Health Sciences Research Activities

An Overview

Faculty of Medicine and Health Sciences

Université de Sherbrooke, Québec, Canada

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Table of Contents

Presentation 3

Research areas 3
  Cancer:
    Part I: Genomics 4
    Part II: Molecular Imaging and Radio-Oncology 5
  Aging 6
  Diabetes, Obesity and Cardio-vascular Diseases 7
  Molecular and Structural Pharmacology 8
  Digestive Physiopathology 9
  Inflammation and Immunity 10
  Development, Growth and Genetics 11
  Neurosciences 12
  Novel Health Interventions 13

Research Chairs
  Canada Research Chairs 14
    - Tier 1 14
    - Tier 2 15
  Privately Endowed Chairs 16

Research Centers and team 17

For more information, please visit the websites of the Sherbrooke University Faculty of Medicine and Health Sciences, the Sherbrooke University Hospital Étienne-Le Bel Clinical Research Center, The Research Centre on Aging and the Charles LeMoyne Hospital Research Center.

http://www.usherbrooke.ca/medecine/
http://www.crc.chus.qc.ca
http://www.ccss-iugs.ca/cdrv/?L=en
http://www.hclm.qc.ca/fr/index.jsp
Presentation

The Sherbrooke University Faculty of Medicine and Health Sciences

The Sherbrooke University Faculty of Medicine and Health Sciences (FMHS) is a teaching and research leader in Canada as well as in the francophone world.

A designated Collaborating Center of the World Health Organization (WHO), the FMHS ranks among the world elite with respect to health-professional training, with nearly 50 different training programmes offered in four campuses in the provinces of Quebec and New-Brunswick.

The FMHS’s mission is to enhance the health and well-being of individuals and populations through teaching, research, healthcare and knowledge transfer. To do so, it places people at the heart of all of its endeavours. Its values are rooted in professionalism and humanism, social responsibility, excellence, creativity and innovation, interdisciplinarity, collaboration and partnership.

Research activities at the Sherbrooke University Faculty of Medicine and Health Sciences

Research activities at the FMHS are conducted in 18 departments or clinical services, by over 100 basic scientists and 60 clinician scientists and their dedicated research teams, including 300 graduate students (Master or PhD) and 50 postdoctoral fellows. Among these 160 scientists, 45% are fellows from a provincial or federal funding agency or from a public or private foundation. In 2009, the FMHS received almost 50 million Canadian dollars in research funds.

Research activities at the FMHS encompass basic research, clinical research, research on population health and health services. They are conducted along the research axes of its four affiliated research centers: the Sherbrooke University Hospital Étienne-Le Bel Clinical Research Center, the Chicoutimi CSSS Research Center, the Research Center on Aging at the Sherbrooke University Geriatric Institute, and the Charles LeMoyne Hospital Research Center.

Research Areas

Research activities focus on nine major health issues and areas, identified as top research priorities in the Strategic Research Plan (2005-2010) of the FMHS.

- Cancer:
  - Part I : Genomics
  - Part II: Molecular Imaging and Radio-Oncology
- Aging
- Diabetes, Obesity and Cardio-vascular Diseases
- Molecular and Structural Pharmacology
- Digestive Physiopathology
- Inflammation and Immunity
- Development, Growth and Genetics
- Neurosciences
- Novel Health Interventions

Each of these research areas are presented in more details below.
Cancer: Part 1, Genomics
Coordinator: Antonio Conconi
Clinical Research Center Oncology Research Axis Director: Antonio Conconi
Clinical Research Center Molecular Imaging and Radiotherapy Research Axis Director: Benoit Paquette

Cancer research thematics include functional genomics, molecular and cellular oncology, molecular imagery and radiobiology; split between two groups.

Investigators of the RNA group study RNA maturation, DNA integrity and repair, telomere biogenesis, cell proliferation, and the underlying mechanisms of apoptosis and cancer metastasis. Their common interest is furthering the understanding of macromolecule interactions between DNA, RNA or proteins, and the essential part they play in biological processes such as gene expression, cell growth and infection.

