

RESEARCH CHAIR IN STEM CELLS AND TISSUE ENGINEERING

Faculty of Medicine

MISSION

To develop tissue engineering, its in vitro applications, and the clinical translation of laboratory-grown tissues and organs to treat wounds, especially severe burns, and replace damaged organs lacking in stem cells.

CHAIR CREATION DATE: October 2013

This research chair is part of Université Laval's Program for the Advancement of Innovation, Research, and Education (PAIRE), which aims to create a stimulating research environment for innovation, ingenuity, and creativity on the part of faculty researchers.

CONTEXT

With the increasing demand for skin, cornea, ligaments, heart valves, and other tissues, the shortage of transplantable tissues and organs has become a critical issue in healthcare. The number of organ donors in North America has been dropping for the past few years. Burns and other types of severe trauma can cause tissue or organ loss. Skin grafting can sometimes be an option, but there is also great potential for tissue-engineered autologous epidermis and skin substitutes. Other acute illnesses and injuries can cause loss of function that requires organ replacement.

The work performed by this research chair focuses on tissue engineering and stem cells, exploring promising new approaches to repair, replace, and regenerate tissues and organs. Université Laval's Centre de recherche en organogénèse expérimentale/LOEX serves as a centre of expertise in the field. Professor Lucie Germain is the scientific director. Research performed under this chair (LOEX) in the laboratories at the CHU de Québec research centre focuses on developing cultivated substitutes like skin, corneas, blood vessels, and heart valves to foster basic research and actively promote its translation into clinical practice.

Research is carried out by multidisciplinary teams of tissue engineering scientists who work together to improve substitutes formed in vitro, with the goal of optimizing the histological, mechanical, biological, and functional properties of engineered tissue. Research will likely also include post-transplant tissue function and scarring evaluation.

"The goal of regenerative medicine is to find solutions to the shortage of transplant organs in order to repair, replace, or regenerate absent or diseased tissue and ease patient suffering."

(Lucie Germain)

CHAIRHOLDER

Lucie Germain is vice-dean for Research and Higher Education at the Université Laval Faculty of Medicine and a professor in the Department of Surgery. She is also director of the Regenerative Medicine Section of the CHU de Québec Research Center, and scientific director of LOEX. Professor Germain leads a stem cells and tissue engineering research program. She receives funding for her work from a variety of granting agencies at the federal level, including the Canadian Institutes of Health Research (CIHR) and Stem Cell Network of the National Centers of Excellence (NCE), and the provincial level, such as Fonds de recherche du Québec - Santé (FRQS). In addition, she heads up FRQS's Cell and Tissue Therapy Network (ThéCell). Professor Germain sat on the FRQS board of directors and the scientific committee of CIHR's Institute of Musculoskeletal Health and Arthritis (IMHA) and was university delegate at Université Laval for CIHR.





OBJECTIVES

The chair has five key objectives:

- > To enhance understanding of in vitro organ production processes, including stem cells, cell differentiation, their response to mechanical loading, and wound healing
- > To use engineered tissue to better identify the mechanisms responsible for human pathologies and to perform toxicological and pharmaco-toxicological analyses
- > To carry out translational research on skin cell and tissue engineering substitutes to accelerate the transfer of findings into clinical practice
- > To foster clinical research, including the dissemination of results and the transfer of knowledge
- > To effectively support student education, enhance the skills of trained personnel, and promote career opportunities in the field of stems cells and tissue engineering

PARTNERS



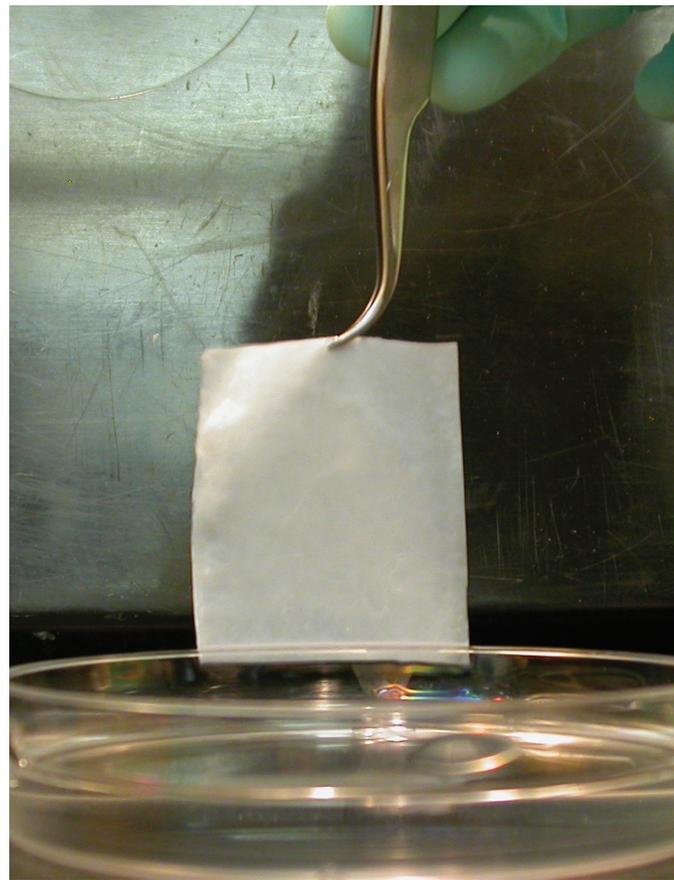
Fondation des pompiers du Québec pour les grands brûlés (FPQGB), an organization that aids traumatic burn victims, supports Quebec's centres of expertise for serious burns and subsidizes research to improve wound care. FPQGB is proud to contribute financially, via its "Agir à grande échelle" campaign, to improving treatments for severe burn victims through research. As an internationally recognized centre, LOEX is a leader in this new, highly advanced field. FPQGB, with support from the firefighting community, is also involved in accident prevention and knowledge sharing activities.



The mission of Fondation du CHU de Québec—an active partner in the development of CHU de Québec—is to promote projects related to teaching, research, the humanization of care, and the procurement of specialized, high-tech medical equipment. Driven by an ongoing desire to offer improved patient care, Fondation du CHU de Québec has helped numerous departments and services stay on the cutting edge of their special fields.

BENEFITS

The research chair will support the work being performed at LOEX in the CHU de Québec Research Center to accelerate the training of highly qualified personnel, the recruitment of new researchers, and the dissemination of knowledge in order to develop more clinically available substitutes. Efforts to engineer better substitutes will also benefit burn survivors and patients who have developed illnesses requiring tissue replacement. The chair will also help increase the number of students and researchers in the field of stem cells and tissue engineering.



INFORMATION

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