

CENTRE DE
RECHERCHE



2023–2024 Annual Report

Our
KNOWLEDGE
brings
HOPE

DISCOVERIES OF THE YEAR

CANCER: BIOLOGY, PROGNOSIS AND DIAGNOSIS AXIS

Ribose Synthesis Opens New Pathways to Cancer Cures

The [research](#) conducted by Professor **François Bachand's** team has revealed a novel mechanism by which RNA-binding proteins, such as Seb1, regulate the progression of RNA polymerase I. This enzyme synthesizes ribosomal RNAs (rRNAs), which are essential for ribosome production. Increased rRNA synthesis and maturation contribute to cancer cell proliferation and survival, which often rely on elevated ribosome production for rapid growth. Understanding how proteins control ribosome synthesis and maturation could lead to therapies targeting this process, potentially slowing or halting tumour progression.

DIABETES, OBESITY, AND CARDIOVASCULAR COMPLICATIONS AXIS

Additional Tools to Protect People Living with Diabetes

Diabetic kidney disease remains a major health issue, impacting patients' quality of life. Current treatments fail to target the dysfunction and loss of podocytes—cells crucial for kidney filtration. This [study](#), conducted by Professors **Pedro Geraldes**, **Dr. Anne-Marie Côté**, and **François-Michel Boisvert**, has shown that preventing diabetes-induced expression and activity of the protein SHP-1 restores podocin stability, essential for podocyte function. The team also discovered a novel mechanism where SHP-1 disrupts protein stability by modulating SUMOylation, leading to degradation. Inhibiting SHP-1 could protect against diabetes-induced podocyte dysfunction, helping to identify at-risk individuals and providing additional therapeutic options.

MEDICAL IMAGING AXIS

New Advances in Tractography

Researchers at the CRCHUS and Université de Sherbrooke, including **Maxime Descoteaux** and **Pierre-Marc Jodoin**, have made advances in tractography, an MRI-based technique for mapping axonal fibre pathways in the brain. They developed deep neural networks to analyze brain connectivity, enhancing the understanding of neurodegenerative diseases. Their [GESTA method](#) (Generative Sampling in Bundle Tractography using Autoencoders) addresses gaps in axonal fibre analysis. A [second publication](#) features their reinforcement learning-based approach to create the first neural network capable of surpassing traditional tractography methods in accuracy.

In accordance with section 58.1 of the [Professional Code](#) (chapter C-26), only medical, dental and veterinary doctors may use the title of "Doctor" or an abbreviation of this title (Dr.) without restriction.

DISCOVERIES OF THE YEAR

HEALTH: POPULATIONS, ORGANIZATION AND PRACTICES AXIS



The Importance of Diversity and Representation in Clinical Practice Guidelines

Félix Camirand-Lemyre, Dr. François Lamontagne and their teams carried out this project based on a [large cohort study](#) of 434,851 severe COVID-19 cases across 54 countries. They observed that 40.1% of patients received corticosteroids, as recommended by the WHO, with significant geographical variations in usage. Countries not involved in clinical trials contributing to these guidelines showed slower adoption rates. The study underscores the importance of diversity and representation in clinical trials to promote rapid adoption of best practices globally.

INFLAMMATION-PAIN AXIS

A New Therapeutic Avenue for Muscular Dystrophies

Published in [Science Translational Medicine](#), **Florian Bentzinger's** team identified Apelin-13 (AP-13), a hormone involved in blood vessel formation, as a potential treatment for muscular dystrophies. These genetic disorders often affect children, leading to muscle function loss. The team found that skeletal muscle microvessels are reduced in many dystrophies. By enhancing vascularization around stem cells, AP-13 supports regenerative functions, slowing disease progression and strengthening muscle fibres without adverse effects on the heart or circulatory system. This discovery could lead to effective treatments for these rare diseases.

MOTHER-CHILD AXIS

New Evidence of Quiescent Cells in the Small Intestine

Published in [Cells](#), **Jean-François Beaulieu's** team studied primary cilia, sensory organelles on cell surfaces transmitting signals for tissue homeostasis and cancer development. Most quiescent cells bear primary cilia, yet differentiated villous cells and crypt progenitors in the small intestine are devoid of them. The team identified a second population of quiescent crypt cells with primary cilia. This discovery suggests new regulatory mechanisms in stem cell dynamics, offering insights into inflammatory or cancerous intestinal diseases.





HIGHLIGHTS

Improving Personalized Care for Patients with Type 2 Diabetes

Dr. André Carpentier and Dr. Vincent Poitout (Université de Montréal) secured significant funding from the Canada Foundation for Innovation (CFI) for their project *Imaging T2D*. Along with CRCHUS researchers **Martin Lepage** and **Brigitte Guérin**, they will establish new molecular imaging infrastructures in Sherbrooke and Montreal (totalling \$16.4 million). The goal is to better understand the dynamic changes in adipose tissue, the liver, pancreas, and brain during Type 2 diabetes progression, ultimately enabling more personalized care for those affected by the disease (9% of the population).

A Major Grant to Develop Integrated Patient Care

Dr. Catherine Hudon and her team received a \$2 million grant from the Canadian Institutes of Health Research (CIHR) and the Fonds de recherche du Québec – Santé (FRQS). This [funding](#) supports the PriCARE Integration program; PriCARE Integration—Case management in primary healthcare for people with complex healthcare needs to improve integrated care: *a large-scale implementation study (2023–2028), focusing on case management in primary care for people with complex needs*.

A Success Story for Sherbrooke Innovation

In 2005, a research project funded by the Conseil du médicament sparked a collaboration between **Dr. Louis Valiquette** (Microbiology and Infectious Diseases Department) and Froduald Kabanza (Computer Science Department). Students Vincent Nault and Mathieu Beaudoin later co-founded Lumed, specializing in clinical decision-support software for hospitals. This software optimizes the prescription of antibiotics, infection monitoring, and oncology protocol management. In January 2024, French diagnostics company bioMérieux acquired Lumed, enabling Sherbrooke's expertise to be shared globally to benefit patients worldwide.

A Major Breakthrough in Pancreatic Cancer Treatment

Pr. Marie-Josée Boucher and her team's fundamental research has paved the way for more effective pancreatic cancer treatments. They [demonstrated](#) that combining two therapeutic strategies can reduce chemotherapy resistance, offering hope for improved survival rates. Preclinical validation studies are underway.

Motivational Interviewing Improves Vaccination Knowledge

Dr. Arnaud Gagneur received \$185,000 from the Public Health Agency of Canada's [Immunization Partnership Fund](#) for the *MIKOVAC* project. This project aims to implement an accessible vaccination promotion approach for Canadian parents using [motivational interviewing techniques](#). Additional funding from the Provence-Alpes-Côte d'Azur Regional Health Agency will expand this expertise to train health mediators in Marseille, France for similar vaccination initiatives.



HIGHLIGHTS

Hope for the Management of Extremely Premature Infants

Extremely premature infants (22–23 weeks gestation) face significant challenges, namely cardiopulmonary issues. [Research](#) by **Drs. Étienne Fortin-Pellerin, Olivier Lesur, and Jean-Paul Praud** explored liquid ventilation for the management of these infants prior to lung aeration. [Results](#) in ovine models showed improved cardiopulmonary stability, suggesting potential new tools for neonatal care.

Publication in Nature

CRCHUS researchers, including **Dr. Alain Piché, Simon Décary, and Karine Tremblay**, co-authored an [article](#) in Nature on genetic factors influencing COVID-19 severity. This knowledge could help improve understanding of the biological mechanisms underlying adverse outcomes and guide drug development.

RESEARCH CHAIRS

Canada Research Chair in Bioinformatics of Non-Coding RNA

This [new research chair](#) is held by **Michelle Scott**, who leads a multidisciplinary team of bioinformaticians, molecular biologists and genomics researchers. The impact of this new chair is especially significant because a better understanding of how non-coding RNA regulates biological processes could potentially lead to new therapeutic approaches for complex diseases, such as cancer, neurodegenerative diseases and metabolic disorders.

CRMUS Chair in AI and Multiomics for Pediatric Pathologies

Pr. Marie Brunet holds this [chair](#), whose general objective is to characterize the role and importance of pseudogenes in biological mechanisms and pediatric pathologies, such as neuroblastomas and hereditary developmental disorders. To achieve this, the chairholder and her colleagues are using cutting-edge techniques in the omics fields, in conjunction with artificial intelligence, to improve the lives of patients thanks to their laboratory findings.

Canada Research Chair in Integrated Care for Patients with Complex Needs

Dr. Catherine Hudon was awarded the [Tier 1 Canada Research Chair](#) in the Implementation of Integrated Care for People with Complex Needs. Her research supports the advancement of knowledge regarding care transitions between different professionals in the health system and the community network; specifically, the case management integration model. This chair aims to improve health equity for people with complex needs.

Chair in Compassion Sciences

Supported by the Université de Sherbrooke Foundation, **Diane Guay** is the holder of this [chair](#), which aims to foster the advancement of knowledge in the compassion sciences and contribute to the scientific influence of innovative educational and clinical strategies.

DISTINCTIONS

Exceptional Contribution to the Training of Future Scientists

Dr. Jean-Paul Praud received the [2023 Scientific Mentor Award](#) from the Quebec Clinical Research Club, recognizing his significant role in training the next generation of scientists.

Two Awards for Dr. François Lamontagne

Dr. François Lamontagne received the 2023 [Canadian Society of Internal Medicine](#) (CSIM) Senior Investigator Award. He was also honoured with the [Research Award](#) during the Quebec Federation of Medical Specialists' Interdisciplinary Training Days, recognizing his contribution to the advancement of medical research.

Roger Lecomte Named IEEE Fellow

Roger Lecomte was awarded the title of Fellow by the Institute of Electrical and Electronics Engineers (IEEE) for his contribution to avalanche photodiodes in scintillation detectors and positron emission tomography (PET). This prestigious title reflects his impactful innovations.

Improved Prostate Cancer Imaging Tests

Thanks to a team led by researcher **Brigitte Guérin** and **Dr. Éric Turcotte**, the CIUSSS de l'Estrie – CHUS now offers more precise and accessible prostate cancer [imaging tests](#). Over 500 men benefited from this innovative approach last year. The team won the [2023–2024 Excellence Award](#) in the University Mission and Outreach category and the 2023 Hippocrates Award for Interdisciplinary Innovation in Quality and Management. Their achievements received widespread [media](#) attention.

CCTG Recognition for the CRCHUS's Radiation Oncology Clinical Research Unit

The **CRCHUS Oncology Clinical Research Unit**, led by **Dr. Laurence Masson-Côté**, received the prestigious [2023 Phase III Team Award from the Canadian Cancer Trials Group \(CCTG\)](#). This honour acknowledges excellence in clinical research practices and recruitment for the PR.22 study, aimed at improving prostate cancer care. The unit has been an active member of the CCTG for over 25 years.

Spotlight on 2023–2024 Distinguished Personalities and Researchers

The [exceptional talent](#) of our research community was recognized once again. **Drs. André Cantin, Diego Bellabarba, Jacques Pépin** and **Jean-Paul Praud** were awarded the title of Distinguished Researcher, the highest distinction awarded to researchers by the CRCHUS. **Dr. Catherine Hudon** was awarded the title of Researcher of the Year, while **Caroline Cayer** and **Anaëlle Morin** were respectively named 2023–2024 Research Professional and Student of the Year. **Denis Boutin** was named Patient Partner of the Year, a well-deserved title for his significant contribution to CRCHUS research.

Rising Star in Rheumatology: Dr. Hugues Allard-Chamard

The [fall 2023 edition of the Canadian Rheumatology Association Journal](#) featured **Dr. Hugues Allard-Chamard** as a rising star, with a research focus on immunology and rheumatology.

Isabelle Laforest-Lapointe Wins Microbiology Award

Isabelle Laforest-Lapointe received the 2024 ThermoFisher Award from the Canadian Society of Microbiologists, recognizing emerging researchers in microbiological sciences.

Estrie Trifecta at FRQ Excellence Awards

Three professionals from the CIUSSS de l'Estrie – CHUS were honoured with [FRQ Excellence Awards](#) for their expertise: Mathieu Hamel (CdRV), Lucien Junior Bergeron (CMDO), and **Amélie Tétu** (CRCHUS).



OUTREACH

Québec Science's Discovery of the Year 2023

Gabrielle Garon-CARRIER's team was honoured by Quebec Science for their [study](#) linking parental leave to child well-being. Findings demonstrated that extended maternity leave benefits children's mental health, even when families experience reduced income.

Hope for Fragile X Syndrome Patients

Dr. François Corbin's research on Fragile X syndrome was featured in a pediatric research [series](#) highlighting scientists behind groundbreaking medical advances.

How Important is it to Screen for Gestational Diabetes?

In an episode of the show "[Moteur de recherche](#)", Dr. Marie-France Hivert discussed the issues related to this question.

Human Brain: Complex and Fascinating!

In an episode of the show "[Beau dans ma tête](#)" broadcast on Télé-Québec, Dr. David Fortin was invited to discuss the changes in the brain induced by parenthood. In a [second interview](#) published in *l'Actualité*, he discussed the complexity of the human brain.

