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

Catalyst Program

Development of a bioreactor system to automate T-cell manufacturing

Oct. 1, 2015 to Dec. 31, 2016

Highlights

- Accelerates development of Canadian-based technology that would create a desktop GMP laboratory-in-a-box and greatly increase the number of clinical sites capable of performing T-cell therapy for cancer treatment
- The proposed bioreactor would dramatically reduce the cost of preparing T cells for cancer therapies
- Successful development of this technology could move beyond T-cell manufacturing and have significant global impact

Biotherapeutics: **1**

T cells
for Adoptive T-cell Therapy and CAR T-Cell Therapy

Eligible cancers:
15,800 new cases of these cancers in 2015
Melanoma **Ovarian** **Leukemia**
5,600 deaths from these cancers in 2015

Project value:
$364,726
$107,500 from BioCanRx

Partners: **4**

- Fraunhofer IBMT
- The Terry Fox Research Institute / L'Institut de recherche Terry Fox
- cure: blood cancer
- McMaster University
- Marta and Owen Boris Foundation

Key investigators:
Dr. Jonathan **Bramson**, McMaster University
Dr. Raja **Ghosh**, McMaster University

About the project

Early results from clinical trials of engineered T-cell therapies have resulted in potent anti-tumour responses. Industry's enthusiasm for this approach is high, resulting in investment across the U.S. and Europe that exceeded USD $1 billion in an 18-month period around 2014. Current estimates indicate that these engineered T-cell therapies could generate annual revenues of USD $10 billion, if approved to treat multiple forms of cancer. However, the cost of manufacturing clinical-grade, engineered T cells remains a major hurdle that must be overcome. Currently, it is estimated that a single course of therapy can cost as much as $500,000. It is well recognized that automation will be required to reduce the cost of goods and enable cell production that will meet the market demands. However, most industry capital is being directed at clinical development, resulting in a gap in manufacturing innovations. This project addresses that gap.

A central component of any automated manufacturing process is the bioreactor used to propagate the cells. Dr. Bramson's team has designed hollow-fibre membrane bioreactors that could offer substantial advantages over the existing technology and prove to be of significant value to all BioCanRx investigators interested in cell therapies. Given the potential significance of T-cell therapies, the development of automated scalable processes for manufacturing the cells is important in allowing more clinical sites to offer these cell therapies.

Looking beyond this immediate project, successful innovations in automated manufacturing solutions for this industry will have tremendous impact globally that will extend beyond T-cell therapies.

Catalyst Project investigators

Montreal
Centre de Recherche Hôpital Maissoneuve-Rosemont
Scientific investigators
Dr. Denis-Claude Roy
Dr. Jean-Sebastien Delisle

Hamilton
McMaster University
Scientific investigators
Dr. Jonathan Bramson
Dr. Raja Ghosh

BioCanRx partners

Cure: Blood Cancer
$15,000

Fraunhofer Institute for Biomedical Engineering
$116,297

Terry Fox Research Institute
$128,429

Boris Family Fund, Faculty of Health Sciences, McMaster University
$105,000

BioCanRx
$107,500
approved on June 10, 2015

Oct. 1, 2015
- Project starts

Oct. 1, 2015 to March 31, 2016
- Fabricate hollow-fibre membrane bioreactors (HFMB) prototypes
- Integrate HFMB prototypes with fluid and instrumentation components
- Assess mass transport of key oxygen and nutrients for HFMB prototypes
- Develop T-cell culture process for HFMB prototypes

April 1, 2016 to Sept. 30, 2016
- Complete assessment of mass transport of key oxygen and nutrients for HFMB prototypes
- Complete development of T-cell culture process for HFMB prototypes
- Fabricate HFMB variants
- Integrate HFMB variants with fluid and instrument components
- Assess mass transport for HFMB variants
- Develop T-cell culture process for HFMB variants

Oct. 1, 2016 to Dec. 31, 2016
- Complete integration of HFMB variants with fluid and instrument components
- Complete assessment of mass transport for HFMB variants
- Complete development of T-cell culture process for HFMB variants

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

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