BioCanRx
Canada's Immunotherapy Network
Le réseau canadien d'immunothérapie

Enabling Studies Program

Garbage to Gold: Expansion of Therapeutic Regulatory T Cells from Discarded Thymus

Jan. 17, 2017 to Mar. 31, 2020

Highlights

- Lays the groundwork for the first clinical trial of Treg adoptive cell therapy in Canada to reduce GVHD reactions in patients treated with allotransplantation
- Creates knowledge capacity that will be applicable to numerous types of anti-cancer adoptive T cell therapies

Project value
$1.01 M
BioCanRx contribution:
$275,659

targeted cancers
Hematologic malignancies
This project's goal is to scale up and optimize protocols to isolate, expand and store thymic Tregsunder GMP conditions.

Partners
7

Biotherapeutics
Regulatory T cell (Treg)

BC Children's Hospital Foundation
Cell Network Réseau de cellules souches
ThermoFisher SCIENTIFIC
Canadian National TRANSPLANT Research Program | Programme national de recherche en TRANSPLANTATION du Canada
STEMCELL™ TECHNOLOGIES
Alberta Cell Therapy Manufacturing
University Hospital Foundation

About the project

For many patients with blood cancers like leukemia, the only option for a cure is a hematopoietic stem cell transplant (HSCT) in which the patient receives immune cells from a healthy donor. Those donor immune cells then kill the leukemia cells. In many patients, the donor immune cells later attack the patient's healthy tissues, causing a serious life-threatening complication called graft-versus-host disease (GVHD). GVHD is a major cause of death even when donor and recipient are matched for all major HLA alleles, and accounts for 15-30% of deaths that occur after HSCT.

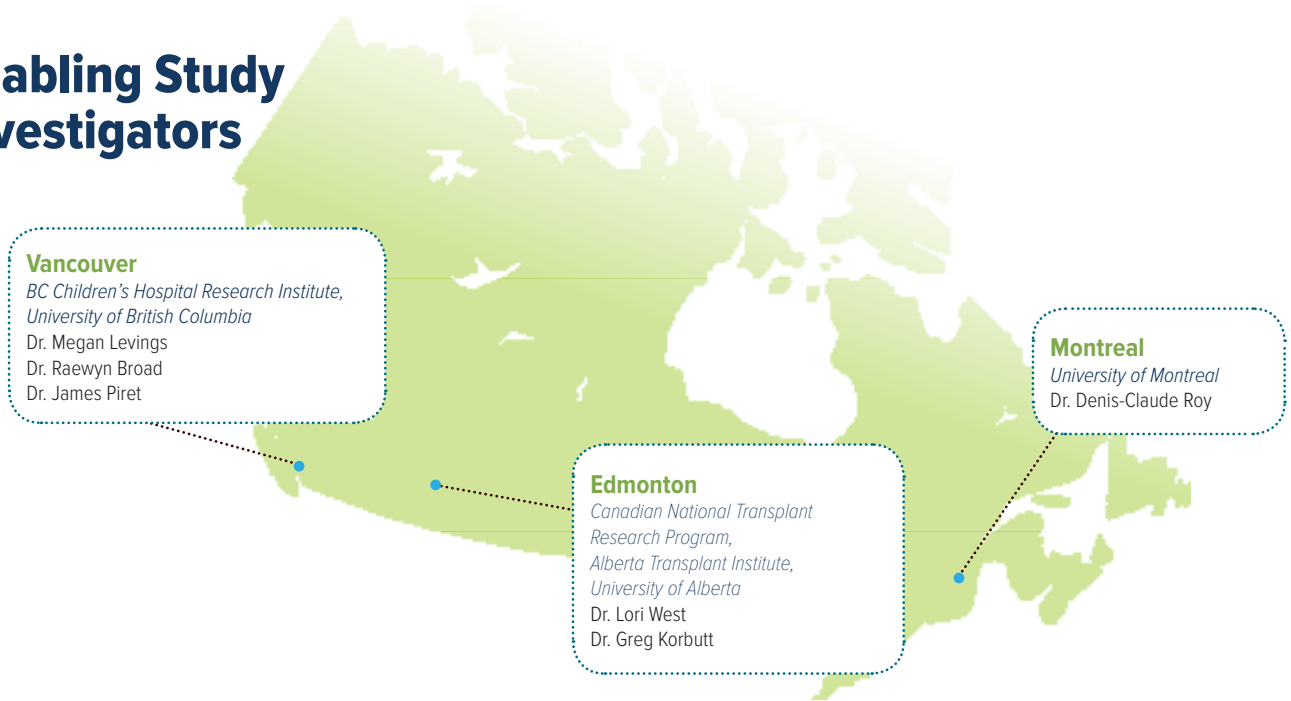
This project aims to find a way to prevent GVHD without affecting the anti-cancer action of the donor immune cells. This will be a major advance in the use of HSCT as a therapy for blood cancers. Dr. Levings and the team proposes that immune cells called regulatory T cell (Tregs), which naturally suppress immune responses, could be used to prevent or treat GVHD. While early clinical studies have been promising, the total number of Tregs in a person's blood is so low that it is difficult, time-consuming, and expensive to obtain enough cells to use in a patient. This study aims to find better ways to obtain enough therapeutic Tregs to make the approach more widely available.

To that end, they propose to isolate Tregs from the thymus gland, which is routinely removed and discarded in children undergoing heart surgery. The team showed that the human thymus contains large numbers of Tregs, and that these thymic Tregs can prevent GVHD in mice. They now want to test thymic Tregs in humans.

This project will develop standard methods for large-scale expansion of thymic Tregs in a 'clean room' environment. This groundwork will enable them to perform a study in patients undergoing HSCT to see if thymic Tregs can reduce GVHD.

Key investigator
Project lead:
Dr. Megan **Levings**
Principal investigators:
Dr. Raewyn **Broady**
Dr. Lori **West**
BC Children's Hospital Research Institute
University of Alberta
UBC

Enabling Study Investigators



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Partners

BC Children's Hospital Foundation $385,200

Alberta Cell Therapy Manufacturing $42,150

Canadian National Transplant Research Program $32,000

StemCell Network $100,000

University of Alberta Hospital Foundation $100,000

STEMCELL Technologies $62,126 (in-kind)

Thermofisher Scientific $10,000

Key Outputs

GMP-compatible process for thymic Treg isolation & expansion

Data package for clinical trial application to Health Canada

The power to kill cancer lies within us. Let's tell our bodies how.

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