

## Infected cell vaccines in the treatment of acute leukemia: laying the groundwork for a clinical trial

Oct. 14, 2016 to October 1, 2018

### Highlights

- Personalized strategy with a virus-infected leukemia cell vaccine can offer more ammunition against acute leukemia
- Vaccine strategy combines cancer-killing viruses with the added ability to stimulate the patient's own immune system against their leukemia
- Creates the foundation for further studies that will bring this new approach for the treatment of leukemia towards a clinical trial
- Leukemia vaccines are being created in a number of ways, but the use of oncolytic viruses as part of the vaccine is a novel approach

targeted cancers

## Acute leukemia

The goal at the end of this project is to have the necessary pre-clinical package to support a pre-CTA meeting with Health Canada to address toxicology studies needed for the clinical trial testing the safety and feasibility of using oncolytic virus-infected and gamma-irradiated leukemia cell vaccines in patients with acute leukemia.

Project value

**\$275,860**  
BioCanRX contribution:  
**\$155,888**

Partners

**6**

The Ottawa Hospital  
L'Hôpital d'Ottawa

**TURNSTONE**  
BIOLOGICS

The Ottawa Hospital  
L'Hôpital d'Ottawa  
FOUNDATION

**Cancer**  
Research Society

**Ottawa Regional**  
Cancer  
Foundation

Biotherapeutics  
**Maraba  
MG1**

BioCanRx core facilities  
**2**

**Molecular Cellular  
Immunology Core  
(Vancouver)**

**Human Immune  
Testing Suite  
(Hamilton)**

### About the project

Acute leukemia is a type of blood cancer that remains difficult to treat with standard therapies, most of which are dangerous and associated with a high risk of complications and death. Despite aggressive chemotherapy and stem cell transplantation, less than 5% of patients with relapsed acute leukemia are cured. Patients with acute leukemia need more ammunition against their disease. This project proposes that a personalized strategy with a virus-infected leukemia cell vaccine can offer just that needed ammunition.

This vaccine strategy combines cancer-killing viruses, an existing BioCanRx technology, with the added ability to stimulate the patient's own immune system against his/her leukemia. This strategy would provide patients with a less toxic and more personalized approach to defeating leukemia. Based upon on their discovery that infected leukemia cell vaccines induce a protective leukemia specific immune response in mice, they propose to test in a clinical trial, whether vaccines created using a patient's own leukemia cells infected with a cancer-killing virus and inactivated with radiation can protect

against leukemic relapse. This infected cell vaccine will be tested in mice under conditions that mimic those of patients enrolled in such a trial. The initial experiments will be performed using the Maraba MG1 virus and murine leukemia cell lines. The proposed experiments will test the effect of chemotherapy on the infected cell vaccine response while further experiments will determine the ideal manufacturing and storage conditions needed for an effective vaccine. Completion of this project will create the foundation for further studies that will ultimately bring this new approach for the treatment of leukemia towards a clinical trial. This vaccine strategy will offer a uniquely tailored therapy to each patient with leukemia, providing patients with these aggressive cancers a chance at cure.

Key investigators

Project lead:

Dr. Natasha **Kekre**

Principal Investigators

Dr. Harold **Atkins**  
Dr. John **Bell**

The Ottawa  
Hospital  
RESEARCH  
INSTITUTE

L'Hôpital  
d'Ottawa  
INSTITUT DE  
RECHERCHE

The Ottawa Hospital  
L'Hôpital d'Ottawa



uOttawa

# Catalyst Program Investigators

## Partners

Bone Marrow Transplantation Foundation, The Ottawa Hospital  
\$40,000

Hematology Division, The Ottawa Hospital  
\$20,000 (in-kind)

The Ottawa Hospital Foundation  
\$20,000

Ottawa Regional Cancer Foundation  
\$53,916

Turnstone Biologics  
\$10,000 (in-kind)

Cancer Research Society  
\$29,972

## Hamilton

McMaster University  
Dr. Brian Lichty

## Ottawa

Ottawa Hospital Research Institute,  
The Ottawa Hospital,  
University of Ottawa  
Dr. Natasha Kekre  
Dr. Harold Atkins  
Dr. John Bell  
Dr. Mitchell Sabloff  
Dr. Rebecca Auer

## About, continued...

This project will develop an infected cell vaccine, a personalized immunotherapy, as a possible approach to treating patients with refractory leukemia or those unable to safely receive chemotherapy. Leukemia vaccines are being created in a number of ways, but the use of oncolytic viruses as part of the vaccine remains a novel approach. This proposal brings new clinical and biologic expertise in hematologic malignancies into the BioCanRx organization, including stem cell transplantation, a field in which clinicians are already comfortable with adopting new immune therapies in the clinic.

## Key Milestones

### October 2016 – January 2017

- Murine experimental design
- Ethics application for patient samples

### March 2018 – October 2018

- Manufacture and characterize ILCV with patient samples

### October 2016 – October 2017

- Murine survival experiments
- Immune assays for immune response and potency to ILCV

### January 2017 – January 2018

- Banking patient samples

### October 2017 – March 2018

- Compare methods of ILCV cryopreservation and production with patient samples

### June 2018 – October 2018

- Validate potency assay in patient samples

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

  
Canada's Immunotherapy Network  
Le réseau canadien d'immunothérapie