

CENTRE DE  
RECHERCHE



2021-2022 Annual Report

Our  
**KNOWLEDGE**  
brings  
**HOPE**

# DISCOVERIES OF THE YEAR

## CANCER: BIOLOGY, PROGNOSIS AND DIAGNOSIS AXIS

### The Intestinal Epithelium and its Central Role in Adipose Tissue Metabolism

**François Boudreau** and his team are focusing on the role played by the HNF4A nuclear receptor in the intestinal epithelium. They have demonstrated that defects in HNF4A restrict production of the incretin hormone GIP. This hormone allows the intestine to communicate with adipose cells, enabling them to store lipids from food intake. However, removing the HNF4A forces the body to use its reserves as a source of energy, even with a high-fat diet. This discovery could be highly beneficial to people suffering from diabetes, helping them regain a better quality of life and even reverse a recent diagnosis of diabetes. Diabetes and the metabolic abnormalities associated with it can contribute to the development of several digestive cancers with poor prognosis. A discovery that led to its publication in the [Nature Communications](#) journal.

## DIABETES, OBESITY AND CARDIOVASCULAR COMPLICATIONS AXIS

### Fructose, the Harmful Sugar

In collaboration with McMaster University, a CRCHUS team has identified the harmful effects of a high-fructose diet. Fructose is found in sugary drinks, among other foods, and affects healthy gut bacteria (microbiome) and brown fat. Brown fat burns energy in the form of sugar and fat, but on a high-fructose diet, brown fat consumes less sugar. This could increase the harmful effects of fructose on health.

**Gabriel Richard, Denis P. Blondin, Mélanie Fortin, Serge Phoenix, Frédérique Frisch, Stéphanie Dubreuil, Brigitte Guérin, Dr. Éric E. Turcotte, Martin Lepage and Dr. André C. Carpentier** are members of the team that [published these interesting results](#).

## MEDICAL IMAGING AXIS

### Diagnosing a Rare Form of Epilepsy Using Tractography

Insular epilepsy is a rare form of the disorder and is difficult to diagnose without surgery. Using white matter bundle tractography, **Maxime Descoteaux's** team (CRCHUS) and Sami Obaid (UdeM) have succeeded in [mapping the epileptic network](#) specific to insular epilepsy. This "imprint" represents a promising tool that could help diagnose insular epilepsy in a non-invasive way, thus enabling more optimal treatment for those affected by the disorder.

## INFLAMMATION-PAIN AXIS

### Mélanie Morin's Team Has Found an Alternative Treatment for Vestibulodynia

Vestibulodynia is chronic pain in the area around the vagina that affects a large number of women. To date, the most widely used treatment is local anesthetic cream. A clinical trial conducted by **Mélanie Morin's** team compared this common treatment to a physical therapy approach with two hundred women over a 10-week period. [The multimodal physical therapy delivered better outcomes at all levels](#), and these results were maintained six months after treatment. In the physical therapy group, 79% of patients reported improvement versus 39% in the topical treatment group. Based on these data, the team can readily recommend the physical therapy approach to first-line workers.

## MOTHER-CHILD AXIS

### Samuel Blais, Dr. Alain Vanasse and Dr. Frédéric Dallaire Have Completed a Broad Retrospective Study on Tetralogy of Fallot

This project, which included all patients with tetralogy of Fallot born in Quebec between 1980 and 2015, demonstrated the [superiority of a surgical approach preserving the function of the pulmonary valve](#). The team also proved that a surgical approach resulted in a higher survival rate and reduced the number of reoperations undergone by children in the long term. The project demonstrated the feasibility of a population-based retrospective cohort study with a follow-up of more than 30 years.

## HEALTH: POPULATIONS, ORGANIZATION, PRACTICES AXIS

### A Case Study with a Participatory Approach: Methodological Innovation in Implementation Science

In an article published in the [Annals of Family Medicine](#), the most prestigious family medicine journal, **Dr. Catherine Hudon** and her team propose a methodological innovation by designing a case study with a participatory approach. A participatory approach involving stakeholders was added to the research design established on the case study that is frequently used in research on health services. The team proposes 12 operational steps that follow the example of the Canada-wide PriCARE program led by Dr. Hudon's team. This new way of doing things seems very promising for the field of implementation science.



# HIGHLIGHTS

## A Donation of \$470,000 from the CHUS Foundation to Improve the Diagnosis of Bladder Cancer

Bladder cancer is the fifth most common cancer in Canada and incidence rates are constantly increasing. [\*Researchers Dr. Claudio Jeldres, Martin Bisaillon and Francois-Michel Boisvert were awarded this significant financial support\*](#) to design a test for the early and non-invasive detection of the presence of blood in urine, a potential sign of bladder cancer. By using specific biomarkers, this test could replace cystoscopy, which is currently the only test available to diagnose bladder cancer.

## \$1 Million to Support the Research Project on Developmental Disorders in Youth Led by Chantal Camden

The Chaire de Recherche GRAND-IR Research Chair, led by researcher **Chantal Camden**, was awarded [\*\\$1,000,000 by the CHUS Foundation thanks to a contribution from the National Bank\*](#) (\$500,000). GRAND-IR is also the first and only CRCHUS research chair. This money will support the development of projects enabling early detection and intervention for children with developmental delays who are living in vulnerable situations.

## Impact Article by Dimitri Ryzcko's Team in the Proceedings of the National Academy of Sciences (PNAS)

[\*Using optogenetics, researcher Dimitri Ryzcko's\*](#) team has targeted the region of the brain that controls locomotion. Optogenetics makes it possible to activate neurons in a specific way and could have a significant impact on the treatment of Parkinson's disease.

## Quebec COVID-19 Biobank (BQC19): A Source of Hope for Those Affected by the Disease

This [\*biobank is a province-wide initiative\*](#) that collects, stores and shares biosamples and clinical data from patients with severe and non-severe forms of COVID-19 in order to effectively respond to the public health challenges posed by the pandemic. The biobank was established by a group of researchers, including **Karine Tremblay** from the CRCHUS. Moreover, **Dr. Alain Piché**, also a researcher at the CRCHUS, is a member of the BQC19 Steering Committee.

## Implementing the Équilia Mental Health Platform at the CRCHUS: Facilitating Access to Effective Programs for Anxiety and Depression

The research team led by CRCHUS researcher **Pasquale Roberge**, and Helen-Maria Vasiliadis, received major funding from the Canadian Institutes of Health Research (CIHR; \$478,000 for perinatal care, \$675,000 for social anxiety disorder) and the CHUS Foundation (\$300,000 contribution from the RBC Foundation). These funds will support the implementation and clinical evaluation of several [\*web-based programs based on cognitive behavioural therapy\*](#) for anxiety and depression, and facilitate access to proven mental health interventions for the general population.



# NEW RESEARCH CHAIRS

## Dr. Patrick Richard Has Launched the Chaire du Centre de Recherche Médicale de l'Université de Sherbrooke (CRMUS) sur le Traitement de Masses Rénales (CRMUS Chair on the Treatment of Renal Masses)

The CRMUS Chair will enable **Dr. Richard** to advance his research on the subject, namely on urinary tract and prostate cancer, diagnosis and detection of cancer, community health and public health.

## Martine Shareck Was Awarded the Canada Research Chair in Urban Health Equity and Young People

**Martine Shareck** was awarded the Tier 2 Canada Research Chair in Urban Health Equity and Young People. Her research aims to understand the etiology of social inequalities in health in urban areas, to assess innovative interventions in order to better understand what works and to find solutions to these inequalities. (*Erratum – 2020–2021 Annual Report*)



## DISTINCTIONS

### A Tribute to Researchers as Part of the 100<sup>th</sup> Anniversary of Insulin

The year 2021 marked the 100<sup>th</sup> anniversary of the discovery of insulin. For the occasion, the CIHR paid tribute to Canadian investigators whose research on diabetes is leading to advances in treatment and prevention: [Dr. André Carpentier was among those honoured for their work.](#)

### Royal Society of Canada Honours Bestowed on Three Researchers

[This prestigious recognition](#) was awarded to **Maxime Descoteaux**, **Dr. Catherine Hudon** and **Dr. François Lamontagne**, highlighting their remarkable scientific contribution to the field of health research.

### The First Titles of Researcher Emeritus Bestowed by the CRCHUS and the 2021–2022 Persons of the Year

The achievements of several people were highlighted over the year. Among our persons of the month, **Brigitte Guérin** and **Louis Valiquette** were tied for the title of Researcher of the Year. **Amélie Tétu** was honoured as [Professional of the Year](#) and the recognition of [Student of the Year](#) was awarded to **Meysam Khosravifarsani**.

**Nicole Gallo-Payet** and **Andrew Grant** were named [Researcher Emeritus](#), the highest distinction awarded to any researcher by the CRCHUS.

## OUTREACH

### Dr. Alex Carignan in the Media to Discuss COVID-19 and Lyme Disease

**Dr. Carignan** has made appearances on various media platforms in Quebec, including [98.5 FM](#), to inform the public about the COVID-19 pandemic and about Lyme disease.

### A Smart Bra Making It Easier to Detect Breast Cancer

Medical Imaging Axis researcher **Elijah Van Houten** and Interdisciplinary Institute for Technological Innovation researcher Alexis Lussier Desbiens have attracted the interest of various media with their smart bra prototype to detect and monitor breast cancer. Listen to the interviews on [Mongrain PM](#), 98.5 FM, and on the [Par ici l'info](#) program on Ici Première.





# PATIENT PARTNERSHIP

Again this year, the Patient Partner Strategic Committee (CSPP) initiated several projects to leverage the experience and expertise gained from living with a disease and use it in the service of research.

## Junior Researchers at the CRCHUS – You are Never Too Young to Start Investigating!

This is the very first research initiated and conducted by children in Quebec and their presence gained significant attention: The Quebec Ministère de la Santé et des Services sociaux awarded them the 2021 Prix de cancérologie and they were named CRCHUS [researchers of the month](#). Radio-Canada's show, Moteur de recherche, also did a feature on them last December.

## The 1 855 561-ROSE Line: Listening to Women Awaiting a Breast Cancer Diagnosis

A [new telephone support line was set up](#) thanks to the collaborative efforts of CRCHUS patient partner Catherine Wilhelmy and Université de Sherbrooke Faculty of Medicine and Health Sciences associate professor Marie-Claude Battista. The Quebec Breast Cancer Foundation enabled this initiative in order to support and help prepare women in the period prior to a breast cancer diagnosis.



## Involvement and Contribution

Patient partners are involved in five research projects as co-investigators; three research projects were initiated by patients and three patient partners have been trained in good clinical practice and ethics.

The CSPP is a significant contributor to the development of patient partnerships across the province: Scientific co-management of the Unité de soutien SSA Québec and leadership in the provincial patient partner community of practice.

# STUDENT SUCCESS STORIES



Master's student **Daphnée Carrier (Health: Populations, Organization, Practices Axis)** is the recipient of several awards and scholarships, including the prestigious Frederick-Banting and Charles-Best Canada Graduate Scholarship from the CIHR.

PhD student **Andrée-Anne Clément (Diabetes, Obesity and Cardiovascular Complications Axis)** received the Young Investigator Award presented at the Congress of the International Society for the Study of Hypertension in Pregnancy.

Pharmacology PhD student **Jade Degrandmaison (Inflammation-Pain Axis)** received the [FRQS Relève étoile Jacques-Genest award](#). This award is given to student investigators who distinguish themselves through the excellence of their research.

Université de Sherbrooke kinanthropology PhD student **Raphaël Hamel (Medical Imaging Axis)**, received the [Relève étoile Louis-Berlinguet award](#) from the Fonds de recherche québécois – Nature et technologie (FRQNT) for his article entitled, Learning the same motor task twice impairs its retention in a time- and dose-dependent manner, which was published in Proceedings of the Royal Society B: Biological Sciences.

**Maude Hamilton (Cancer: Biology, Prognosis and Diagnosis Axis)** received the Quebec Lieutenant Governor's Youth Medal for her student involvement as well as an honourable mention from the Dean of the Université de Sherbrooke Faculty of Medicine and Health Sciences for the quality of her research and excellent university curriculum.

**Elizabeth Svoboda (Mother-Child Axis)** was among the four recipients of the oral communications Coup de Coeur award at the 30<sup>th</sup> annual meeting of the Société Québécoise de l'Hypertension Artérielle.



## DEDICATED PEOPLE

**303**  
RESEARCHERS

**182**  
RESEARCH  
PROFESSIONALS

**900**  
STUDENTS

# CRCHUS IN NUMBERS

**\$44.8 million**  
annual budget

**6** RESEARCH AXES

**13** CANADA RESEARCH  
CHAIRS

**1,033**  
SCIENTIFIC  
PUBLICATIONS

**1,368**  
ACTIVE RESEARCH  
PROJECTS

## FUNDING SOURCES FOR THE 2021–2022 PERIOD

Fonds de recherche du Québec – Santé (FRQS) Grant (Centre)	\$2,459,963
Grants from FRQS-recognized organizations	\$18,042,122
Scholarships from FRQS-recognized organizations	\$5,716,909
Research contracts with the private sector	\$5,245,704
Sales and services	\$2,104,978
Contribution of the CIUSSS de l'Estrie – CHUS and the CHUS Foundation	\$809,722
Donations for teaching and research	\$64,250
CFI/John R. Evans Leaders Fund/IOF	\$1,645,731
Grants not recognized by the FRQS	\$4,920,235
Scholarships not recognized by the FRQS	\$2,069,652
Other income*	\$1,742,873
<b>Annual budget</b>	<b>\$44.8 million</b>

\*NPO, non-Canadian agencies, Quebec Agency, MSSS and healthcare organizations.

Note: The total amount of funding reported here may differ from that in the Centre Hospitalier Universitaire de Sherbrooke financial statements as some partner grants are managed by the Université de Sherbrooke.

RESEARCH AXES	UNIVERSITY RESEARCHERS	UNIVERSITY CLINICAL RESEARCHERS	ASSOCIATE RESEARCHERS	STUDENTS			SCHOLARSHIPS AND GRANTS (RGAS*)	CONTRIBUTION TO PUBLICATIONS
				MSc	Ph D	Postdoc		
Cancer: Biology, Prognosis and Diagnosis	36	11	14	55	72	18	7 056 274 \$	171
Diabetes, Obesity and Cardiovascular Complications	18	10	13	39	39	9	2 835 656 \$	148
Medical Imaging	28	4	2	80	78	23	2 362 460 \$	122
Inflammation-Pain	38	18	7	103	91	18	4 910 699 \$	163
Mother-Child	20	16	26	71	57	15	3 845 653 \$	176
Health: Populations, Organization, Practices	16	20	6	75	48	9	2 748 290 \$	253
<b>TOTAL</b>	<b>303</b>			<b>900</b>			<b>23,759,032 \$</b>	<b>1,033</b>

\*Recognized granting agencies.



## Contact us

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Our partners:

