) cell therapies, tumor infiltrating lymphocytes (TILs), marrow derived lymphocytes (MILs), gammadelta T cells, and dendritic vaccines.	- Chimeric antigen receptors (CAR) T cell therapies - T cell receptor (TCR) therapies - Natural killer (NK) cell therapies - Tumor infiltrating lymphocytes (TILs) - Marrow derived lymphocytes (MILs) - Gammadelta T cells, and dendritic vaccines - Cytotoxic T Lymphocyte - Mesenchymal Stem Cell - Pluripotent stem cell - Regulatory T Cell - Other Stem Cell; Other Cell
Tissue Engineered Products	Tissue engineering seeks to restore, maintain, improve, or replace damaged tissues and organs through the combination of scaffolds, cells, and/or biologically active molecules. Tissue engineering often begins with a scaffold, which may utilize any of a number of potential materials, from naturally occurring proteins to biocompatible synthetic polymers. Certain tissue engineering therapies may utilize an existing scaffold by removing the cells from a donor organ, a process called decellularization, until only the pre-existing protein-based scaffold or extracellular matrix (ECM) remains. Cells—and in some cases, additional growth factors to encourage the cells to take root—are added, allowing a tissue or organ to develop and grow ex-vivo. Biomaterials include any substance engineered to interact with a patient's living biological system for a medical purpose. These biomaterials often provide support as a physical structure for engineered tissues.	- Scaffolds, cells, and/or biologically active molecules - Decellularization; Biomaterials - 3D bioprinting



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