

## Catalyst Program

# **Development of a bioreactor system to automate T-cell**

manufacturing

#### **Highlights**

Oct. 1, 2015 to Dec. 31, 2016 ·····

- 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

new cases of these cancers in 2015 **Ovarian** Melanoma Cancers Leukemia

deaths from these cancers in 2015

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

\$107.500 from BioCanRx

Fraunhofer

### **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.

cure: blood cancer McMaster University

> Marta and Owen Boris Foundation

Lexing Brigators Dr. Jonathan Dr. Raja

#### **Catalyst Project** investigators Centre de Recherche Hôpito Maissoneuve-Rosemont Scientific investigators Dr. Denis-Claude Roy Dr. Jean-Sebastien Delisl **Hamilton** McMaster University **BioCanRx** partner Scientific investigators Dr. Jonathan Bramson Dr. Raja Ghosh **Boris Family Fund, Faculty of** Fraunhofer Institute for **Terry Fox Cure: Blood Cancer** Health Sciences, **Biomedical Engineering Research Institute** \$15,000 **McMaster University** \$116,297 \$128,429 \$105,000 **BioCanRx** Oct. 1, 2015 to March 31, 2016 • Fabricate hollow-fibre membrane bioreactors \$107.500 (HFMB) prototypes approved on • Integrate HFMB prototypes with fluid and June 10, 2015 instrumentation components Oct. 1, 2015 • Assess mass transport of key oxygen and nutrients Project starts 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 The power to kill cancer lies within us. prototypes • Fabricate HFMB variants Let's tell our bodies how. • 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

Le réseau canadien d'immunothérapie