Children's Mental Health Under the Microscope

In a series of articles published in the media, including one in [La Tribune](#), and featured in several local media, researcher and professor Catherine Malboeuf-Hurtubise highlighted her work on children's mental health, discussing the impact of art and philosophy in addressing anxiety in children. She also received funding from the CFI to support research on these topical issues.

Changing Perceptions of Obesity

A guest on the *Phare Ouest* radio program, Dr. André Carpentier [discussed](#) the importance of viewing obesity as a chronic illness rather than a simple matter of willpower.

Shedding Light on Rheumatology Research

As part of World Arthritis Day, Drs. Hugues Allard-Chamard and Gilles Boire, along with patient partner Marie-Claude Beaulieu, spoke to [Radio-Canada](#) about the challenges faced by arthritis patients and the importance of conducting research in this field.

Addressing the Taboo of Female Sexual Pain

Research led by Mélanie Morin on provoked vestibulodynia, a major cause of sexual pain in women, was featured in [La Tribune](#). Despite its prevalence, the condition remains under-researched and misunderstood.

Is There a Link Between Living Environment, Microbiota, and Inflammatory Diseases?

Isabelle Laforest-Lapointe discussed this question in an episode of the show [Moteur de recherche](#).

PATIENT PARTNERSHIP



2023–2024 Excellence Award From the CIUSSS de l'Estrie – CHUS

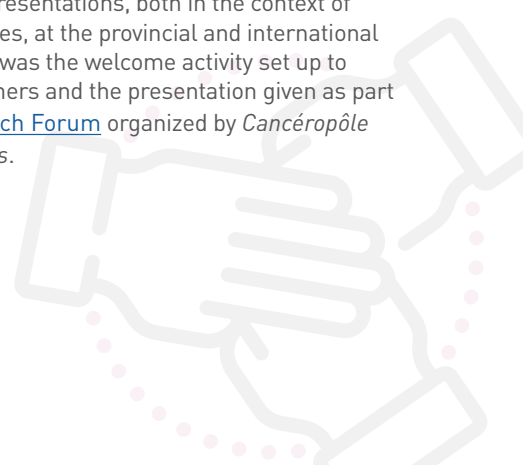
The Youth Patient Partner Committee continues to stand out! This year, they had the honour of receiving an [Excellence Award from the CIUSSS de l'Estrie – CHUS](#) for their project *Le labo des pisteurs: When children take their place in oncology research*.

Appointment of Catherine Wilhelmy – Santé Québec

Catherine Wilhelmy, our patient partner coordinator, has accepted the important mandate of joining the [Transition Committee](#) working to prepare the rollout of Santé Québec, which was established in January 2024.

Several Invitations to Share our Expertise in Patient Partnership

The opportunities to promote patient partnership have multiplied over the course of 2023–2024! Thus, patient partners from our centre gave some twenty presentations, both in the context of scientific and public activities, at the provincial and international level. Among others, there was the welcome activity set up to introduce new patient partners and the presentation given as part of the [2023 Cancer Research Forum](#) organized by *Cancéropôle Lyon Auvergne Rhône-Alpes*.





STUDENT SUCCESS STORIES



Students in the Diabetes, Obesity and Cardiovascular Complications axis have strengthened their collaboration with patient partners. As part of a new competition set up by the axis, students brilliantly presented research projects highlighting the important role that patient partners can play at different stages of their research. Congratulations to the recipients of the scholarships awarded during this first edition of the competition (**Éloïse Brosset, Alexandra Thibodeau, Christophe Richer Dit Laflèche, Pamela Tanguay and Gabriel Lemieux!**)

Nika Kooshki Zamani (Cancer: Biology, Prognosis and Diagnosis axis, PhD student in microbiology and infectiology under the supervision of Pr. Taha Azad), has been awarded a prestigious [2023–2024 Vanier Canada Graduate Scholarship](#) for his project *Advancing the Development of Oncolytic Viruses for Enhanced Efficacy and Safety*. These scholarships recognize students with exemplary academic achievement and outstanding leadership potential.

Olivier Dionne (Mother-Child axis), PhD student in biology under the supervision of Dr. François Corbin and Benoît Laurent, received the award for best presentation at the 20th International *Workshop on Fragile X and Other Neurodevelopmental Disorders* held in November 2023 in Atlanta, Georgia.

Dr. Isabelle Hardy (Mother-Child axis, under the supervision of Drs. Jean-Patrice Baillargeon and William Fraser) continues to garner accolades. In 2023, she received the Léon Tétrault Award, which is given to a graduating postgraduate who has demonstrated exceptional commitment during their studies. She also received the Best Oral Presentation Award on the theme of mental health at the Canadian National Perinatal Research Meeting, in addition to the Best Oral Presentation Award in Obstetrics at the annual clinical and scientific conference of the Society of Obstetricians and Gynecologists.

Alexia Royer (Inflammation-Pain axis), PhD student in microbiology co-supervised by Pr. Louis-Charles Fortier, received the FRQ Jacques-Genest Star Emerging Talent Award - Health sector for the publication of her article *Clostridioides Difficile S-Layer Protein A (SlpA) Serves as a General Phage Receptor* published in the *Microbiology Spectrum* journal.

MSc student in radiation sciences and biomedical imaging **Vincent Doyon** (Medical Imaging axis) has the wind in his sails. A member of Pr. Roger Lecomte's team, he won the first prize in the prestigious Brain Imaging Council Young Investigator Award from the Society of Nuclear Medicine and Molecular Imaging for his oral presentation entitled *First PET Investigation of the Human Brain at 2 µL Resolution with the Ultra-High Resolution (UHR) Scanner*. He outperformed presentations by renowned teams from Japan, the United States and China as well as teams from the NeuroEXPLORER scanner, a competitor of the UHR, [developed in Sherbrooke](#).

The team of **Anaëlle Morin** and **Marie-Ève Perron** (Health: Populations, Organization, Practices axis), two MSc students contributing to the CRMUS Research Chair on Optimal Professional Practices in Primary Care directed by Pr. Marie-Eve Poitras, are recipients of the [Hippocrates Award](#) in the «Emerging» category thanks to an innovative Caf'Échange project promoting patients' experiential knowledge.

MSc student **Diego Legrand** (Health: Populations, Organization, Practices axis) is a recipient of the Elsevier Best Research Paper Award at the XXVI World Congress of Neurology (WCN 2023) in Montreal in 2023, for his presentation entitled *Association Between Benzodiazepine and Alzheimer's Disease Likely Driven by Prescription for Prodromal Phase Symptoms*.



CRCHUS IN NUMBERS

DEDICATED PEOPLE

316
RESEARCHERS

186
RESEARCH PROFESSIONALS

13
ADMINISTRATIVE PROFESSIONALS

755
STUDENTS

6
research axes

48,7 M \$
annual budget

17 CANADA RESEARCH CHAIRS

1 NATURAL SCIENCES AND ENGINEERING RESEARCH COUNCIL OF CANADA RESEARCH CHAIR

4 NEW RESEARCH CHAIRS

917
SCIENTIFIC PUBLICATIONS

1,479
ACTIVE RESEARCH PROJECTS

FUNDING SOURCES FOR THE 2023-2024 PERIOD

Fonds de recherche du Québec (FRQ) - secteur Santé Grant (Centre)	\$ 2 755 000
Grants from FRQ - secteur Santé recognized organization	\$ 16 987 403
Scholarships from FRQ - secteur Santé recognized organizations	\$ 6 333 282
Research contracts with the private sector	\$ 5 953 055
Sales and services	\$ 1 748 237
Contribution of the CIUSSS de l'Estrie - CHUS and the CHUS Foundation	\$ 2 530 556
Donations for teaching and research	\$ 39 839
CFI/John R. Evans Leaders Fund/IOF	\$ 2 535 675
Grants not recognized by the FRQ - secteur Santé	\$ 5 845 559
Scholarships not recognized by the FRQ - secteur Santé	\$ 2 469 163
Other*	\$ 1 552 755
Annual budget	\$ 48 750 524

*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.

AXIS	RESEARCHERS			STUDENTS			SCHOLARSHIPS AND GRANTS (RGAs*)	CONTRIBUTION TO PUBLICATIONS
	UNIVERSITY RESEARCHERS	UNIVERSITY CLINICAL RESEARCHERS	ASSOCIATES	MSc	PhD	Postdoc		
Cancer: Biology, Prognosis and Diagnosis	37	15	13	67	68	12	\$ 7 254 688	150
Diabetes, Obesity and Cardiovascular Complications	19	10	12	29	40	8	\$ 2 714 874	131
Medical Imaging	27	4	2	67	77	15	\$ 2 605 338	121
Inflammation - Pain	38	18	8	61	74	14	\$ 5 652 398	141
Mother-Child	22	21	29	63	43	8	\$ 2 467 438	145
Health - Populations, Organizations and Practices	14	22	5	60	41	8	\$ 2 625 949	229
TOTAL	316			755			\$ 23 320 685	917

*Recognized granting agencies.



Contact us

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Our partners:

