

# SENTINEL NORTH RESEARCH CHAIR IN THE NEUROBIOLOGY OF STRESS AND RESILIENCE

Faculty of Medicine

## MISSION

The Sentinel North Chair in the Neurobiology of Stress and Resilience aims to shed light on the biological mechanisms underlying vulnerability or resilience to stress, in part with the help of state-of-the-art photonic technology, in order to develop innovative treatments to treat or even prevent depression and mood disorders.

A comprehensive look at the biological changes caused by chronic stress will be combined with population studies in order to identify personalized treatments.

CHAIR CREATION: February 5, 2018

## BACKGROUND

One out of every five people will suffer from major depressive disorder in their lifetime. The World Health Organization recently determined that depression, which affects twice as many women as men and is the main risk factor in death by suicide, is now the leading cause of disability worldwide, affecting more than 300 million people.

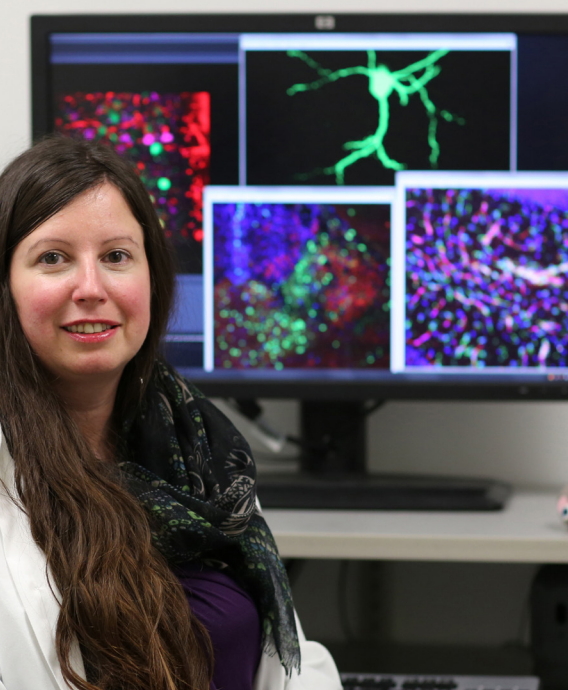
Northern populations are exposed to a unique form of stress due to important environmental, cultural and socio-economic changes. Chronic stress is associated with changes to the vascular and immune systems. While individual differences seem responsible for resilience or vulnerability to stress and the development of depression, little is yet known about them or about how these systems interact with the brain to induce these behaviours. In this context, a better understanding of the neurobiology associated with stress could enable an innovative therapeutic method focused on resilience and a whole body approach.

## CHAIRHOLDER

**Caroline Ménard** is an assistant professor in the Department of Psychiatry and Neuroscience at Université Laval's Faculty of Medicine and a researcher at the CERVO Brain Research Centre. She has studied biophysics, psychiatry, and neuroscience at Université du Québec à Trois-Rivières, McGill University, Université de Montréal, and the Icahn School of Medicine at Mount Sinai in New York City. In addition to her research on stress and resilience, she has investigated the neurobiology of memory as it relates to aging and Alzheimer's as well as the effects of diet on brain plasticity.

Dr. Ménard's research program combines behavioural approaches with molecular, biochemical, functional, and imaging techniques. The data obtained from preclinical models is validated clinically in cooperation with researchers and clinicians at Université Laval and other national and international institutions.





## OBJECTIVES

This research chair aims to identify the biological mechanisms involved in vulnerability and resilience to stress, with special attention paid to population differences. It also provides training to students and postdoctoral fellows in a multidisciplinary environment. Specific topics to be studied :

- > Molecular and cellular mechanisms related to neurovascular health in situations of chronic social stress in adults or childhood adversity
- > Impact of chronic stress on immune response and diversity of the intestinal microbiome as well as the effects of chronic stress on neurovascular health

Various strategies will be used to promote resilience, including a northern diet rich in neuroprotective compounds. This research will consider the differences between men and women and the unique character of northern populations in order to identify lesser-known biological mechanisms potentially related to resilience. The ultimate goal is to develop better targeted treatments, for northern populations in particular.

## PARTNER

Funded by the Canada First Research Excellence Fund, Sentinel North allows Université Laval to draw on over a half-century of northern and optics/photonics research to develop innovative new technology and improve our understanding of the northern environment and its effect on human beings and their health. This new Chair is part of the major transdisciplinary research program at Sentinel North whose mission includes training the next generation of researchers that will help address some of the complex challenges facing the changing North.

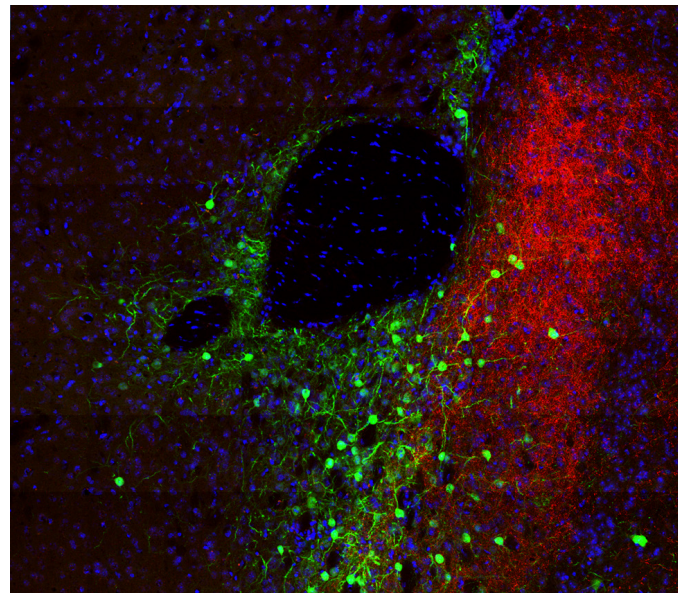
The Sentinel North Chair in the Neurobiology of Stress and Resilience will contribute to this endeavour in many ways: by identifying new biological mechanisms related to vulnerability and resilience to chronic stress; evaluating the effects of a northern diet on neurovascular and immune health to develop a preventive approach for different populations; and potentially proposing new therapeutic treatments better suited to northern populations given their unique culture, heritage, and environmental conditions.



## BENEFITS

The Chair will add to Université Laval's northern expertise and will also support cardiometabolic and mental health research, which are pillars of the Sentinel North program and sectors of excellence within the Faculty of Medicine. It will also foster a stimulating and multidisciplinary environment for training highly qualified personnel.

The Chair's mission fills a promising niche by investigating interactions between the complex systems of the brain, neurovascular health, the immune system, and the intestinal microbiome. The Chair will use innovative preclinical models that enable in-depth mechanistic studies using state-of-the-art techniques. It will also support translational research and interdisciplinarity, as the promising targets identified in the preclinical models will be confirmed with clinical studies in cooperation with researchers at the university, across Canada, and abroad.



### CONTACT

Caroline Ménard  
Faculty of Medicine  
Department of Psychiatry and Neuroscience  
Université Laval  
CERVO Brain Research Centre  
2601 chemin de la Canardière  
Québec City, Québec G1J 2G3  
Tel.: 418-663-5741  
Caroline.Menard@fmed.ulaval.ca