The RNA group conducts high impact science funded (over 20 million dollars over the past years) by peer-reviewed granting organizations such Genome Canada, Genome Québec, the Canadian Institutes of Health Research (CIHR) and the Canada Foundation for Innovation (CFI).

The Sherbrooke approach is particularly powerful because alternative splicing is a process which conveniently links transcriptome and proteome. Alternative splicing, an important biological process which controls the expression of 2/3 of our genes, is perturbed when cancer strikes. The Sherbrooke University Functional Genomics Laboratory and its RNomics Platform offer technology and services which are conducive to scientific collaborations because they are both unique and complementary to approaches and services offered by other cancer research centers. The ARN LISA (Layered and Integrated Systems of Analysis) Platform services research groups across North America at several levels: gene of interest function elucidation in human cells using high-throughput functional genomics; isotyping and functional analysis of a gene of interest, a family of genes or a signalling pathway; determination of the coding potential of a gene of interest in a given tissue in order to precisely analyze by mass spectrometry for proteomics research; isotyping of novel therapeutic targets; research on drug action mechanisms; identification of diagnostic markers; and validation of genomic microarray data.

Cancer related research chairs in the genomics group include three Canada Research Chairs:

- The Canada Research Chair in Functional Genomics (Benoit Chabot)
- The Canada Research Chair on Genomics and Catalytic RNA (Jean-Pierre Perreault)
- The Canada Research Chair in Telomeres Biology (Raymund Wellinger)

Principal Achievements
- Genome Canada / Genome Quebec 9.9 M$ Grant for the discovery of specific alternative splicing breast and ovarian cancer isoforms via the Sherbrooke University Functional Genomics Laboratory
- Canadian Foundation for Innovation New Initiatives’ 6.6 M$ Grant for the Integration of advanced technologies into a multidisciplinary biomedical research complex
- 31.4M$ infrastructure grant from the federal and Québec provincial governments for construction of a cancer research pavilion

For more information, please visit the following websites:

http://www.genomequebec.com/platforms/rnomics.asp
http://riboclub.org/cgi-bin/RiboWeb/index.pl
Cancer: Part 2, Molecular Imaging and Radiotherapy
Coordinator: Antonio Conconi
Clinical Research Center Oncology Research Axis Director: Antonio Conconi
Molecular Imaging and Radiotherapy Research Axis Director: Benoit Paquette

The Radiobiology and Molecular imaging group design and build novel detectors combining both Positron Emission Tomography (PET) and TomoDensitometry (TDM) in a single apparatus, generate novel radiotracers, novel contrast agents for Magnetic Resonance Imaging (MRI), and conduct pharmacokinetic modeling and radiobiology studies to improve cancer treatment and diagnostics.

The Sherbrooke Molecular Imaging Center is the first center of its kind in Canada as its features both pre-clinical and clinical PET and MRI imaging, as well as all of the required resources for the development and production of novel radiopharmaceutics and scanners for animal and human tridimensional whole-body high resolution imaging. The Sherbrooke Molecular Imaging Center provides access to state-of-the-art equipments, in a one-of-a-kind center in Quebec, to over 170 basic research and pre-clinical projects and more than 20 clinical trials. From a clinical PET standpoint, it is the most active center in Canada (2,700 patients per year) and among the most active in North America, thus providing a large basin for patient recruitment and clinical studies. A recent addition to MRI imaging facilities is the first 7-Tesla scanner in Quebec.

The Radiation sciences group specializes in the development of photo- and radio-sensitizers based on the understanding of the basic molecular mechanisms of photo- and radiotherapy. Radiosensitizers are drugs that make cancer cells more sensitive to radiation therapy. The group has developed unique instruments including apparatus to irradiate biological molecules, such as DNA, with low-energy electrons. The group's investigators are among the leaders in the field of DNA damage analysis.

