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

Enabling Studies Program

First in Human ThINKK Adoptive Immunotherapy to Prevent Leukemia and Neuroblastoma Relapse: GMP-manufacturing and Phase I Clinical Trial

July 1, 2020 - June 30, 2023.

Highlights

- The team is developing an innovative immunotherapy based on the stimulation of innate immunity that could be applicable to several type of leukemia and solid cancers.
- This approach does not target a specific antigen; the majority of cancer cells tested so far are sensitive to induced NK cell killing (ie., Therapeutic Inducers of Natural Killer Cell Killing; ThINKK).
- This approach leads to a broad spectrum of potential clinical applications, as this technology is a first "off-the-shelf" immunotherapy that will be available to all transplanted patients with high-risk malignancies.

targeted cancers: **Acute leukemia; neuroblastoma**

In order to maximize the effect of the immune system against cancer, the researchers are basing their approach on the stimulation of killer immune cells by the injection of specialized helper cells obtained from cord blood-derived cultures.

Project value: **$940, 500**
BioCanRx contribution: **$445,500**

Immunotherapy type: **Adoptive Cell Therapy (Off-the-shelf)**

Partners: **3**
University of Alberta Cell Therapy Manufacturing
Fondation Charles-Bruneau
IRICoR

About the project

Despite advances in allogeneic hematopoietic stem cell transplantation (HSCT), about 40-80% of transplanted children still relapse and subsequently die from their disease, indicating the urgent need for novel therapeutic approaches.

The stimulation of donor-derived immune effectors after HSCT can increase the Graft-versus-Leukemia (GvL) effect and eradicate residual leukemia cells. Donor-derived natural killer (NK) cells are the earliest immune mediators of the GvL effect, but acute lymphoblastic leukemia (ALL) is deemed to be resistant to NK cell-mediated cell killing. Nonetheless, the team, with support from a BioCanRx funded Catalyst study, recently demonstrated that these resistances are overcome when NK cells are stimulated with plasmacytoid dendritic cells (pDC), the NK cell physiological activators of early innate immune response.

To prepare for the clinical application of these findings, the team developed a good manufacturing practices (GMP)-compliant method for the expansion of pDC analogs from cord blood (CB) CD34+ progenitors. The team named these cells "Therapeutic Inducers of Natural Killer Cell Killing (ThINKK)".

This project is a continuation of a Cycle I Catalyst project. The current Enabling study will further progress this project toward a Phase I clinical trial by assessing feasibility of ThINKK adoptive transfers in patients with leukemia or neuroblastoma undergoing allogeneic HSCT by: validating a ThINKK manufacturing process in a GMP environment, filing a Clinical Trial Application to Health Canada, and opening a Phase I safety and feasibility trial in patients with leukemia or neuroblastoma undergoing allogeneic HSCT.

Availability of clinical grade Therapeutic Inducers of Natural Killer Killing (ThINKK) will open a new field in post-transplant cancer immunotherapy. By targeting innate immunity to reinforce the graft-versus-tumor effect of hematopoietic stem cell transplantation, this approach is innovative and complementary to anti-cancer cell therapies currently tested in Canada and within the BioCanRx network in particular.

Key investigator: Dr. Michel **Duval**
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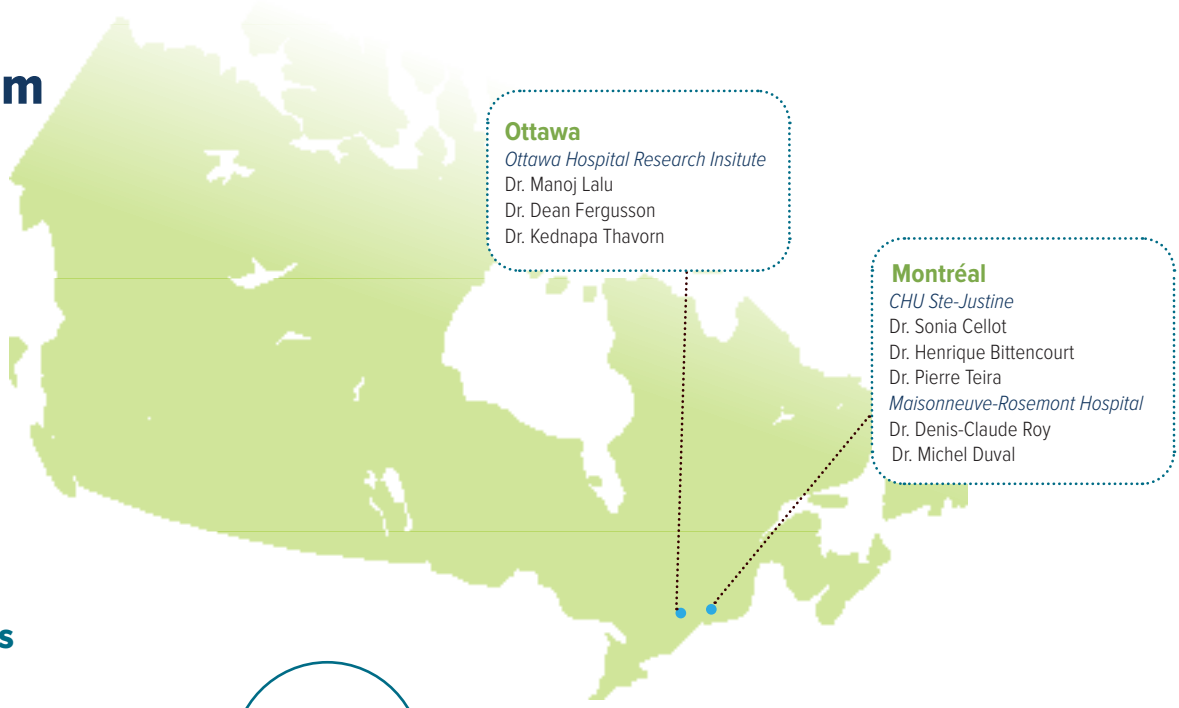
Project Team Members



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Partners

- CHU Ste-Justine/Charles Bruneau Foundation
- IRICoR
- Alberta Cell Manufacturing Facility

Key Milestones

- Transfer and validate ThINKK manufaturing process in a GMP environment
- Preparation of a clinical trial application and trial opening including patient engagement in protocol development and early health technology assessment.
- Trial Opening

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

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