

U of T'S CONTRIBUTION BY THE NUMBERS

Research funding attracted by
U of T and partner hospitals in
past 5 years:

\$601M

Faculty Members:

61

Canada Research Chairs &
Canada Excellence Research
Chairs in RM-related fields:

22

Graduate students supervised:

334

Research-based startups
created in last 5 years:

13

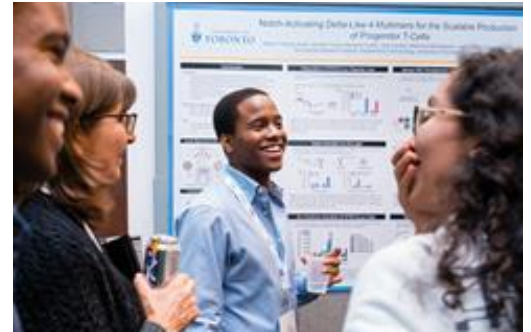
TORONTO'S REGENERATIVE MEDICINE SECTOR

Companies in CCRM Industry
Consortium

100+

REGENERATIVE MEDICINE

Regenerative Medicine (RM) is a broad area of translational research and innovation that deals with replacing, engineering, or regenerating human cells, tissues and organs. RM holds the promise to treat, manage, and perhaps cure some of the most devastating, complex, chronic, and costly diseases. **Toronto is a world-leading RM hub for fundamental research, clinical application, and the development of advanced manufacturing stem cell technologies.** The City's internationally-recognized Discovery District represents Canada's largest concentration of hospitals, research institutes, business incubators, and capital organizations, and is home to Canada's most extensive and productive cluster of RM scientists, clinicians, and biomedical engineers. The current global market for RM is estimated to be worth US\$36 billion and is forecast to grow to US\$49.4 billion by 2021.



HOW U OF T ENHANCES THE CLUSTER

U of T is the Canadian leader in regenerative medicine research funding and scholarly output and has a rich history of research and innovation excellence, beginning with the identification of blood stem cells by biophysicist James Till and hematologist Ernest McCulloch in 1960. **With a \$114M award in 2015 from the Canada First Research Excellence Fund, U of T established Medicine by Design (MbD) for the creation and manufacture of cells, tissues, and organs.** MbD is greatly facilitated by U of T's integrated system of specialized research facilities dedicated to basic and applied research, clinical translation, advanced manufacturing, and commercialization, such as the Translational Biology and Engineering Program, a key component of the Ted Rogers Centre for Heart Research. The Centre for Commercialization of Regenerative Medicine (CCRM), MbD's commercialization partner and hosted by U of T, brings together leading experts and key corporations in therapeutic innovations, pharmaceuticals, devices, reagents, tools, biomaterials, and cell therapies. CCRM has supported the launch and scaling of five emerging companies, including two clinical stage companies: ExCellThera, which is engineering cell transplants with blood stem cell expansion technology, and AVROBIO, a leading gene therapy company. CCRM-associated companies have raised \$446 million in the past two years.

KEY EDUCATIONAL & RESEARCH PROGRAMS

- Advanced Manufacturing & Health Technologies
- Applications and Training in Cardiovascular Health
- Bioethics
- Biomaterials & Biomedical Engineering
- Biotechnology
- Cell & Systems Biology
- Chemistry
- Clinical Engineering
- Donnelly Centre for Cellular and Biomolecular Research
- Health Science Translational Research [IMS]
- Management of Innovation
- Manufacturing Materials and Mimetics
- Medicine by Design
- Microfluidic
- Pharmacy
- Training Program in Regenerative Medicine

KEY FACILITIES, INITIATIVES & PARTNERSHIPS

- Canadian Institute for Advanced Research
- Centre for Advanced Therapeutic Cell Technologies
- Centre for Commercialization of Antibodies and Biologics
- HPC4Health
- Institute for Clinical Evaluative Sciences
- JLABS@Toronto
- Karolinska Institute
- MaRS Innovation
- McEwen Centre for Regenerative Medicine
- Network Biology Collaborative Centre
- Ontario Institute for Cancer Research
- Ontario Institute for Regenerative Medicine
- Ontario-China Stem Cell Research and Commercialization Partnership
- Technion-UHN International Centre for Cardiovascular Innovation
- Ted Rogers Centre for Heart Research
- The Centre for Phenogenomics

U OF T & HOSPITAL INNOVATION IMPACT



AVROBIO

AVROBIO is a clinical-stage biotechnology company developing transformative cell and gene therapies targeting cancer and rare diseases. AVROBIO's highly innovative therapies offer potentially life-altering impact for patients following a single infusion of genetically-modified cells. The company's chief priority is to accelerate development of two novel cell and gene therapies pioneered within the labs of scientific co-founders Dr. Christopher Paige and Dr. Jeffrey Medin (now at the Medical College of Wisconsin) at the University Health Network (UHN). Cell and gene therapies represent a new paradigm in human health, with the potential to deliver dramatic disease-modifying effects with long-lasting, durable impact. Underlying these advances are a deeper understanding of cell biology, immunology and a newer generation of vector designs enabling safe and effective delivery of therapeutic genes targeted to specific cells.

EXCELLTHERA

Co-founded by Professor Peter Zandstra during his time at the University of Toronto, ExCellThera is a clinical stage biotechnology company that is focused on developing robust and cost-effective ways of growing blood stem cells for therapeutic use. Its first product is expected to deliver superior therapeutic benefits for acute myeloid leukemia (AML), a type of cancer that is characterized by the rapid growth of abnormal white blood cells. AML is the most common acute leukemia affecting adults, and its incidence increases with age. ExCellThera is also interested in pursuing partnerships for the use of its technologies in other blood stem cell applications, including gene therapy. ExCellThera has developed a unique way of producing high-quality blood stem cells in large quantities, and the company's technology will improve the outcome of stem cell transplants in patients by allowing for better-matched donors.

TARA BIOSYSTEMS

Professor Milica Radisic, in the Institute of Biomaterials and Biomedical Engineering at the University of Toronto, is a co-founder of TARA Biosystems. TARA is dedicated to pioneering predictive cardiac tissue models that enable faster, safer, and more reliable development of new medicines. Safer and more effective new medicines that rapidly make it to market mean better health and longer life for people everywhere. The company's proprietary heart-on-a-chip platform, developed in the Radisic laboratory at U of T, with collaborators at Columbia University and MIT, produces physiologically relevant mature heart tissue that can be interrogated to measure physical and biological factors capable of accurately predicting cardiotoxicity for pre-clinical applications. TARA's technology approach forms the basis for the reliable and predictive discovery and toxicology testing of new medicines.



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TORONTO