Basic research projects are naturally complementary to the clinical cancer research projects developed by our clinician scientists at the divisions of radio-oncology, nuclear medicine and radiobiology. This is particularly so for clinical research projects featuring clinical imaging and radiobiology applications. Other clinicians including hemato-oncologists, neuro-oncologists, pathologists and urologists also actively take part in cancer research.

Cancer related research chairs include one Canada Research Chair and two privately endowed chairs:

- The Canada Research Chair in Magnetic Resonance Imaging (Martin Lepage)
- The National Bank of Canada Research Chair in Neuro-Oncology (David Fortin)
- The Jeanne and Jean-Louis Levesque Chair in Radiobiology (Johannes van Lier)

Principal Achievements
- Canadian Foundation for Innovation New Initiatives' 6.6 M$ Grant for the Integration of advanced technologies into a multidisciplinary biomedical research complex
- Quebec Government 4.9 M$ Grant for the Sherbrooke Molecular Imaging Center
- Only radioactive-copper producing center in Canada, and the 2nd in North America
- Only center in Canada to having demonstrate its capacity to produce cyclotron-derived $^{99m}$Tc
- Colorectal cancer biobank, prostate cancer biobank (Procure), breast and ovarian FRSQ cancer biobank

For more information, please visit the following website:

http://www.cimf.med.usherbrooke.ca/
Despite longer life expectancy in good health, loss of autonomy is linked to various causes, physical, cognitive, psychological and/or social, which are numerous, multidimensional and multifactorial. This highlights the special challenges facing research on aging.

Investigators at the Sherbrooke Center for Research on Aging (the Centre de recherche sur le vieillissement du Centre de santé et des services sociaux-Institut universitaire de gériatrie de Sherbrooke) examine the underlying mechanisms and healthcare management of diseases or psychosocial problems linked to old age such as Alzheimer’s, osteoporosis, and maltreatment, through an interdisciplinary approach which considers the individual as a whole. They study the preventive biological, psychosocial and social factors which enhance autonomy of the elderly. Via rigorously conducted evaluative studies, they are poised to propose efficient support strategies for caregivers and to innovate with respect to the organization of healthcare and services to the elderly.

Research into health and aging will enable the promotion of optimal quality of life for an aging population.

The Sherbrooke Center for Research on Aging features a highly interdisciplinary group of investigators in the basic sciences, community health, nursing, medicine, nutrition, rehabilitation, psychology, social services, kinesiology, administration and engineering and three main research axes:

1) Clinical
2) Biological Mechanisms of Aging
3) Society, Populations and Services

The development of the Sherbrooke Center for Research on Aging is closely linked to that of the Departments of Community Health sciences, Nursing, Family Medicine, and the Geriatrics’ Division. The Sherbrooke Center for Research on Aging is highly respected within Canada and abroad, as it houses investigators from various scientific horizons all dedicated to research on aging.

The Center offers its investigators a solid infrastructure to support basic research as well as clinical research and population health research. Despite the recent and rapid growth of the field of research on aging, the capacity to conduct research in this area is still largely insufficient.

Aging related research chairs include one Canada Research Chair and one privately endowed Chair:

- The Canada Research Chair on Use of Dietary Fatty Acids and Cognitive Functions During Aging Process (Stephen Cunnane)
- The Merck-Frosst Chair in Pharmaco-Geriatrics (Hélène Payette)

For more information, please visit the website of the Research Centre on Aging:

http://www.csss-iugs.ca/cdrv
Diabetes, Obesity and Cardio-vascular Diseases
Coordinator: André Carpentier
Clinical Research Center Endocrine and Metabolic Disease Research Axis
Director: Jean-Luc Ardilouze

Basic and clinician scientists, with expertises in endocrinology, pharmacology, physiology and cell biology work together on the underlying mechanisms of insulino-resistance and the physiopathology of obesity.

