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

Catalyst Program

Ground-breaking immunotherapy to prevent acute lymphoblastic leukemia relapse: dosage and therapeutic settings of plasmacytoid dendritic cell infusions

April 23rd, 2018 to November 1, 2020

Biotherapeutics: **Plasmacytoid dendritic cells (pDC)**

Project value: **$544,875**
BioCanRx contribution: **$214,875**

targeted cancers: **Acute Lymphoblastic Leukemia (ALL)**
The goal of the project is to optimize dosage of plasmacytoid dendritic cells (pDC), as a therapeutic strategy to prevent leukemia relapse.

Partners: **1**

Fondation Charles-Bruneau

Highlights

- Acute lymphoblastic leukemia (ALL) relapse remains the first cause of death following hematopoietic stem cell transplantation (HSCT)
- Post-transplant novel therapeutic approaches are urgently needed to prevent childhood ALL relapse as approximately 50% of transplanted children with ALL relapse and subsequently die
- A novel immunotherapy approach via pDC adoptive transfers was shown to be efficacious in pre-clinical humanized mouse models of HSCT with human leukemia
- Results from this study aim to provide a promising health outcome for transplanted children with high-risk leukemia

About the project

Acute leukemia is the leading cause of death by cancer in children. Despite advances in hematopoietic stem cell transplantation, about 50% of children with acute leukemia refractory to chemotherapy still relapse and die from their disease. To prevent leukemia relapse after stem cell transplantation and improve the outcome of patients, we propose to stimulate the anti-leukemia activity of the transplanted immune system using infusions of immune helper cells. We have already demonstrated the efficacy of this novel immunotherapy in a pre-clinical humanized mouse model. We showed that five weekly injections of immune helper cells cured 100% of humanized mice injected with human leukemia, while untreated mice died from leukemia. To prepare the translation of these pre-clinical findings into a clinical trial, we propose to determine the optimal dosage (number of cells) and therapeutic schedule (frequency and number of treatments) of injections using humanized mouse models.

We will also determine the optimal transplantation settings to be used to maximize the efficacy of transferred immune cells. These results will provide the required data to present a Clinical Trial Application to Health Canada and open a new clinical trial designed to prevent leukemia relapse and improve the outcome of transplanted children with high-risk leukemia. BioCanRx research network will benefit from our novel immunotherapeutic approach harnessing innate immunity to cure residual disease and prevent cancer relapse since this approach could be extended to adult leukemia and even solid cancers.

Key investigators:

Project lead:
Dr. Michel **Duval**

Co-Principal Investigator:
Dr. Denis-Claude **Roy**

Catalyst Program Investigators

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Partner

Fondation Charles Bruneau
$330,000

Key Milestones

Aim 1

- Determine the optimal pDC cell number to be injected and the frequency of injections to maximize NK cell stimulation and ALL clearance

Aim 2

- Determine an immunosuppressive regimen that will not decrease the anti-leukemic effect of pDC-activated NK cells

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

BioCanRx
Biotherapeutics for Cancer Treatment
Biothérapies pour le traitement du cancer