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

Clinical Trials Program

Phase I clinical trial of Anti-Minor Histocompatibility Antigen Immunotherapy Broadening the Scope of Application for Precision Therapeutics

Jul. 1, 2017 to Sept. 30, 2021

Highlights

- First internationally to identify so many relevant and validated MiHAs and generate T-cell lines againt these MiHAs.
- A novel strategy to enhance the Graft-Versus-Tumor Effect (GVTE) and circumvent GVHD of AHCT.
- Adoption of MiHA-targeted immunotherapy will allow for safe, targeted and more effective treatment of patients with HCs without increasing the global cost of HC

Trial sites: 4

Patients: 20

Project value: $2.6M
$796,397 from BioCanRx

Biotherapeutic: 1

Eligible cancer:
HC
Hematologic Cancers
Specifically lymphoid HCs.

Partners: 7

Minor Histocompatibility Antigens (MiHA) receptive T cells

Centre d'excellence en thérapie cellulaire Hôpital Maisonneuve-Rosemont
Centre affilié à l'Université de Montréal

Centre intégré universitaire de santé et de services sociaux de l'Est-de-l'Île-de-Montréal
Québec

AmorChem

SpecifiCell PHARMA

C3i Center for Commercialisation of Cancer IMMUNOTHERAPY

CellCAN
Regenerative Medicine and Cell Therapy Network

CETC Management

About the project

Hematologic cancers (HCs), i.e. cancers that effect the blood and lymph system, represent about 10% of all cancers. The number of new cases of HCs in Canada is 16,000 per year. HC affects both adults and children, and while around 50% of patients with HC can be cured by chemotherapy, the other 50% develop resistance to chemotherapy and die. This project's objective is to provide safer and more effective treatments for patients with resistant HCs. For most of these patients, allogeneic hematopoietic cell transplantation (AHCT) is the only curative treatment. It is now known that the curative effects of AHCT results from immune system cells that recognize or target tumor Minor Histocompatibility Antigens (MiHAs), small cell-surface proteins that function as 'signals' for immune system cells. However, the use of adoptive immunotherapy is hampered by two factors: i) the variable anti-HC activity of AHCT, and ii) the risk of a devastating complication, graft-vs.-host disease (GVHD=donor cells attacking the patient). Currently, the inability to selectively target malignant cells leads to the occurrence of GVHD. The team envisions that their work will transform AHCT into a consummate model of personalized cancer therapy because of their strategy will wallow to tailor AHCT components as a function of the proteome of the cancer cells. They are initiating a phase I clinical trial to test this novel immunotherapeutic strategy in patients. The T cell product with anti-MiHA activity has been called "GLIDE" for Guided Lymphocyte Immunotpeptide Derived Expansion against MiHAs.

The team has identified 98 MiHAs that have preferential expression on hematopoietic cells, thus minimizing the risk of GVHD. Also, they were able to develop an ex vivo immunization strategy that allows to generate T cells with anti-MiHA specificity. They will initiate a clinical trial using this novel strategy to treat patients with lymphoid HCs and also expand the HLA typing repertoire in order to increase patient reach to approximately 95% of the patient population (from the current 45% reach). MiHA-targeted immunotherapy would allow for safe, targeted and more effective treatment of patients with otherwise fatal HCs.

Key investigators

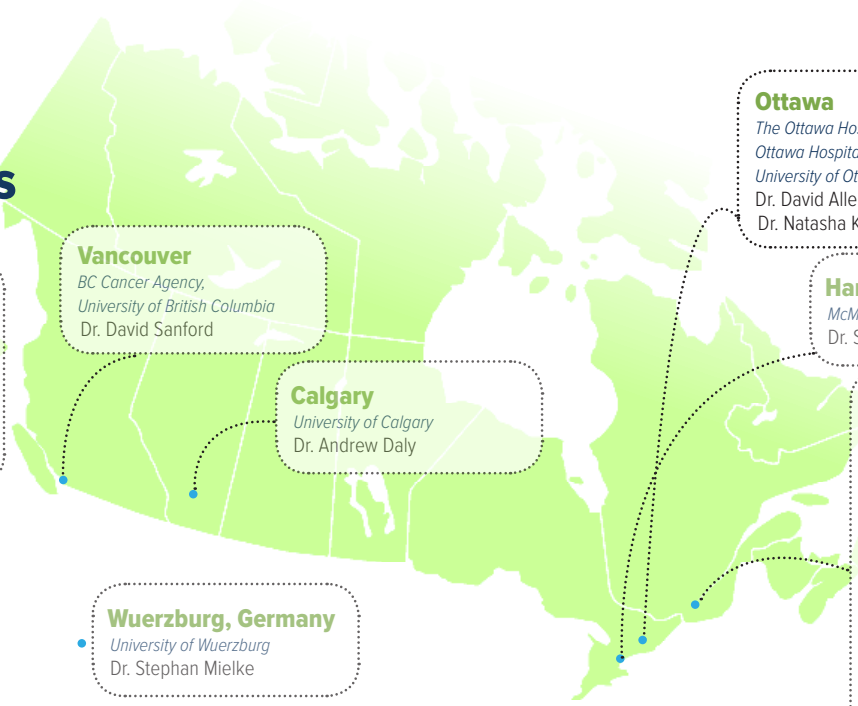
Dr. Denis-Claude **Roy**

Dr. Claude **Perreault**

Hôpital Maisonneuve-Rosemont
Centre affilié à l'Université de Montréal

Université de Montréal

Clinical trial sites and investigators



Planned Clincal Trial Sites:

Phase I:

- Montreal
- Ottawa
- Calgary
- Vancouver

Vancouver
BC Cancer Agency, University of British Columbia
Dr. David Sanford

Calgary
University of Calgary
Dr. Andrew Daly

Wuerzburg, Germany
University of Wuerzburg
Dr. Stephan Mielke

Ottawa
The Ottawa Hospital, Ottawa Hospital Research Institute, University of Ottawa
Dr. David Allen
Dr. Natasha Kekre

Hamilton
McMaster University
Dr. Stephen Ronan

Montreal
Montreal Heart Institute Coordinating Center, Research Center and Center of excellence in Cellular Therapy - Hôpital Maisonneuve-Rosemont, University of Montreal
Dr. Denis-Claude Roy
Dr. Claude Perreault
Dr. Imran Ahmad
Dr. Jean-Sebastien Delisle
Dr. Marie-Claude Guertin
Dr. Silvy Lachance
Dr. Jean Roy

BioCanRx
$796,397
approved on
July 6, 2017

Partner contributions

CIUSSS EMTL - HMR	AmorChem SpecificiT	CETC-Managment	C3i	CellCan
$500,000 in kind	$900,000 cash	$400,000 in kind	$40,000 in kind	$5,000 in kind

Year 1

- Modification to current clinical protocol to include more HLA subtypes and include new hematopoietic diesease indications
- Amendments submission to Health Canada and REB
- Improvements and Optimization of current MiHA manufacturing process
- Development of companion diagnostics
- Aquisition of new MiHA peptides
- Perform MiHA infusion in 2 patients

Year 2

- Perform MiHa infusion in 4 more patients,
- Data aquisition
- Development of Ligand binding affinity analysis algorithm to improve prediction of binding
- Use newly developed companion diagnostics on all patients

Year 3

- Perform MiHa infusion in 4 more patients
- Data acquisition
- Complete reports on clinical study
- Design of next clinical assay
- Improvement and performance of companion assays

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

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