

CENTRE DE
RECHERCHE



2022–2023 Annual Report

Our
KNOWLEDGE
brings
HOPE

DISCOVERIES OF THE YEAR

CANCER: BIOLOGY, PROGNOSIS AND DIAGNOSIS AXIS

Are all Ribosomes Created Equal?

The ribosome plays a fundamental role in the translation of messenger RNA from DNA, orchestrating the assembly of proteins vital to human functions. Comprising approximately one hundred proteins, the diverse composition of ribosomes and its correlation with translation activity remain areas of limited understanding. The [study](#) conducted by **Sherif Abou Elela's** team demonstrated that adjusting the level of two versions of the ribosomal protein L7/uL30 induces a deceleration in ribosome function and allowed it to continue proliferating in the presence of staurosporine, a cytotoxic agent that has been shown to reduce cancer cell growth. This change results in an increased translation of proteins promoting tolerance to this drug and suggests that sensitivity to certain treatments could be modulated by adjusting ribosome composition.

MOTHER-CHILD AXIS

Giving a Single Anti-Rejection Drug May Improve Survival in Children After Heart Transplantation

Heart transplants in children represent the final recourse for terminal heart disease cases. To avoid rejection, it is common to use a combination of several anti-rejection drugs, albeit with numerous side effects. **Dr. Frédéric Dallaire, Dr. Laurence Watelle** and their team [analyzed](#) data from transplanted children who were administered only one anti-rejection drug. They used data from the *Pediatric Heart Transplant Society*, which collects information on children who have undergone heart transplantation across more than 60 hospitals worldwide. Among the 3,493 children monitored over an average of seven years, they noted that nearly one in four children relied solely on one anti-rejection medication, largely to limit side effects. These children did not experience more graft rejection, and their survival rates improved by 35%. These findings show that transplanted children in whom certain drugs were withdrawn fared comparably, if not better, than those adhering to standard treatment protocols. These findings may lead us to reconsider the way we treat people who have undergone heart transplants.

MEDICAL IMAGING AXIS

Automating Large-Scale Production of Gallium-68

The [work](#) done as part of a collaboration between radiochemistry experts **Samia Ait-Mohand, Sébastien Tremblay** and engineer **Jean-François Beaudoin** has enabled the automated cyclotron-based production of gallium-68 (^{68}Ga). The medical radioisotope is highly sought-after for the formulation of various radiotracers used for diagnosing specific cancers. This technology not only streamlines the production process but also reduces gallium-68 (^{68}Ga) production costs by half, thereby enhancing the accessibility of medical imaging services to individuals across the Eastern Townships and throughout the province. In its inaugural year, the deployment of this innovative tracer facilitated imaging for several hundred patients. This work, supervised by **Brigitte Guérin, Dr. Éric Turcotte** and **Étienne Rousseau**, has led to a significant increase in the service offering in this sector.

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



François Lamontagne's Team Has Published the Results of the LOVIT Study

The results of the LOVIT (Lessening Organ Dysfunction with VITamin C) multicentre study, led by **Dr. François Lamontagne** at the CRCHUS and Dr. Neill Adhikari at Sunnybrook Health Sciences Centre, have been published in the [New England Journal of Medicine](#). The aim of this project was to determine whether high-doses of vitamin C could reduce the risk of death or organ dysfunction in the treatment of patients affected by sepsis, an infection caused by the presence of bacteria in the blood that spreads throughout the body. In the largest study conducted to date, involving 35 intensive care units in Canada, France and New Zealand, the research team demonstrated that [vitamin C does not help people with sepsis receiving vasopressor therapy](#) in the intensive care unit, thus calling into question a treatment that had been considered promising.



INFLAMMATION – PAIN AXIS

Study of the French Version of a Voice Recognition Software for People with Multiple Sclerosis

The best psychometric test to measure information processing speed (IPS) in people with multiple sclerosis (MS) is the SDMT (Symbol Digit Modalities Test). However, this test requires a trained tester, limiting its use in a neurology clinic. Dr. Anthony Feinstein, from the University of Toronto, has developed a version of the fully automated voice recognition test (VR-SDMT) and has asked **Dr. Emmanuelle Lapointe's** team to validate a French version. The team translated the software and tested it on 49 people with MS and 29 healthy control participants. The results of this [study](#) on the French version concur with those obtained in the earlier study, and thus confirm the usefulness of voice recognition software in assessing cognition in people with MS. Research nurse coordinator **Caroline Cayer** and research nursing assistant **Caitlyn Bockus** are co-authors of this publication.