Human studies concern the anomalies involved in the development of type 2 diabetes and the relationships between dietary fatty acids and immune system dysfunction; the mechanisms of cardiac lipotoxicity in type 2 diabetes; and the role of insulin action on polycystic ovarian syndrome. Investigators also study early anomalies which are possible signs of disease. Research subjects include offspring of people afflicted by diabetes, women with polycystic ovarian syndrome, and women with gestational diabetes.

Investigators also study thyroid cancer and thyroid disorders, take part in multicenter pharmacological studies on the risk factors for coronary disease, and develop evaluative research projects on health system improvement with respect to obesity prevention, treatment, and healthcare organization.

Basic research is conducted on the molecular and cellular mechanisms of hormone action, signal transduction, particularly with respect to hormones of the hypothalamo-hypophyso-adrenal axis, as well as the role of hormones in the development of hypertension, stress-related diseases, or the regulation of food intake.

This involves the study of several signal transduction pathways, the cytoskeleton, the extracellular matrix, integrins, nuclear action mechanisms, as well as ionic channels and hormone maturation. State-of-the-art electrophysiology and biochemistry techniques are thus available.

Integrated and multidisciplinary approach features active research collaborations between basic research and clinician scientists, innovative research projects and state-of-the-art equipment.

Diabetes, Obesity and Cardio-vascular related research chairs include two Canada Research Chairs:

- The Canada Research Chair on Aging on Use of Dietary Fatty Acids and Cognitive Functions During Aging Process (Stephen Cunnane)
- The GlaxoSmithKline Research Chair on Diabetes
Molecular and Structural Pharmacology
Coordinator: Pierre Lavigne
Clinical Research Center Cardio-vascular Disease Research Axis Director: Pedro D’Orléans-Juste

Molecular and Structural Pharmacology thespectives combine expertise of clinicians, pharmacologists, molecular biologists, cellular biologists, biophysicists and chemists to uncover new therapeutic targets for pathologies such as cancer and cardio-vascular diseases. Researchers work together through the Centre de recherche en pharmacologie structurale (CREPSUS). Four themes are developed:

Identification of Therapeutic Targets: The first step to the discovery of new therapeutic targets is the identification, within cells of target organs from healthy and diseased animal models, of protein complexes which vary in composition, nature and localization, and to relate their differences to a modification in cellular signal transduction. Investigators identify such targets by proteomics.

Structural Pharmacology of G-Protein Coupled Receptors (GPCRs): Our scientists have developed an expression Platform, which is unique in Canada, for the biosynthesis, purification and folding of GPCRs. This Platform will enable the resolution of the 3-D structure of the inactive form of a GPCR (e.g. in the absence of its ligands) as well as its active form. Our scientists have the required expertise to monitor, model and characterize the precise changes in GPCR structure.

Functional Validation of Therapeutic Targets and Agents: Our expertise in systemic pharmacology include work on cellular and animal models to study pathologies such as brain tumors and hypertension. Investigators validate the existence of expected protein-protein interactions. Correlation of physiological effects and the presence of such interactions enable the validation of novel therapeutic targets.

Development of New Biophotonic Technologies: Professors at the Department of Electrical Engineering and Computer Sciences and the Department of Pharmacology collaborate on Biosensor micro-fabrication to detect protein-protein interactions and signal transduction. Such novel technologies are expected to enable the detection and measurement of protein-protein interactions directly within an animal.

Molecular and Structural Pharmacology related research chairs include two Canada Research Chairs:

- The Canada Research Chair in Nanopharmacology and Atomic Force Microscopy (Michel Grandbois)
- The Canada Research Chair on Cell Pharmacology (Christine Lavoie)

Principal Achievements

- 1.7M$ from the Québec Ministère du développement économique, innovation et exportation, for the optimisation of selective inhibitors of proprotein convertases as effective antiproliferative agents (Rober Day).

For more information, please visit the following website:

http://www.usherbrooke.ca/ips/
Digestive Physiopathology
Coordinator: Jean-François Beaulieu
Clinical Research Center Digestive Physiopathology Research Axis Director: François Boudreau

Digestive physiopathology research thematics feature unique human cellular and organ study models, transgenic animal models, as well as viral and microinjection transgenic techniques in human epithelial cells.

Research themes mainly concern the functional and pathological development of the stomach and intestine, and adult digestive physiopathology particularly with respect to diseases such as necrosing enterocolitis, colorectal cancer, chronic inflammation, Crohn’s disease, ulcerative colitis as well as corresponding animal and cellular models. Investigators also study:

- the regulation of cell proliferation, differentiation and survival;
- the role of cellular interactions with the matrix in controlling digestive functions;
- intracellular signal transduction;
- the molecular mechanisms involved in gene transcription during intestinal cell renewal;
- the analysis and characterization of stem cells;
- understanding epithelio-mesenchymal interactions;
- cell cycle regulation;
- the molecular mechanisms underlying human enterocyte anoikis;
- intestinal absorption and malabsorption; and
- the intestinal epithelial cell genome and proteome.

Our scientists’ ultimate goal is the identification of novel diagnostic and therapeutic targets aimed at paediatric and adult gastroenterological diseases.

Digestive physiopathology related research chairs include two Canada Research Chairs:

- The Canada Research Chair in Digestive Physiopathology (Jean-François Beaulieu)
- The Canada Research Chair in Intracellular Signalling and Digestive Physiopathology (Nathalie Rivard)
Inflammation and Immunity
Coordinator: Marek Rola-Pleszczynski
Clinical Research Center Immuno-inflammation Axis Director: Claire Dubois
Osteo-articular Axis Director: Jean-Luc Parent
Pulmonary Physiopathology Research Axis Director: André Cantin

Immuno-inflammation, respiratory health and osteo-articular physiopathology research bring basic research and clinician scientists together to study the cellular and molecular interactions of the immune and inflammatory response. Such interactions have wide applications with respect to pathologies such as allergic and auto-immune diseases, pulmonary and articular inflammation, as well as atherosclerosis, cancer, and pain.

Basic research activities in immunology and inflammation concern:

- the role and regulation of immune response receptors, the nature of intracellular signals they emit and the regulation of their expression
- the molecular mechanisms of cytokine action and production, hematopoietic growth factors and other inflammatory and immune response mediators
- lymphocyte activation mechanisms in auto-immune inflammatory diseases
- the regulation of bone metabolism in articular inflammatory diseases, and
- the mechanisms of extravascular migration in inflammatory reactions and the distribution of integrins in lipid rafts.

Pulmonary physiopathology research concerns:

- pulmonary inflammation,
- the modulation of the asthmatic immune and inflammatory responses to zinc,
- transcriptional control of neutrophile early-inflammatory-response genes,
- neuropeptides and bronchoreactivity,
- the role of antioxidants and oxidants in pulmonary fibrosis
- the molecular, cellular and tissular events of cystic fibrosis at the pulmonary level, and
- fundamental mechanisms of sepsis in intensive-care-unit hospitalized subjects.

Osteo-articular physiopathology research concerns:

- the study of prostanoïd receptors
- the study of bone metabolism (osteoblast/osteoclast interactions), and
- the study of autoimmunity (autoantigen characterization, prognosis assessment of patients with onset of polyarthritis, participation in multicentric studies on Systemic Lupus Erythematosus).

Inflammation and Immunity research chairs include two privately endowed Chairs:

- The Quebec Lung Association Research Chair in Respiratory Health (Pierre Larivée)
- The André-Lussier Chair in Rheumatology (Jean-Luc Parent)
Development, Growth and Genetics
Coordinator: Jean-Paul Praud
Clinical Research Center Mother-and-Child Research Axis Director: Jean-Paul Praud

Development, Growth and Genetics research thematics concern clinical paediatrics, maternal and foetal aspects of health research issues, as well as the development of novel biomedical equipment.

Basic research projects concern different aspects of foetal and newborn health:

- the pathogenesis of cerebral palsy (neonatal cerebral inflammation and anoxia)
- respiratory problems of the newborn (preterm apnea-bradycardia and sudden infant death syndrome)
- liquid ventilation of neonatal respiratory distress, and
- the physiopathology of undesirable outcomes of pregnancy such as prematurity, placental anomalies, premature membrane rupture, foetal exposition to environmental contaminants.

Clinical research projects concern:

- the pre- and post-natal detection of congenital diseases
- the development of parent-child relationships, and
- the multiple pathologies of newborn, children and adolescents.

Health systems and healthcare research concern the prevention of prematurity and community education.

Public health and populations' research includes the study of the determinants of prematurity and several databases on premature births and cerebral palsy.

Genetic research related to paediatrics' concerns two main axes:
1) reproduction and prenatal diagnosis, identification of the genetic causes underlying spontaneous abortion and the understanding of fertilization arrest
2) study of individual chromosome telomere length with respect to age and leukemia.

Development, Growth and Genetics related research chairs include two Canada Research Chairs:

- The Canada Research Chair in Genetics, Mutagenesis and Cancer (Régen Drouin)
- The Canada Research Chair in Neonatal Respiratory Physiology (Jean-Paul Praud)

Principal Achievements

- Unique ovine research facility for perinatal research
Neurosciences
Coordinator: Philippe Sarret
Clinical Research Center Pain Research Axis Director: Serge Marchand

Neurosciences are rapidly emerging as a research priority at the Sherbrooke Faculty of Medicine and Health Sciences with a core of talented young investigators with internationally recognized expertises in pain, neuro-oncology, neuro-paediatrics, neuro-endocrinology and neuro-psychology of aging.

At the Sherbrooke Faculty of Medicine and Health Sciences, research into Neurosciences is expanding rapidly and is supported by a dynamic team of basic and clinician scientists who work together to optimize the transfer of new knowledge from bench to bedside and back to bench. Neuroscience research thematics tend, for the most part, to be approached from both the basic science and clinical standpoints.

Highly specialized investigators from different University Hospital departments and divisions are conducive to innovative research collaborations and projects on:

- Chronic pain and cancer, arthritis and neuropathic diseases
- Diffuse pain in relation to gender and development
- The impact of stress on the response to pain
- Cerebral cancer treatment by transient opening of the blood-brain barrier
- The development of neuroprotective treatments to reduce perinatal cerebral palsy
- The impact of lipids on aging of the brain
- The role of prions in neurodegeneration, and
- The integration of MRI and TEP medical imaging within all neurosciences thematics.

Most of the researchers in this field are members of the Université de Sherbrooke Neuroscience Centre, directed by Philippe Sarret.

Neurosciences related research includes one privately endowed Chair:

- The National Bank of Canada Research Chair in Neuro-Oncology (David Fortin)

For more information, please visit the following website:

http://www.med.usherbrooke.ca/cns
Novel Health Interventions
Director of the Charles LeMoyne Hospital Research Center: Jean Cusson
Clinical Research Center Interdisciplinary Health Research Axis Director: Alain Vanasse

Health interventions take into account multiple expertises and cover a wide range of measures for curative, preventive and rehabilitation purposes, featuring hospital and community resources. Identifying organizational factors and setting up novel interventions are two important aspects of Health Intervention research. Novel Health Interventions are at the heart of the Charles LeMoyne Hospital Research Center's mission. Primary care research is also a research priority at the Chicoutimi Health and Social Services Center, to which a number of the Family Medicine Department professors are affiliated. Part of this expertise is also developed at the Sherbrooke University Hospital Clinical Research Center, via the Interdisciplinary Health Research Axis.

At the Charles LeMoyne Hospital Research Center, several specific research axes concern:

- Prevention of work incapacities
- Emergency services and primary care
- Efficient interventions in oncology
- Professional best practices, and
- Mental Health and aging
- Drug addiction
- Gambling problem
- High-risk driving behaviors

The Interdisciplinary Health Research Axis brings together investigators from different disciplinary horizons for evaluative health research projects that are collaborative and complementary in nature and concern the following thematics:

- Healthcare services’ integration and organization
- Informatics and information and knowledge management
- Technology transfer assessment
- Professional practice support.

Epidemiology and Infectiology Research on transmissible diseases is mostly conducted at the Sherbrooke University Hospital Clinical Research Center and at the Charles LeMoyne Hospital Research Center and concerns a wide range of specific areas such as:

- Epidemiology and Physiopathology if infectious diarrheas
- The study of sexually transmitted diseases
- Novel therapeutic approaches to HIV
- Nosocomial infections and epidemiological studies (Clostridium difficile, influenza, methicilline resistant Staphylococcus aureus, etc.), study of risk factors, diagnostics and prevention.

Novel Health Interventions’ research chairs include three privately endowed Chairs:

- The Research Chair in Occupational Therapy (Marie-Josée Durand)
- The CIHR Applied Chair in Health Services and Policy Research on Chronic Diseases in Primary Care (Martin Fortin)
- The Research Chair in Drug Addiction (Élise Roy)

For more information, please visit the following website:

http://www.hclm.qc.ca/fr/index.jsp
Research Chairs
Canada Research Chairs

There are two types of Canada Research Chairs:

**Tier 1 Canada Research Chairs**, tenable for seven years and renewable, are for outstanding researchers acknowledged by their peers as world leaders in their fields.

Active Tier 1 Canada Research Chairs at the FMHS are:

Jean-François Beaulieu
**The Canada Research Chair in Digestive Physiopathology**
Objective: to explain the mechanisms that regulate gene expression in the cells that form the human intestinal system, both healthy and diseased.

Benoît Chabot
**The Canada Research Chair in Functional Genomics**
Objective: to study alternative splicing of ribonucleic acid (RNA).

Stephen Cunnane
**The Canada Research Chair on Use of Dietary Fatty Acids and Cognitive Functions During Aging Process**
Objective: To understand the relationship between the body's use of fatty acids and the maintenance or loss of cognitive functions during the aging process.

Regen Drouin
**The Canada Research Chair in Genetics, Mutagenesis and Cancer**
Objective: Using an advanced genome sequencing technology, to study damage to DNA in skin cells by sun (ultraviolet) rays; genetic repair mechanisms; and control of expression of genes involved. To develop a diagnostic test of trisomy 21 from fetal cells in maternal blood.

Jean-Pierre Perreault
**The Canada Research Chair on Genomics and Catalytic RNA**
Objective: To explain molecular mechanisms of ribozymes and viroids and develop related technological applications.

Jean-Paul Praud
**The Canada Research Chair in Neonatal Respiratory Physiology**
Objective: To increase our understanding of crucial aspects of neonatal respiratory physiology and to transfer it to the daily care of newborns and infants

Raymund Wellinger
**The Canada Research Chair in Telomeres Biology**
Objective: To uncover and understand the mechanisms governing chromosome stability and how telomere biology integrates into these mechanisms

Previously owned Tier 1 Canada Research Chairs at the FMHS:

Nicole Gallo-Payet
**The Canada Research Chair in Endocrinology of the Adrenal Gland**
Objective: To determine the role of the adrenal gland in the development of hypertension, insulino-resistance and stress-related diseases
Marek Rola-Pleszczynski  
The Canada Research Chair in Inflammation  
Objective: High-resolution imaging of cells and molecules to test theories about inflammation and immune responses

Léon Sanche  
The Canada Research Chair in Radiation Sciences  
Objective: Micro-analysis of ultra-fast radiation damage

**Tier 2 Canada Research Chairs**, tenable for five years and renewable once, are for exceptional emerging researchers, acknowledged by their peers as having the potential to lead in their field.

Active Tier 2 Canada Research Chairs at the FMHS are:

Michel Grandbois  
The Canada Research Chair in Nanopharmacology and Atomic Force Microscopy  
Objective: Use of atomic force microscopy to study the properties of collagen-based tissues.

Christine Lavoie  
The Canada Research Chair on Cell Pharmacology  
Objective: To use cell-imaging techniques to determine functional interactions between signalling and intracellular trafficking processes.

Martin Lepage  
The Canada Research Chair in Magnetic Resonance Imaging  
Objective: To promote the development, synthesis and biological validation of "intelligent" contrast agents for use in magnetic resonance imaging (MRI).

Nathalie Rivard  
The Canada Research Chair in Intracellular Signalling and Digestive Physiopathology  
Objective: To study the intracellular signalling mechanisms that control the renewal and differentiation of cells in the human alimentary canal.

Previously owned Tier 2 Canada Research Chairs at the FMHS:

Brendan Bell  
The Canada Research Chair in Genomics Regulation  
Objective: elucidate the mechanisms of gene expression in cancer and AIDS

Jeannie Haggerty  
The Canada Research Chair on Population Impacts of Primary Health-Care Organization and Practice  
Objective: To study patients' experiences with health-care system to develop and refine tools for the evaluation of health services from the patient perspective.
Research Chairs
Privately Endowed Research Chairs

There are currently 10 privately endowed research chairs at the FMHS:

Holder to be announced in 2011
The GlaxoSmithKline Research Chair on Diabetes
Marie-José Durand
The Research Chair in Occupational Therapy
J. Armand Bombardier and Pratt & Whitney Canada Foundation
David Fortin
The National Bank of Canada Chair in Neuro-Oncology
Martin Fortin
The CIHR* Applied Chair in Health Services and Policy Research on Chronic Diseases in Primary Care
Pierre Larivée
The Quebec Lung Association Chair in Respiratory Health Research
Jean-Luc Parent
The André-Lussier Chair in Rheumatology
Hélène Payette
The Merck-Frosst Chair in Pharmaco-Geriatrics
Élise Roy
The Research Chair in Drug Addiction
Christina St Onge
The Research Chair in Medical Teaching from la Société des médecins de l’Université de Sherbrooke
Johannes van Lier
The Jeanne and Jean-Louis Lévesque Chair in Radiobiology

Previously owned privately endowed Research Chair at the FMHS:

Serge Marchand
The joint UQAT-UdeS Chair in Pain Physiopathology
Université du Québec en Abitibi-Témiscamingue – Université de Sherbrooke

Marianne Xhignesse
The Lucie and André Chagnon Chair for Teaching the Integrated Approach in Prevention

* Canadian Institutes of Health Research
Research Centers and team

The following teams of investigators at the FMHS are recognized and funded as Centers or team of Excellence by the Université de Sherbrooke.

The Research Center in the Biology of Digestive Epithelia
Principal investigator: Daniel Ménard

The Research Center in Endocrinology, Metabolism and Cell Signalling
Principal investigator: A. Carpentier

The Research Center in Radio-Oncology
Principal investigator: Benoît Paquette

The Research Center in Structural Pharmacology from Université de Sherbrooke
Principal investigator: Pierre Lavigne

The Research Center on RNA Biology
Principal investigator: Jean-Pierre Perreault
http://riboclub.org/cgi-bin/RiboWeb/index.pl?page=index_en

The Research and Teaching Center in inflammation from Université de Sherbrooke
Principal investigator: Marek Rola-Pleszczynski

The Sherbrooke Molecular Imaging Center
Principal investigator: Roger Lecomte

The Sherbrooke Center of Neurosciences
Principal investigator: Philippe Sarret

The Charles LeMoyne Hospital Research Center
Principal investigator: Jean Cusson

The Perinatal Research Team in ovine models
Principal investigator: Jean-Paul Praud