DIABETES, OBESITY AND CARDIOVASCULAR COMPLICATIONS AXIS



A Potential New Weapon Against COVID-19

Richard Leduc and Pierre-Luc Boudreault have demonstrated that it is possible to inhibit the entry of SARS-CoV-2 before it can infect cells. They succeeded in designing a molecule, called N-0385, with the ability to block the virus before it enters the cell. This major discovery has been published in the prestigious journal [Nature](#). For the first time, a molecule targeting a human enzyme has proved effective in combating SARS-CoV-2 infection, paving the way for the development of treatments to fight COVID-19.



HIGHLIGHTS

After a Year in Operation, Research PET Scan Delivers the Goods

In the post-installation ministerial report, it was demonstrated that research positron emission tomography (PET) scan [offers clear benefits in terms of image acquisition time](#), which has been cut from 35 minutes to 8 minutes, and in terms of radiation exposure for the user, which has been reduced by a factor of 3 to 5. These improvements have increased by 3 to 5 times the number of clinical studies that the CRCHUS is now able to conduct in this field: 22 projects have benefited from this machine since 2021. New methods have been developed to study the metabolism of dietary fat and adipose tissue in the body of people living with diabetes. These new methods are currently guiding the development of new treatments for certain complications of diabetes. Over the past year, the research PET scan has generated \$1.38 million in new funding, as well as increased scientific productivity, knowledge transfer activities, employability and training for the next generation of research scientists.

Combining Artificial Intelligence and Imaging to Increase Glioblastoma Detection Rates

A new approach has enabled 71 research centres, including the Université de Sherbrooke's Cancer Research Institute (IRCUS), to rapidly contribute to the advancement of knowledge on glioblastoma, a rare and highly aggressive form of brain cancer. Thanks to an innovation combining artificial intelligence and medical imaging, thousands of glioblastoma data sets were analyzed at the project's participating centres. **Dr. David Fortin**, **Martin Vallières** and **Martin Lepage** took part in this [major study](#), which led to an unprecedented breakthrough in the field: The analysis of over 25,000 magnetic resonance imaging results, leading to a 33% increase in the detection rate of the tumour boundary.

Co-Lead of the Post-COVID-19 Condition Research Network

The Canadian Institutes of Health Research has awarded \$20 million in funding to implement a Canadian-wide research network on the post-COVID-19 condition, led by Dr. Angela Cheung from the University of Toronto. **Simon Décary** has been appointed co-lead of the network, and will act as a consultant on the Chief Science Advisor of Canada's National Plan. The network has gathered a community of researchers, clinicians and patient partners to develop effective strategies for the diagnosis, treatment and rehabilitation of post-COVID-19 condition.

RESEARCH CHAIRS

A Canada Research Chair in Development of Personalized Therapies for Ovarian Cancer Patients

Marilyne Labrie was awarded the Tier 2 Canada Research Chair to study how ovarian tumours adapt to various types of endogenous (internal), environmental and therapeutic stressors. Her findings will help define stress-related therapeutic vulnerabilities and lead to personalized therapeutic approaches.

A New Research Chair Seeking Alternatives to Opioids in the Treatment of Chronic Pain

The new [Research Chair in Pain Management and Opioid Pharmacology](#), led by **Louis Gendron**, aims to develop new strategies and therapies for the treatment of chronic pain. As yet, there are no drugs with few side effects that are powerful enough to provide relief to chronic pain sufferers. Opioids remain the most effective option, despite the discomfort and risks associated with their use.

Passing of the Torch for the Quebec Lung Association's Chair in Respiratory Health

The research chair, which was created in 2007, has begun its fourth term under the leadership of **Dr. Simon Couillard-Castonguay**, taking over from **Dr. Pierre Larrivée**, who had held the chair since its inception.

DISTINCTIONS

Yannick Tousignant Awarded the Title of Fellow

The researcher, specializing in the management of chronic pain associated with musculoskeletal disorders has been awarded the honorary title of Fellow by the Ordre professionnel de la physiothérapie du Québec (OPPQ). This title highlights the involvement of OPPQ members in various aspects of their duties, and represents a special recognition of their commitment, professionalism and desire to advance the profession.

A Year of Recognition

Dr. Magaly Brodeur has been in the news a great deal over the past year. In 2022, Canada International Black Women Excellence named her one of the Top 100 Black Women to Watch in Canada. She was also awarded the [Prix du Mérite estrien](#) by La Tribune as well as the title of [Researcher of the Year](#) by the CRCHUS.

Prestigious Appointment to the Canadian Academy of Health Sciences

In her quest to improve the lives of patients with complex needs, **Dr. Catherine Hudon** has been elected a Fellow of the Academy, a group of eminent researchers who recommend concrete strategies for complex health issues in Canada. She was also awarded the [Université de Sherbrooke Prix Tremplin en recherche et création](#).

From Professor and Researcher to President

Pascale Beauregard was named [president](#) of the Canadian Society of Microbiologists. The non-profit organization has hundreds of members and seeks to advance the field of microbiology and facilitate the exchange of ideas between microbiologists.

Vice Chair of the Canadian Academy of Health Sciences

Mélanie Couture, who, for many years, has spearheaded numerous autism research projects, has been appointed [Vice Chair of the Oversight Panel](#). Member selection criteria are based on expertise, credibility and attention to diversity.

A Prestigious Award for a High-impact Publication

The article entitled [NEMA NU 4-2008 Comparison of Preclinical PET Imaging Systems](#), co-authored by **Roger Lecomte** and published in the *Journal of Nuclear Medicine*, was awarded the Michael S. Patterson Publication Impact Prize from the Canadian Organization of Medical Physicists (COMP). This prize is awarded to members for a scientific paper that has had a tremendous impact on the field of medical physics.

Spotlight on the 2022–2023 Emeritus Researchers and Persons of the Year

Once again, the exceptional talent of our research community was highlighted this year. **Dr. Alain Vanasse**, **Johannes E. van Lier** and **Dr. Marek Rola-Pleszczynski** were awarded the title of [Researcher Emeritus](#), the highest distinction awarded to researchers by the CRCHUS.

Dr. Magaly Brodeur was named Researcher of the Year, while **Anick Champoux** and **Laurence Déry** were named 2022-2023 Research Professional and Student of the Year, respectively. It goes without saying that we also honoured the **young investigators of the Patient Partner Committee** among our [personalities of the year](#), namely for their outreach across several media.

OUTREACH

Do Women Have a Higher Pain Threshold Than Men?

Professor and researcher **Pascal Tétreault**, an expert in pain imaging, and his student **Monica Sean** appeared on [Le gros laboratoire](#) TV show to answer this question.

Increasing Vaccination Rates Among Children Through Discussion

[The Canada-wide MIICOVAC project](#), based on **Dr. Arnaud Gagneur**'s PromoVac study, has helped increase vaccination rates among newborns and young children by offering Canadian parents a virtual interview with an immunization consultant to answer their questions. There has been a series of [interviews](#) and [articles](#) about this initiative.

Modified Bacteria Named 2022 Discovery of the Year

Québec Science magazine's [Découverte de l'année 2022](#) prize was awarded by public vote to **Sébastien Rodrigue**'s team for their discovery enabling the eradication of harmful intestinal bacteria using "good" bacteria armed with genetic knives.

Understanding the Effects of Urban Environments on Young People

An [article](#) published in Le Devoir's special Recherche section featured **Martine Shareck**'s work demonstrating the relationship between the urban environment and people's physical and mental health, especially among young people. The Canada Research Chair holder and her team took advantage of the major revitalization of Sherbrooke's downtown core to carry out this study.



PATIENT PARTNERSHIP

Young Investigators Continue to Make News!

The young investigators have been featured in the media for the first Quebec-based research project to be initiated and led by children. The recruitment of study participants is already underway. The youths' contribution earned them the honour of being named during the [Dix de 2022](#) program, highlighting the 2022 personalities of year, as well as an appearance on the [Salut Bonjour morning show](#). They also contributed to the production of a [video](#) for Clinical Research Day.

Outreach of Our Patient Partner Expertise in the Scientific Community

Thanks to the expertise developed by our Patient Partnership Centre, several members, including patient partner and patient partnership coordinator **Catherine Wilhelmy**, have been invited to speak at some twenty local, provincial and even international scientific community events. Patient partnership was also featured at the International Children's Advisory Network Research 2022 conference in Lyon, as well as at the Entretiens Jacques-Cartier event, an interdisciplinary Francophone gathering experts from France and Quebec.

Involvement in Public Events

In order to raise awareness of patient partnership in the field of research and position this concept as an attractive option to the public, ten presentations were delivered as part of outreach activities for the general public, namely at the Journée de vulgarisation scientifique held in Jacques-Cartier Park and at the annual McPeak-Sirois symposium.

STUDENT SUCCESS STORIES



Nawal Amhis (Cancer: Biology, Prognosis and Diagnosis Axis), a surgical resident and Master's student in Lee-Hwa Tai's laboratory, is a rising star in the field of cancer immunology research. Between 2022 and 2023, she received numerous awards for both basic and clinical research, including an FRQS/MSSS scholarship for specialty medicine residents with an interest in pursuing a research career.

Run Zhou Ye (Diabetes, Obesity and Cardiovascular Complications Axis), a PhD student under the supervision of Dr. André Carpentier, received several awards and honours during the year. Among them, he won the Canadian Medical Hall of Fame's "MD Financial Management and Université de Sherbrooke FMSS" award, a CIHR Canada Graduate Scholarship - Doctoral, and was voted September's "[Student of the Month](#)" by the Centre de recherche du CHUS.

Thierry Judge (Medical Imaging Axis), a Master's student under the supervision of Professor Pierre-Marc Jodoin, developed the [CRISP software](#), which helps predict uncertainty or inaccuracy in ultrasound image analysis results obtained using artificial intelligence (AI). CRISP is currently being evaluated at Oxford (UK), a leader in AI-enabled ultrasound. For his work, Thierry Judge was awarded the Mitacs Award for Outstanding Innovation – Master's.

Isabelle Hardy (Mother-Child Axis), a PhD student in health sciences under the supervision of Dr. William Fraser, is making

remarkable progress. She won a [Vanier Canada Graduate Scholarship 2022-2023](#) for her clinical study on the adoption of healthy lifestyle habits by future parents during preconception and pregnancy. She also received an FRQS/MSSS salary award for specialty medicine residents pursuing a career in research, and was invited to present at the Society of Obstetricians and Gynaecologists of Canada's Annual Clinical and Scientific Conference.

Jessica Bernier (Health: Populations, Organizations, Practices Axis), received the Coup de cœur award at the Réseau-1 Québec 2022 annual event for her presentation entitled [Développement d'une intervention de réadaptation cardiaque adapté aux régions éloignées](#). This prize, which is awarded by a patient partnership committee, recognizes the clarity, relevance, commitment and benefits of these patient-centric interventions.

Justine Benoit-Piau (Inflammation-Pain Axis), a PhD student in Nathaly Gaudreault's laboratory, has been acknowledged for her commitment, which was recognized by the Faculty of Medicine and Health Sciences in 2022 as well as by a mention on the Université de Sherbrooke's honour roll. She has received a number of scholarships, including two travel grants from the Réseau québécois de recherche sur la douleur as well as from other sources, enabling her to travel to various conferences, namely Neurosciences Sherbrooke, with includes a publication award, and another grant for support to Ministère de l'Éducation volunteers.



CRCHUS IN NUMBERS

DEDICATED PEOPLE

311

RESEARCHERS

185

RESEARCH PROFESSIONALS

11

ADMINISTRATIVE PROFESSIONALS

848

STUDENTS

6
research
axes

45,7 M \$
annual budget

14 CANADA RESEARCH CHAIRS

1 NATURAL SCIENCES AND ENGINEERING RESEARCH COUNCIL OF CANADA RESEARCH CHAIR

2 NEW RESEARCH CHAIRS

927

SCIENTIFIC PUBLICATIONS

1 343

ACTIVE RESEARCH PROJECTS

FUNDING SOURCES FOR THE 2022-2023 PERIOD

Fonds de recherche du Québec – Santé (FRQS) Grant (Centre)	\$2 725 000
Grants from FRQS-recognized organizations	\$16 890 268
Scholarships from FRQS-recognized organizations	\$5 690 652
Research contracts with the private sector	\$5 677 848
Sales and services	\$1 607 735
Contribution of the CIUSSS de l'Estrie – CHUS and the CHUS Foundation	\$1 623 350
Donations for teaching and research	\$29 878
CFI/John R. Evans Leaders Fund/IOF	\$1 264 379
Grants not recognized by the FRQS	\$5 171 609
Scholarships not recognized by the FRQS	\$2 719 016
Other*	\$2 342 739
Annual budget	\$45 742 474 M

*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	14	12	65	74	15	\$6 733 119	162
Diabetes, Obesity and Cardiovascular Complications	18	10	12	34	38	10	\$2 814 313	119
Medical Imaging	29	4	2	79	81	22	\$2 322 249	105
Inflammation – Pain	39	17	8	71	79	16	\$4 667 802	154
Mother-Child	21	18	28	70	49	11	\$2 959 818	167
Health – Populations, Organizations and Practices	12	23	7	71	52	11	\$3 083 618	220
TOTAL	311			848			\$22 580 919	927

*Recognized granting agencies.



Contact us

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Our partners:

