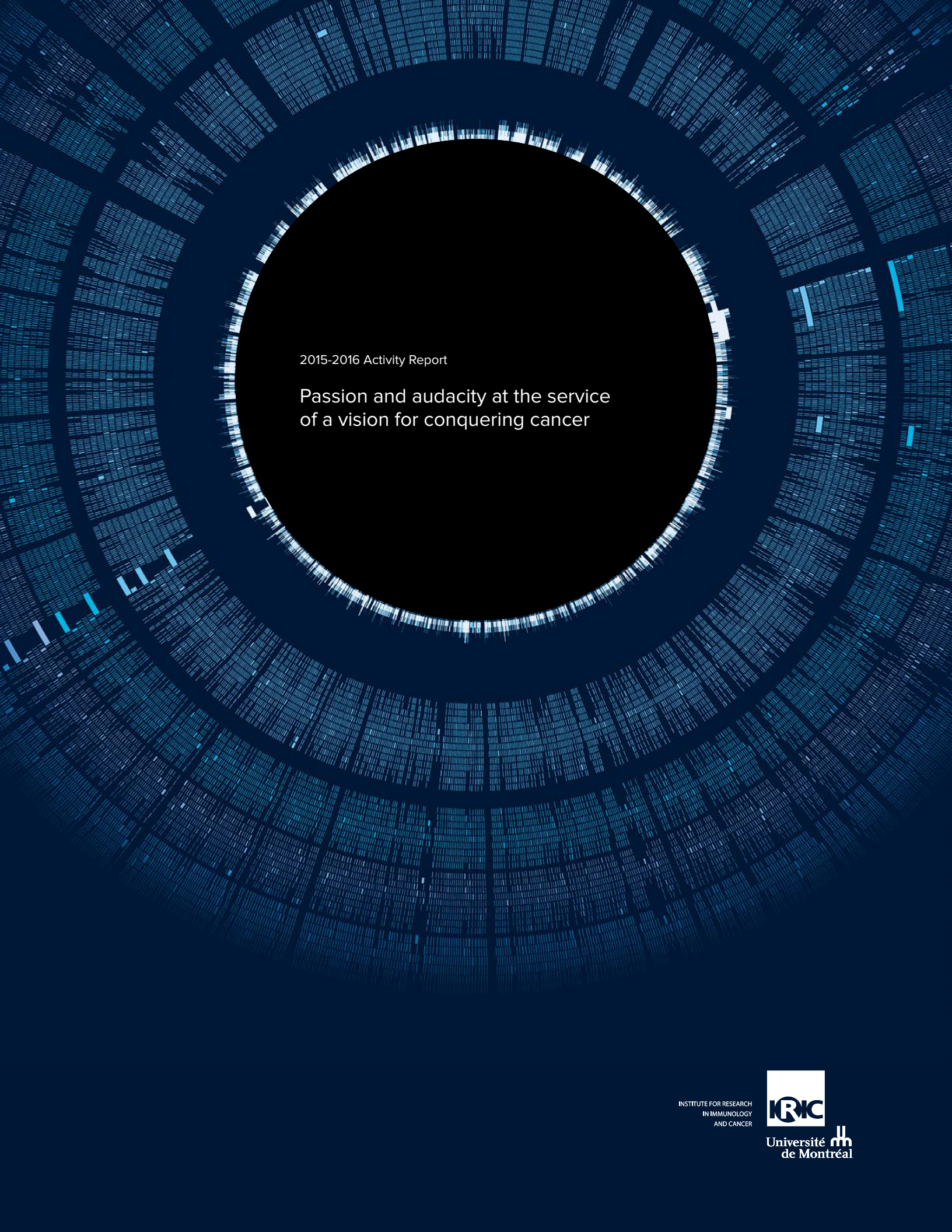


2015-2016 Activity Report

Passion and audacity at the service of a vision for conquering cancer

INSTITUTE FOR RESEARCH
IN IMMUNOLOGY
AND CANCER

IRIC

Université de Montréal

About the Institute for Research in Immunology and Cancer (IRIC)

An ultra-modern research hub and training centre, Université de Montreal's IRIC was created in 2003 to shed light on the mechanisms of cancer and to accelerate the discovery of new, more effective therapies to counter this disease. IRIC operates according to a model that is unique in Canada. Its innovative approach to research has already led to discoveries that over the coming years will have a significant impact on the fight against cancer. **iric.ca**

About Université de Montréal (UdeM)

Deeply rooted in Montreal and international by definition, Université de Montréal is one of the top universities in the world. It was founded in 1878, and today, with its two affiliated schools, HEC Montréal and École Polytechnique, constitutes the largest centre of higher education and research in Québec and one of the major centres in North America. Université de Montréal brings together over 2,700 professors and researchers, and accommodates more than 67,000 students. **umontreal.ca**

Cancer is...

200	different illnesses
202,400	new cases in Canada in 2016, of which 51,900 in Québec alone
2 Canadians / 5	will develop it in their lifetimes
78,800	died from it in 2016
30 %	of all deaths in Canada

Source: The Canadian Cancer Society's Cancer Statistics Advisory Committee: *Canadian Cancer Statistics 2016*. Toronto, Ontario: Canadian Cancer Society, 2016.

IRIC is...

A concentration of cancer researchers

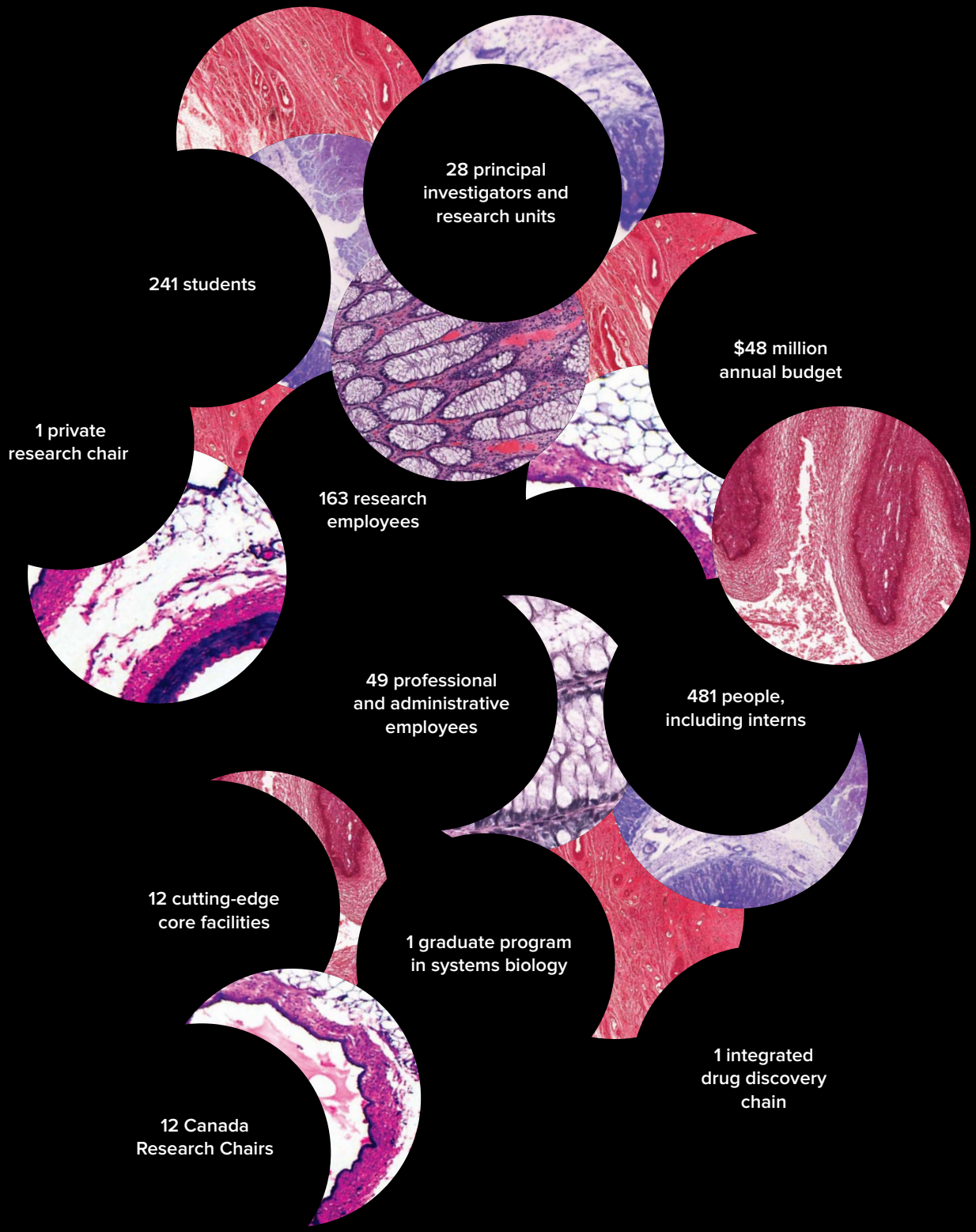
A complementarity of areas of expertise

A drug discovery chain

A multidisciplinary training program

An ultramodern technology park

An integrated development and commercialization unit


28 principal investigators and research units
241 students
$48 million annual budget
1 private research chair
163 research employees
49 professional and administrative employees
481 people, including interns
12 cutting-edge core facilities
1 graduate program in systems biology
1 integrated drug discovery chain
12 Canada Research Chairs

Results thanks to the dedication of audacious people

Robert Tessier
—
Chairman of the Board
of IRIC

IRIC has become, over the years, a major player in the discovery of therapeutic advances in the fight against cancer, the leading cause of death in Canada.

Despite its relatively recent creation, the Institute aspires to be the global reference in fundamental and applied research designed to defeat cancer.

It can count on world-class, extremely productive researchers. Its highly trained staff run core facilities equipped with state-of-the-art technology.

The established therapy discovery chain is operating effectively. Already, three discoveries have reached phase II clinical trials.

The Institute also stands out as a vector of training. Over 200 young scientists each year share in its activities. They benefit from a top-level university program in a context that is unique in Canada.

Mention must also be made of the contribution of the Institute for Research in Immunology and Cancer – Commercialization of Research (IRICoR), which to date has brought to fruition nine research partnerships and eight licensing agreements with the biopharmaceutical industry, and protected forty patent families while contributing to the creation of four companies.

Thanks to its leadership as well as to the skills and passion of all its members, the Institute enjoys an enviable reputation not only in Québec and Canada but around the world.

The board of directors, made up of eminent members of the university community and independent members from civil society, is extremely satisfied with the Institute's progress and strategic guidelines.

Obviously, a fundamental concern remains access to adequate funding.

Constant efforts are made with governments and granting agencies, but funds are scarce and much sought after.

IRIC must therefore also rely on philanthropy, and I wish to thank all the organizations and all the people who contribute, through their donations, to making a difference.

A team driven by audaciousness

Michel Bouvier
Ph.D., FCAHS, FRSC
—
Chief Executive Officer of IRIC

Serving as chief executive officer of IRIC means marvelling each and every day at the achievements and the passion of all those who make up a team driven by audaciousness. This past year has clearly demonstrated as much.

Let us begin with the arrival of Matthew J. Smith as principal investigator in the Signalling and Structural Biology of Cancer research unit. This unit focuses on the acquisition of new scientific and technological knowledge, which will contribute to a better understanding of the fundamental mechanisms in the control of cell growth and serve as a basis for the development of diagnostic tests or targeted therapies for specific types of cancer. This work, and the numerous discoveries made this year by IRIC researchers, enables us to make a major impact both in basic research and in the clinical application of knowledge.

In other matters, we can never call attention enough to the importance of IRIC's donors, thanks to whom, year in and year out, we are able to make a difference. To express our gratitude to these good-hearted people, in March 2016 we dedicated an honour roll to them, which now adorns the entrance hall of the Marcelle-Coutu Pavilion.

Audaciousness was borne out once again with the creation of ExCellThera, a spinoff company launched jointly by the Institute for Research in Immunology and Cancer – Commercialization of Research (IRICoR) and the Centre for Commercialization of Regenerative Medicine (CCRM). Thanks to this new entity, created further to the discovery of the molecule UM171, patients with acute myeloid leukemia (AML) needing a stem cell transplant will now be able to count on a novel experimental therapeutic approach that ranks with the world's best.

These new developments will unquestionably enable us to advance even further in the fight against cancer, in a collective and ground-breaking spirit, and this is thanks to our entire dedicated team at IRIC.

Scientific affairs: pivot of the institute

The mandate of IRIC's Scientific Affairs is to formulate recommendations on all the Institute's research and training activities.

Marc Therrien
Ph.D.
—
Scientific Director and
Principal Investigator
at IRIC

Major acquisitions and partnerships

I cannot but take pride in being able yet again to make an extremely positive assessment of the past year.

IRIC researchers once more made several major breakthroughs in understanding the molecular and cellular mechanisms of cancer, and some of those advances are described in the pages that follow. They constitute new avenues to be explored in the potential development of more effective and safer diagnostic tools and innovative therapies.

Among the many highlights, we may mention that IRIC renewed its recruitment campaign launched in 2014, whose objective is to complement the areas of expertise already well-established at the Institute and to diversify the approaches used. To accomplish that, we need to be able to enlist the services of outstanding researchers in the fields of chemical, structural, and systems biology or bioinformatics, and it was with this in mind that Professor Matthew J. Smith was welcomed to our team.

The Institute also continued to expand its network of collaborators for the joint development of innovative therapies in Canada, thanks to the expertise and leadership of IRICoR. In that light, an agreement was reached with the Centre for Drug Research and Development (CDRD) regarding three new projects, two of which stem from discoveries made by IRIC researchers. The two entities will therefore work together to make the most of their existing resources in order to develop the most promising discoveries in the country.

Finally, IRIC obtained another major grant for improving its research infrastructures as part of the Canada Foundation for Innovation (CFI) competition. The project, led by Dr. Guy Sauvageau, entitled "A chemo and proto-genomic approach for a personalized medicine for acute myeloid leukemia," was funded for a total of over $12M, coming in equal parts from the CFI and the Québec government, with a contribution from a number of suppliers of high-tech equipment. These funds have already allowed for the acquisition of state-of-the-art equipment for certain core facilities and will enable considerable expansion of the Institute's medicinal chemistry laboratory and its drug discovery capabilities.

Thus, in 2015-2016 our Institute continued to reinforce its various fields of expertise, diversify its approaches and models, develop key partnerships, and acquire leading-edge equipment. In other words, every effort has been made for IRIC to carry on with its mission in the best way possible.

The committees

Work-Life Committee
Étienne Gagnon,
Principal Investigator

Fund Allocation Committee
Marc Therrien,
Scientific Director and
Principal Investigator

Mentoring Committee
Trang Hoang,
Principal Investigator

Principal Investigator Recruitment Committee
Marc Therrien,
Scientific Director and
Principal Investigator

Space and Equipment Committee
Jean-Claude Labbé,
Principal Investigator

Awards and Distinctions Committee
Vincent Archambault,
Principal Investigator

Strategic Projects Committee
Philippe Roux,
Principal Investigator

The Scientific Assembly and the Scientific Committees

The different aspects of research at IRIC are managed collectively and are the subject of continual consultations with researchers. That is, the scientific director coordinates the activities of a number of committees that assist him in, among other matters, the recruitment of researchers, the acquisition and usage policies of major research infrastructures and spaces, the planning of scientific programming, support for strategic projects, and the recruiting and monitoring of graduate students and postdoctoral fellows.

The activities and development of IRIC's technological core facilities are also supervised by a committee devoted to each core facility. All the committees are chaired by principal investigators of the Institute. The scientific director is also supported in his work by the scientific assembly, comprising all the Institute's principal investigators and which meets regularly to discuss strategic questions for the Institute's research program and scientific life.

The principal investigators also had the opportunity to exchange ideas at an annual scientific retreat. For the first time this year, IRIC held a scientific retreat jointly with McGill University's Rosalind and Morris Goodman Cancer Research Centre. The event, which brought together 23 researchers from IRIC and 21 from the Goodman Centre, took place from November 25 to 27, 2015, at Auberge du Lac Morency in Saint-Hippolyte. The get-together allowed for exchanges on innovative research projects and an assessment of their potential for the development of collaborations. Complementarity and opportunities for integration of certain technological core facility services were also discussed.

A multidisciplinary team

2015-2016 Principal investigators

IRIC brings together renowned scientists from Canada, the United States, and Europe who engage in bold collaborations at the crossroads of complementary disciplines. The Institute boasts 28 principal investigators who are passionate about their work and committed to discovering new therapies to defeat cancer.

Vincent Archambault, Ph.D.
Cell Cycle Regulation

Katherine Borden, Ph.D.
Structure and Function
of the Cell Nucleus

Gregory Emery, Ph.D.
Vesicular Trafficking and
Cell Signalling

Trang Hoang, Ph.D.
Hematopoiesis and Leukemia

Michel Bouvier, Ph.D., FCAHS, FRSC
Molecular Pharmacology
Chief executive officer of IRIC

Louis Gaboury, M.D., Ph.D., F.R.C.P.(c), F.C.A.P.
Histology and Molecular Pathology

Benjamin Kwok, Ph.D.
Chemical Biology
of Cell Division

Sébastien Carréno, Ph.D.
Cellular Mechanisms of Morphogenesis
during Mitosis and Cell Motility

Étienne Gagnon, Ph.D.
Cancer Immunobiology

Jean-Claude Labbé, Ph.D.
Cell Division and Differentiation

Damien D'Amours, Ph.D.
Cell Cycle Regulation and
Chromosome Structure

Lea Harrington, Ph.D.
Telomere Length Homeostasis
and Genomic Instability

Sébastien Lemieux, Ph.D.
Functional and Structural
Bioinformatics

Julie Lessard, Ph.D.
Chromatin structure
and stem cell biology

Claude Perreault, M.D., F.R.C.P.(c)
Immunobiology

Marc Therrien, Ph.D.
Intracellular Signalling

Sylvie Mader, Ph.D.
Molecular Targeting
in Breast Cancer

Martine Raymond, Ph.D.
Yeast Molecular Biology

Pierre Thibault, Ph.D.
Proteomics and Bioanalytical
Mass Spectrometry

François Major, Ph.D.
RNA Engineering

Philippe Roux, Ph.D.
Cell Signalling and Proteomics

Michael Tyers, Ph.D., FRSC, FRSE
Systems Biology and
Synthetic Biology

Anne Marinier, Ph.D.
Medicinal Chemistry

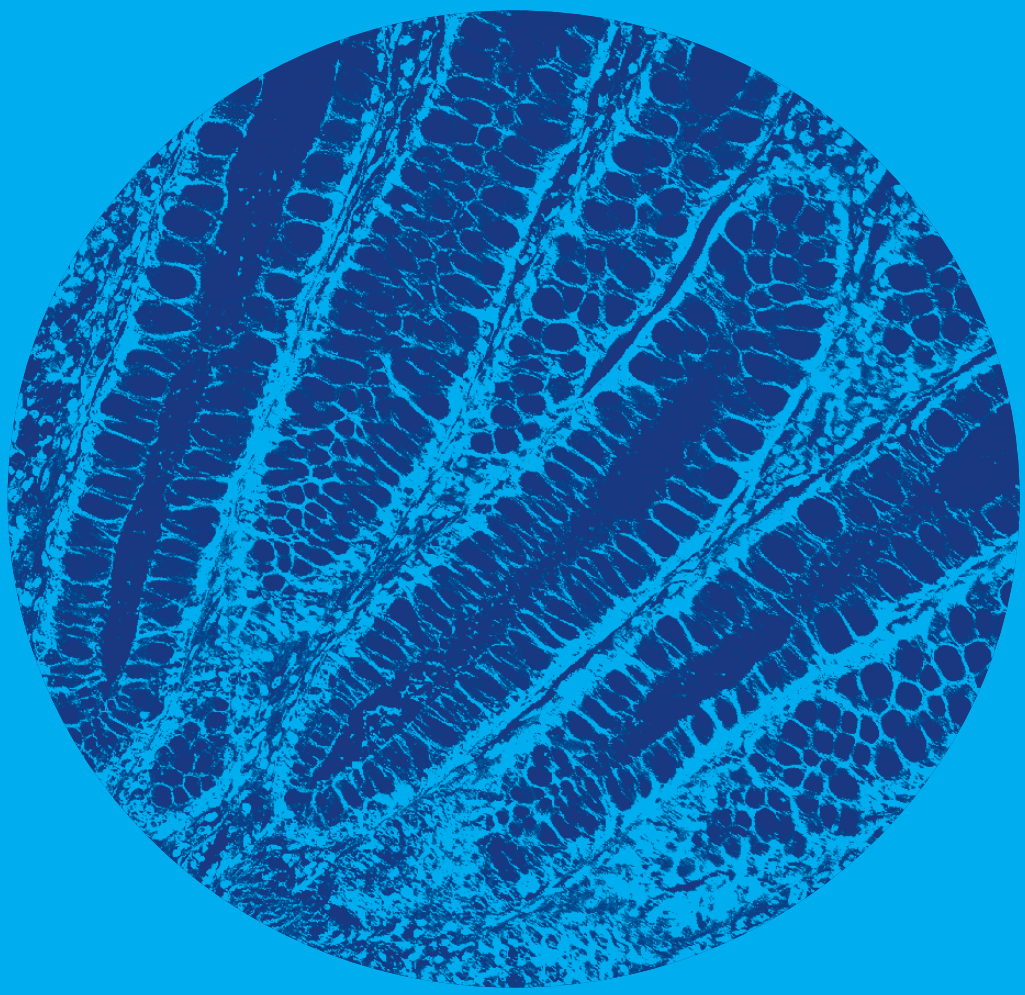
Guy Sauvageau, M.D., Ph.D., F.R.C.P.(c)
Molecular Genetics of Stem Cells

Alain Verreault, Ph.D.
Chromosome Biogenesis

Sylvain Meloche, Ph.D.
Signalling and Cell Growth

Matthew J. Smith, Ph.D.
Signalling and structural
biology of cancer

Brian Wilhelm, Ph.D.
High-Throughput Genomics



Three research focuses

Focus 1

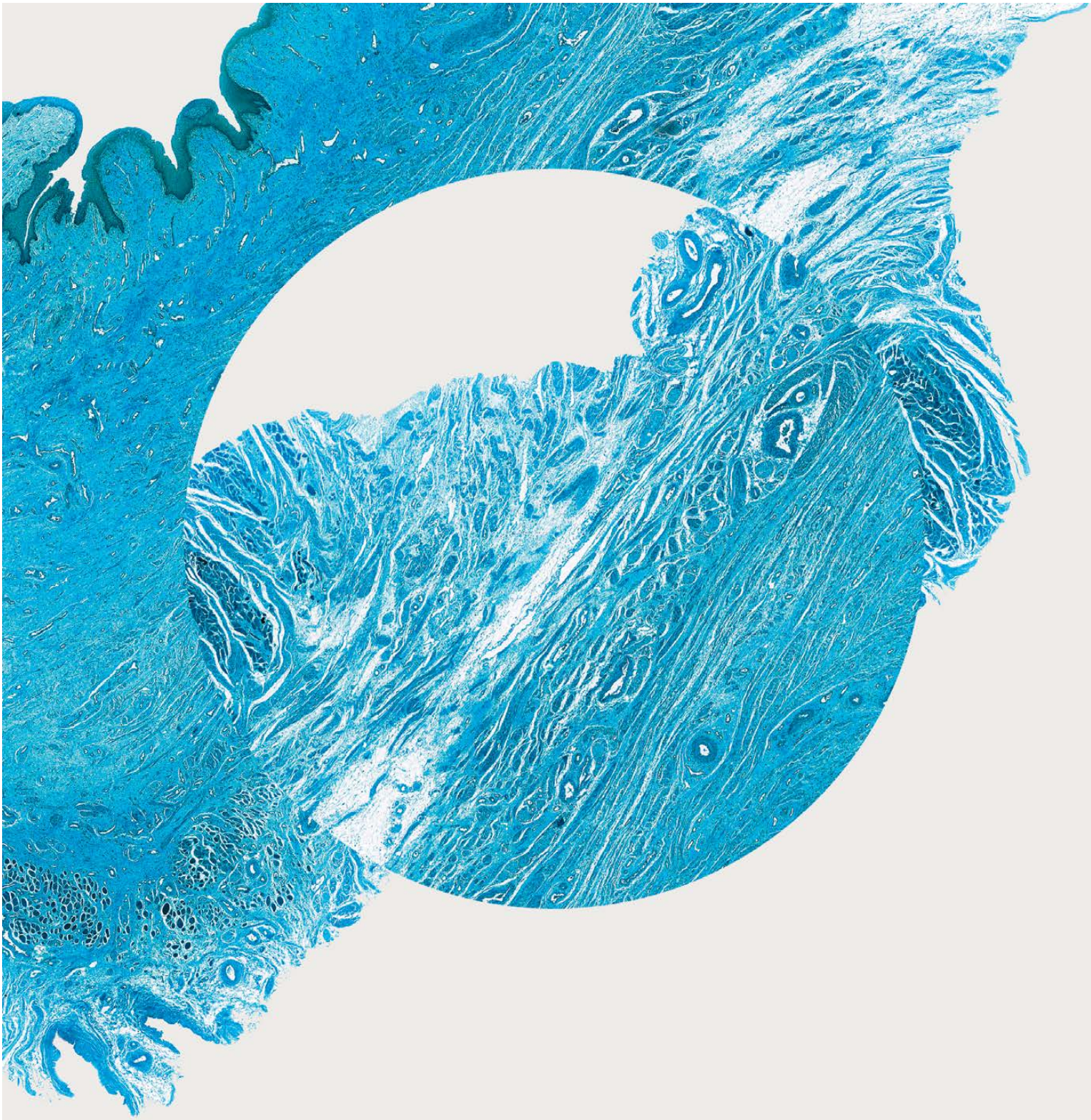
Biology of cancer

Fifteen research teams at IRIC concentrate on basic aspects of the biology of normal and cancerous cells. A deeper understanding of the extremely complex mechanisms that control cell proliferation, survival, and differentiation constitutes an essential basis for the development of new targeted and personalized therapies, i.e., those tailored to each type of cancer.

The researchers in this focus area use a great diversity of approaches and experimental models (yeasts, nematode worms, fruit flies, mice, and animal and human cell cultures). Their aim is to understand important aspects of cell signalling and gene regulation, the mechanics of cell division, and cell cycle regulation.

Research units	**Principal investigators**
Signalling/transcription	
Chromosome Biogenesis	**Alain Verreault**
Molecular Targeting in Breast Cancer	**Sylvie Mader**
Proteomics and Bioanalytical Mass Spectrometry	**Pierre Thibault**
Cell Signalling and Proteomics	**Philippe Roux**
Signalling and Cell Growth	**Sylvain Meloche**
Cancer Signalling and Structural Biology	**Marc Therrien**
Intracellular Signalling	**Gregory Emery**
Vesicular Trafficking and Cell Signalling	
Cell division regulation and mechanisms	
Chemical Biology of Cell Division	**Benjamin Kwok**
Systems Biology and Synthetic Biology	**Michael Tyers**
Cell Division and Differentiation	**Jean-Claude Labbé**
Telomere Length Homeostasis and Genomic Instability	**Lea Harrington**
Cellular Mechanisms of Morphogenesis during Mitosis and Cell Motility	**Sébastien Carréno**
Cell Cycle Regulation	**Vincent Archambault**
Cell Cycle Regulation and Chromosome Structure	**Damien D'Amours**

Associate investigator
Dr. André Robidoux (Centre hospitalier de l'Université de Montréal)



In 2015-2016

15 research units	**70** students	**22** postdoctoral fellows	**33** publications	**$11,600,174** in research funding

Highlights — Matthew J. Smith joins IRIC

Professor Matthew J. Smith joined the IRIC team in December 2015 as principal investigator in the Signalling and Structural Biology of Cancer Research Unit. He is also assistant professor in the Department of Pathology and Cellular Biology at the Université de Montréal's Faculty of Medicine.

Professor Smith completed his doctoral studies in molecular and medical genetics at Mount Sinai Hospital's Lunenfeld-Tanenbaum Research Institute in Toronto. He then did postdoctoral work at the University Health Network's Ontario Cancer Institute, also located in Toronto, and since 2014, he has been a research associate at the same institute.

At IRIC, Matthew Smith's laboratory uses approaches from biophysics, structural biology, and bioinformatics to study the relationships between the structure and function of proteins from oncogenic signalling pathways in the cell. In particular, via an approach based on techniques from nuclear magnetic resonance, Matthew J. Smith and his team will be able to analyze in real time the interactions between the many proteins involved in these signalling pathways. Their work will make it possible to acquire new scientific and technological knowledge and will serve as the basis for the development of diagnostic tests or therapies targeting certain types of cancer.

"Matthew's coming to our team is excellent news," indicated IRIC's scientific director, Marc Therrien. "His research methods fit very well with our philosophy and with the way of doing things at IRIC, where the focus is on ambitious collaborations at the crossroads of complementary disciplines."

Showcased discoveries — Redundant functions for two key cell proliferation regulators

Research cited:

Frémin C., Saba-El-Leil M. K., Lévesque K., Ang S. L., Meloche S. "Functional redundancy of ERK1 and ERK2 MAP kinases during development," *Cell Reports*, 12 (6):913-921, 2015.

Do the twin enzymes ERK1 and ERK2 play the same role in the cell or do they have different functions? The question has intrigued specialists in cell biology for a long time and is especially important given that ERK1 and ERK2 are key regulators of cell survival, proliferation, and differentiation, and are intimately associated with birth defects and pathologies such as cancer.

Researchers in the laboratory of Sylvain Meloche have finally provided a clear answer to this controversial question. Their study published in the journal *Cell Reports* demonstrates plainly in an animal model that the two enzymes have the same function. "It was vital to determine whether or not these two enzymes play different roles," points out Professor Meloche, "because they constitute the last link in one of the cell signalling pathways very often deregulated in cancer and are the ultimate target of a number of drugs that act on that pathway." To date, a dozen ERK1/2 signalling pathway inhibitors have undergone or are now undergoing clinical assessment for the treatment of different cancers.

Earlier studies with mice already demonstrated that the loss of ERK2 had considerably more serious consequences than the loss of ERK1, which suggested different functions for the two enzymes. The IRIC researchers used a combination of sophisticated genetic approaches to adjust the amount of each of the enzymes present in cells *in vivo*. They were able to demonstrate that the severity of pathologies associated with a drop in the level of those enzymes is determined by the total level of ERK1+2, and that they could be substituted for each other as long as the total level remains high. The two enzymes therefore perform similar functions during development.

Research cited:

Ratsima H., Serrano D., Pascariu M., D'Amours D. "Centrosome-dependent bypass of the DNA damage checkpoint by the Polo kinase Cdc5," *Cell Reports*, 14(6):1422–1434, 2016.

Cell Reports Journal

Understanding the reproduction of cells with damaged DNA

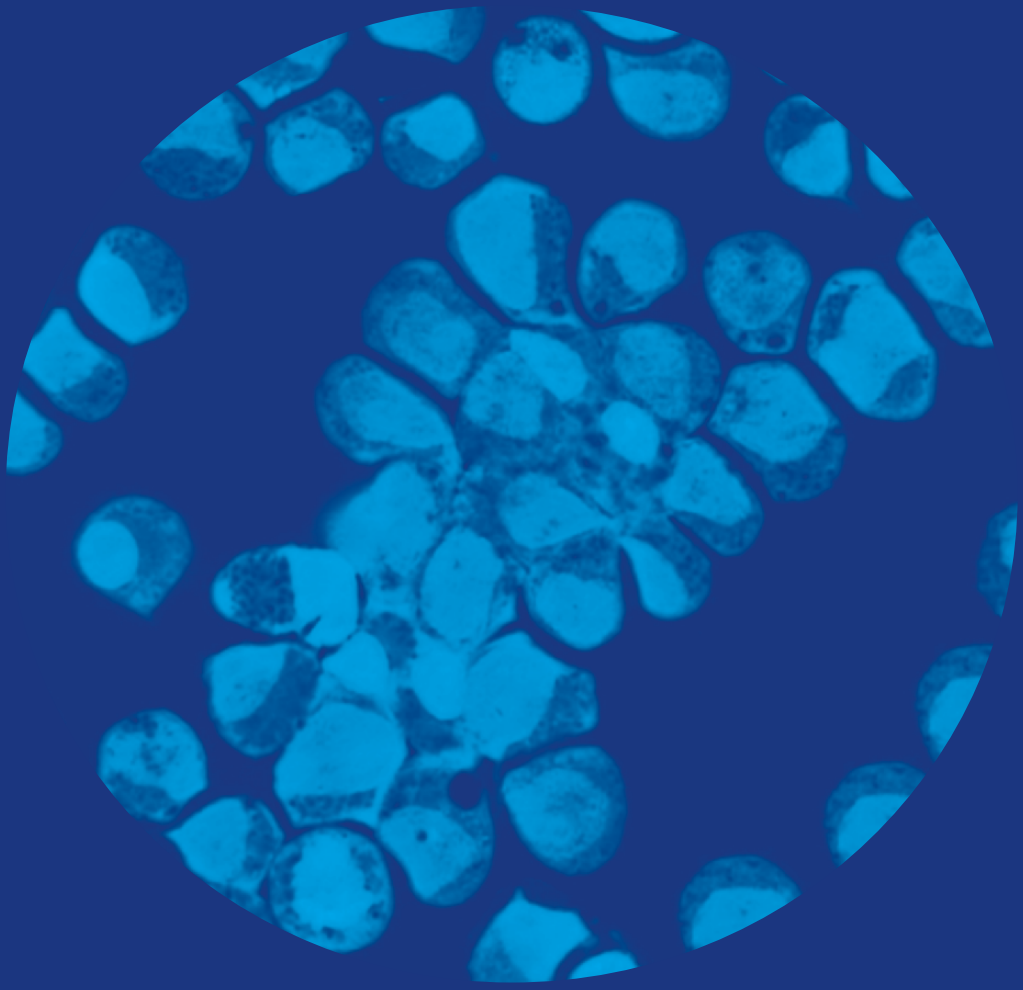
The group of Dr. Damien D'Amours made an important breakthrough in research on the mechanisms responsible for the reproduction of damaged DNA-cells. The study reporting their most recent discovery was moreover featured on the cover of the prestigious *Cell Reports* journal.

This finding will have a considerable impact on cancer therapy, since a significant proportion of cancer treatments currently in use throughout the world (like radiation therapy) kill cancer cells by damaging their DNA. The mechanisms uncovered by Dr. D'Amours' team explain how some cells can bypass the DNA damage response induced by chemo and radiation therapy and allow cells to develop into secondary tumours or metastases in patients.

"When DNA damage occurs, cells will typically have one of two healthy responses," explains Dr. D'Amours. "Either they repair their DNA so that they may proliferate again without alteration or they trigger their own death to rid the body of abnormal cells. However, there is a third response, in which cells reproduce themselves with damaged DNA. What we have discovered here are the mechanisms that allow cells to ignore the damage in their genome and to multiply actively despite damaged DNA. This phenomenon, known as 'adaptation to DNA damage,' can contribute to the survival of cancer cells."

Enzymes playing a key role in the response to DNA damage – Polo-like kinases (Plks) – are partially responsible for this reaction. Control points are set up within the cell cycle to preserve DNA integrity. Mechanisms described in this study led to the identification of the elements that promote the bypass of those control points and consequently the reproduction of cells with damaged DNA.

The laboratory's future research will make it possible to identify new therapeutic targets to prevent the reproduction of DNA-damaged cells and possibly ensure efficient treatment of tumours in patients.



Focus 2

Leukemia and stem cells

Although relatively rare in adults, hematological cancers constitute a special problem. They rank with the cancers causing the most deaths, and recurrences are extremely frequent. In addition, leukemia is the most commonly diagnosed cancer in children.

Six IRIC research teams focus on leukemias and the blood stem cells that are at the origin of these cancers. They also study molecular aspects of immunity that affect the success of stem cell transplants and the development of new cancer immunotherapies. • A number of researchers in this focus area work in close collaboration with partners from the hospital community, and their work has led to several clinical trials currently in progress.

Research units	**Principal investigators**
Molecular Genetics of Stem Cells	**Guy Sauvageau**
High-Throughput Genomics	**Brian Wilhelm**
Hematopoiesis and Leukemia	**Trang Hoang**
Immunobiology	**Claude Perreault**
Chromatin Structure and Stem Cell Biology	**Julie Lessard**
Structure and Function of the Cell Nucleus	**Katherine Borden**

Associate investigators
Frédéric Barabé (Université Laval)
Dr. Josée Hébert (Centre de recherche de l'Hôpital Maisonneuve-Rosemont)
Dr. Denis-Claude Roy (Centre de recherche de l'Hôpital Maisonneuve-Rosemont)

In 2015-2016

6 research units	**28** students	**15** postdoctoral fellows	**22** publications	**$18,890,958** in research funding

Highlights — Health Canada authorizes clinical trials for the molecule UM171

In December 2015, Health Canada authorized the first clinical trial phases for the transplantation of stem cells previously multiplied in a unit of cord blood – thanks to the molecule UM171 – to patients with AML.

The molecule UM171, discovered by the teams of Anne Marinier and Dr. Guy Sauvageau, is the first of its kind allowing for the multiplication of blood stem cells in culture.

The Centre of Excellence for Cellular Therapy at Maisonneuve-Rosemont Hospital will serve as a production unit for these stem cells. Grafts will then be distributed to patients in the cities of Montreal, Quebec and Vancouver for this first cross-Canada clinical study.

"This is excellent news," claimed Dr. Sauvageau. "The first clinical trials on a certain number of patients suffering from blood-related diseases will allow us to confirm our hypotheses. It's an important step in the fight against cancer, and I would like to highlight the exceptional work of all our teams in taking it, both at IRIC and at Maisonneuve-Rosemont Hospital."

"We should see the first results in 2016," added Dr. Sauvageau, "and if everything goes well, subsequent clinical trial phases will follow."

Showcased discoveries — A new function for the LMO2 oncogene, control of DNA replication

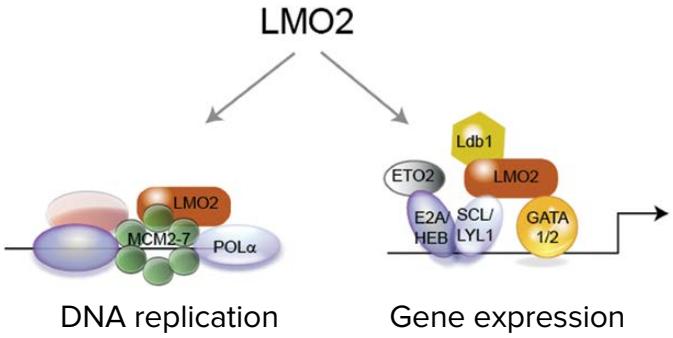
Research cited:

Sincennes M. C., Humbert M., Grondin B., Lisi V., Veiga D. F., Haman A., Cazaux C., Mashtalir N., Affar el B., Verreault A., Hoang T. "The LMO2 oncogene regulates DNA replication in hematopoietic cells," *Proceedings of the National Academy of Sciences of the United States of America*, 113(5):1393–1398, 2016.

Researchers from the laboratory of Trang Hoang discovered a new important role for LMO2, a cellular factor that normally controls the expression of genes essential to the production of red blood cells and which is involved in the development of certain leukemias. This transformative discovery was recently published in the *Proceedings of the National Academy of Sciences of the United States of America*.

To better understand the functions of LMO2, Trang Hoang's team and collaborators attempted to identify the proteins with which LMO2 interacts in stem cells and blood progenitor cells. They were surprised to find that in addition to the proteins involved in gene regulation, LMO2 also interacted with a number of proteins involved in DNA replication. Additional experiments showed that LMO2 is recruited to specific sites on the DNA where replication originates and could induce recruitment of replication proteins and initiation of the replication of those sequences.

"These protein-protein interactions are not easily detected," declared Trang Hoang. "It took a technical 'tour de force' and fantastic teamwork to bring this project to maturity." Understanding of this direct involvement of LMO2 in DNA replication could have significant long-term impact, since LMO2 is sometimes abnormally activated in cells of the immune system, where it contributes to the induction of T-acute lymphoblastic leukemia (T-ALL), a form of the disease that represents approximately 20 percent of all childhood leukemias.



LMO2 controls two different cellular processes: DNA replication and gene expression.

Research cited:

Laumont C. M., Daouda T., Laverdure J. P., Bonneil É., Caron-Lizotte O., Hardy M. P., Granados D. P., Durette C., Lemieux S., Thibault P., Perreault C. “Global proteogenomic analysis of human MHC class I-associated peptides derived from non-canonical reading frames,” *Nature Communications*, 7:10238, 2016.

Non-coding DNA contributes to the detection of abnormal cells by the immune system

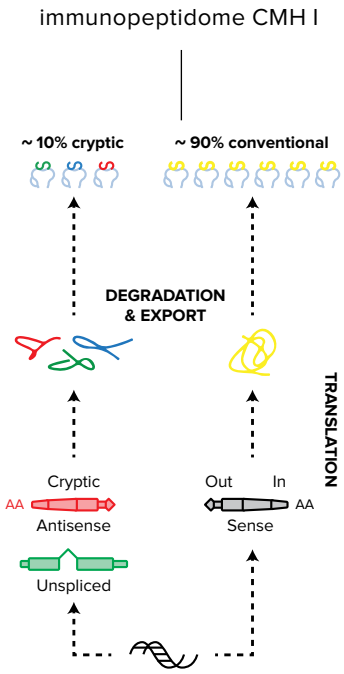
The laboratory of Dr. Claude Perreault, in collaboration with Sébastien Lemieux and Pierre Thibault, demonstrated in an article appearing in Nature Communications that some DNA sequences believed to be non-coding, i.e., whose biological function is not fulfilled by a protein, actually play a key role in self-recognition by the immune system.

Self-recognition is the most important role assumed by our immune system: this is how our body detects and suppresses abnormal cells to keep us alive.

There was already evidence that the mission of this non-coding DNA is to regulate specific cell functions, but this is the first time that products of this DNA have been found at the surface of cells in order to fulfill immune-related functions.

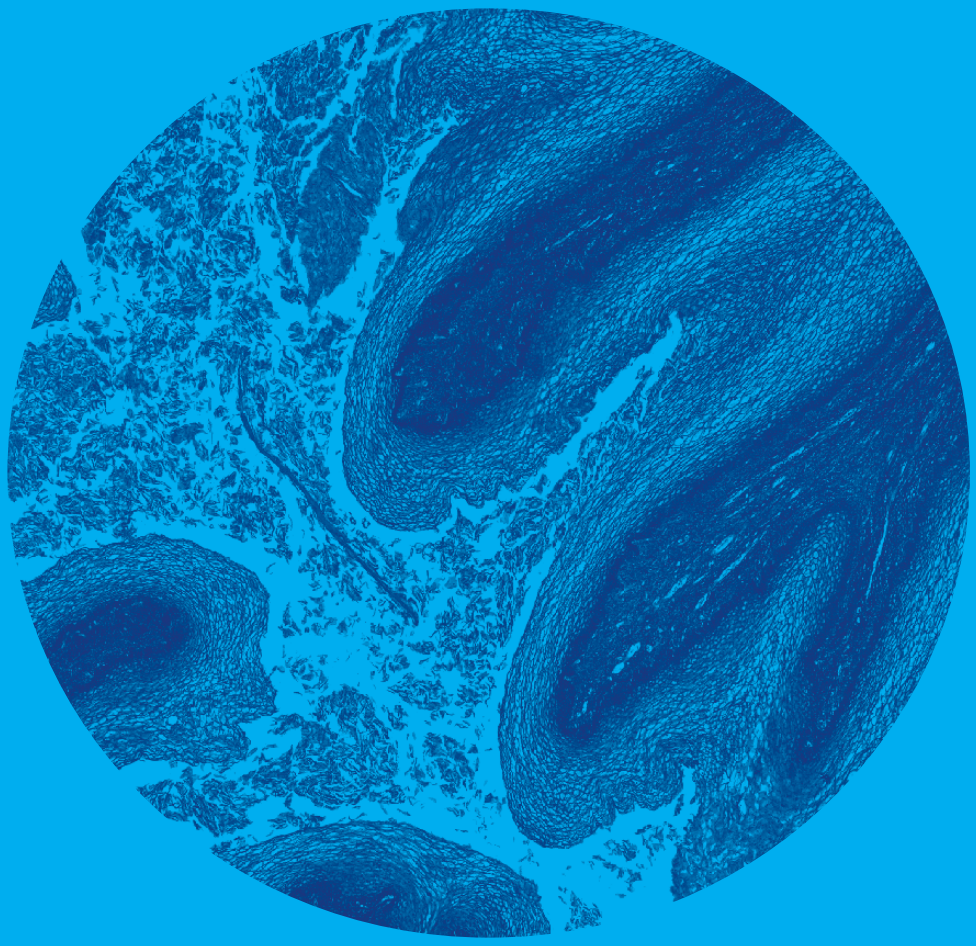
Indeed, some portions of this non-coding DNA – it is estimated that 98 percent of the DNA of our cells is non-coding – are used to produce protein fragments called peptides, found at the surface of our cells. Those peptides are “scanned” and recognized by the immune system, which triggers a reaction leading to the elimination of a cell if it is deemed abnormal.

The study shows that about 10 percent of the peptides found at the surface of cells derive from non-coding DNA. This discovery significantly increases the likelihood of finding a specific difference between peptides present at the surface of healthy cells and those present on the surface of cancer cells. New immunotherapeutic approaches may exploit these differences to teach a patient’s immune system to detect and destroy the cancer cells.



MHC I molecules present cryptic peptides that derive from non-coding DNA.

Focus 3:
Molecular diagnostics and targeted therapies



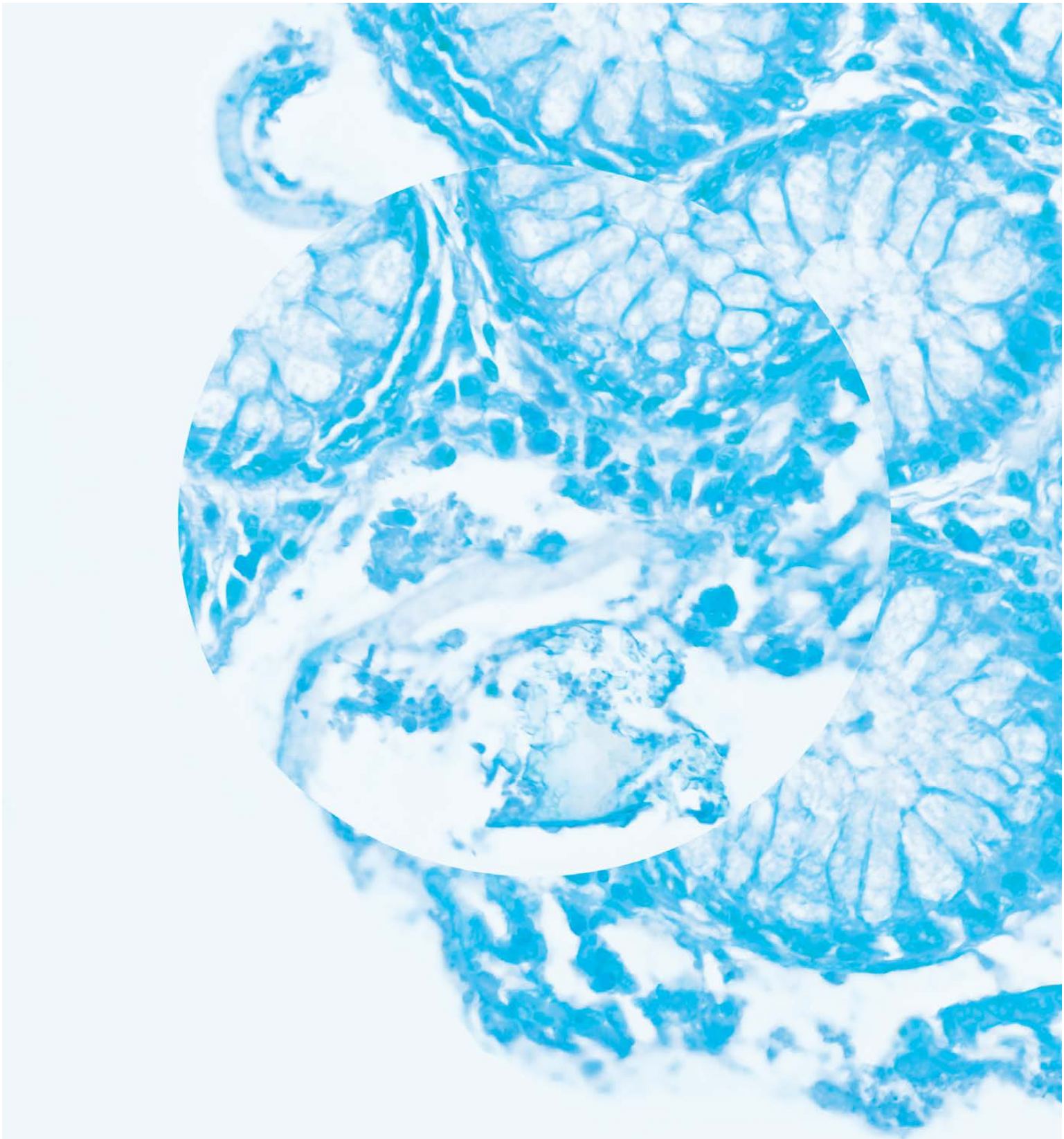
Focus 3

Molecular diagnostics and targeted therapies

The seven teams in this focus area concentrate on the development of new diagnostic tools and new and more targeted therapeutic modalities and innovative drugs.

The diversified expertise of these research units allows for the creation of software and bioinformatics tools as well as for RNA engineering, the discovery of new histological markers, the immunological characterization of the tumour environment, and the identification and optimization of therapeutic molecules. As for all IRIC researchers, these teams have access to a cutting-edge research infrastructure, including the largest medicinal chemistry laboratory in a Canadian university.

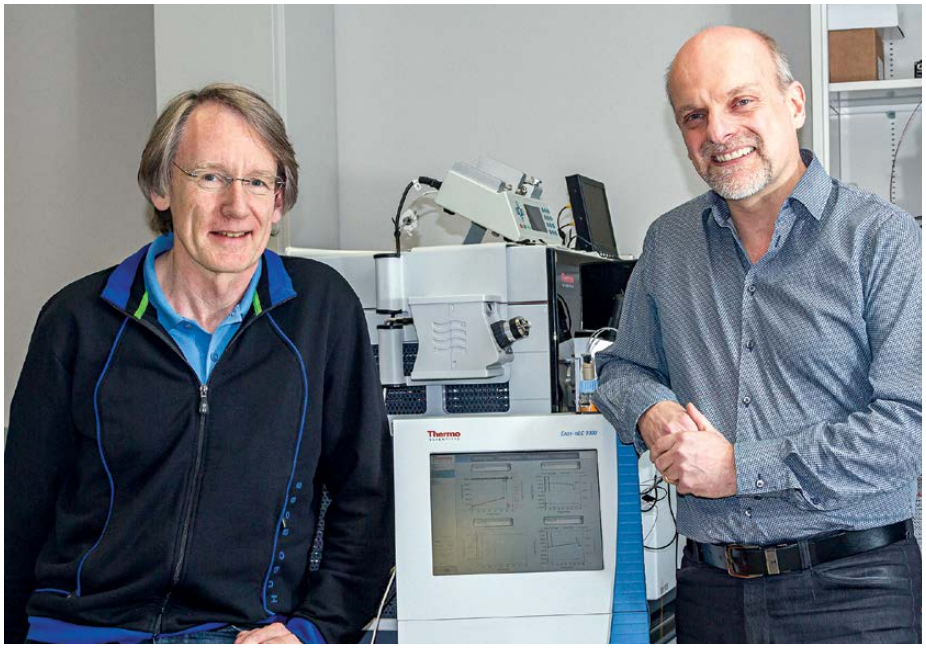
Research units	**Principal investigators**
Functional and Structural Bioinformatics	**Sébastien Lemieux**
Yeast Molecular Biology	**Martine Raymond**
Medicinal Chemistry	**Anne Marinier**
Histology and Molecular Pathology	**Louis Gaboury**
Cancer Immunobiology	**Étienne Gagnon**
RNA Engineering	**François Major**
Molecular Pharmacology	**Michel Bouvier**



In 2015-2016

7 research units	**27** students	**8** postdoctoral fellows	**24** publications	**$8,154,376** in research funding

Highlights — IRIC receives a grant for its Centre for Advanced Proteomic Analyses from Genome Canada and Génome Québec



Michael Tyers and Pierre Thibault, principal investigators at IRIC and professors in UdeM's Department of Medicine and Department of Chemistry respectively.

IRIC received a grant of over $755,000 for its Centre for Advanced Proteomic Analyses (CAPA) as part of Genome Canada and Génome Québec's Canadian Genomics Innovation Network competition. CAPA is one of the 10 advanced technology centres in the Canadian Genomics Innovation Network.

CAPA is a multi-disciplinary facility that provides state-of-the-art proteomics technologies to support the development of cancer treatments and the discovery of cellular regulatory mechanisms based on protein interactions and post-translational modifications. The Centre is headed by Pierre Thibault and Michael Tyers, both principal investigators at IRIC and professors in UdeM's Department of Chemistry and Department of Medicine respectively. CAPA offers Canadian and international researchers the cutting-edge technologies they need for their proteomics research work.

The Centre relies on strong expertise in bioinformatics for data processing and analysis. In addition, it trains highly qualified personnel, including graduate students, postdoctoral fellows, visiting scientists, and research assistants in the latest advances in proteomics analysis.

Research cited:

Paradis J. S., Ly S., Blondel-Tepaz É., Galan JA., Beautrait A., Scott M. G., Enslen H., Marullo S., Roux P. P., Bouvier M. "Receptor sequestration in response to β-arrestin-2 phosphorylation by ERK1/2 governs steady-state levels of GPCR cell-surface expression," *Proceedings of the National Academy of Sciences of the United States of America*, 112(37):E5160-5168, 2015.

Showcased discoveries — An unexpected role for the ERK1/2 protein kinases in the regulation of a large family of cell receptors

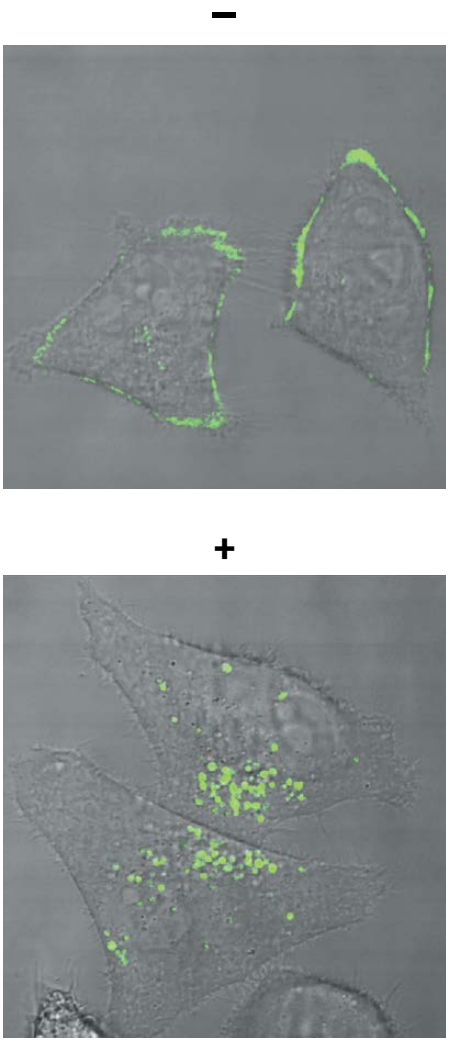
The laboratories of Michel Bouvier and Philippe Roux at IRIC, in collaboration with the team of Stefano Marullo at Institut Cochin in France, published a study in the journal *Proceedings of the National Academy of Sciences* that reveals the central role of protein kinases ERK1/2 in the control of signalling by a number of G protein coupled receptors (GPCRs). Since GPCRs represent the largest family of therapeutic targets, this work could have a significant impact on the development of new therapeutic approaches for the treatment of various diseases, including cancer.

This study demonstrates that the protein kinases ERK1/2 cause the intracellular sequestration of GPCR and thus decrease the responsiveness of cells to many stimuli, including hormones, neurotransmitters, and drugs that normally activate GPCRs at the surface of the cell.

This work is important because the signalling pathway to which protein kinases ERK1/2 belong is frequently deregulated in cancer and is the target of several anticancer drugs. The results suggest that the expression of several GPCRs on the surface of cancer cells is disrupted, which could have important consequences on the response of these cells to their environment, but also on the type of possible treatments to target these cells.

Taking full advantage of the joint expertise of the laboratories involved, this project combined techniques of bioluminescence resonance energy transfer (BRET), flow cytometry, and *in vitro* phosphorylation and phosphoproteomics, to highlight a new GPCR regulatory mechanism.

Activation of ERK1/2



Cultured cells expressing the CXCR4 receptor (green), a member of the G protein coupled receptor (GPCR) family. In absence of ERK kinase activation (top panel), the receptor is located at the cell surface. When the ERK kinase is activated (bottom panel), the receptor is sequestered inside the cell and becomes unable to respond to signals coming from outside the cell.

A stable marriage between microRNAs and messenger RNAs

Research cited:

Weill N., Lisi V., Scott N., Dallaire P., Pelloux J., Major F. "MiRBooking simulates the stoichiometric mode of action of microRNAs," *Nucleic Acids Research*, 43(14):6730–6738, 2015.

Since their discovery some 20 years ago, microRNAs (miRNAs) have been demonstrated to play an important role in the regulation of gene expression. They bind to certain messenger RNAs (mRNAs) containing a complementary sequence and interfere with the translation of the sequence of these mRNAs into proteins. The use of artificial miRNAs in targeting oncogenes therefore constitutes a highly interesting potential therapeutic approach.

Nevertheless, it is difficult to predict the impact of a particular miRNA, since it depends on the presence of each of the 2,500 different miRNAs and the amount of each mRNA in the cell. To simulate the situation in the cell, the team of bioinformaticians headed by François Major developed an algorithm called MiRBooking which takes into account the sum total of potential miRNN-mRNA interactions and strives to optimize the number of "stable marriages" between miRNA and mRNA in given conditions. By comparing the predictions of MiRBooking to real results obtained on cell lines, the IRIC researchers were able to demonstrate that this new approach outperforms in accuracy other miRNA target prediction programs.

In the long term, this new software, which is the subject of an article in the journal *Nucleic Acids Research*, will help in the design and engineering of artificial miRNA, optimized for a therapeutic effect in cancer cells.

Cutting-edge scientific facilities

The highly qualified professionals of IRIC's 12 core facilities have access to an equipment park at the leading edge of technology, allowing them to offer high-level specialized services to researchers at the Institute, Université de Montréal, and elsewhere in academia and in industry. ● These facilities constitute one of the few integrated drug discovery chains in a university setting in Canada. ● At the heart of the integrative research in immunology and cancer carried out at IRIC are core facilities, each overseen by an advisory committee chaired by a principal investigator. ● Facility directors manage the operations of state-of-the-art equipment and offer an advisory service for carrying out research work. The activities of the core facilities are coordinated by Manon Valiquette, Head of Scientific Platforms.

Highlights

The team of Dr. Guy Sauvageau and collaborators obtained an institutional grant of over $12 million from the FCI and Québec's Ministère de l'Économie, de l'Innovation et des Exportations. With this grant, the bio-imaging core facility was able to acquire a ZEISS LSM 880 confocal microscope with Airyscan and FLIM technology from the Carl Zeiss Company.

The microscope, one of the installed in Canada, increases spatial resolution, signal-to-noise-ratio, and image acquisition speed. The histology core facility, meanwhile, acquired a new stainer, the Bond RX by Leica. In addition to traditional markings in immunohistochemistry and immunofluorescence, the stainer is used to perform *in situ* hybridization with RNAscope (ACD) probes, as well as TUNEL marking, which characterizes cellular apoptosis in a completely automated way. The grant will also help to acquire a number of other high-tech instruments to be integrated into IRIC's scientific core facilities, enabling the Institute to maintain its expertise in breakthrough-oriented research.

The work of Dr. Sylvain Martel of Polytechnique de Montréal, in collaboration with Dr. Louis Gaboury, Principal Investigator at IRIC and Director of the Department of Pathology and Cell Biology at UdeM's Faculty of Medicine, along with the histology core facility, has led to a spectacular technological discovery for cancer treatments. Their work involves the creation of an army of nanorobots capable of navigating the bloodstream to accurately target cancer tumors. Their discovery was the subject of a major publication in *Nature Nanotechnology*.

In collaboration with the Centre for Drug Research and Development in Vancouver and thanks to financial support from Merck, Principal Investigator Katherine Borden and the Biophysics Core Facility developed a fragment-library high-throughput screening service via nuclear magnetic resonance (NMR), using purified proteins.

Overview of the core facilities

Animal facility in the Marcelle and Jean Coutu Pavilions

IRIC houses one of Canada's largest animal facilities, adhering to rigorous pathogen-free standards and benefiting from separate quarantine rooms. As well as providing hosting and technical and veterinary support for animal research and health, IRIC's animal facility offers a variety of services for *in vivo* segments of research projects. Among other things, studies in pharmacokinetics are carried out here, in collaboration with the biopharmacy core facility of the UdeM Faculty of Pharmacy.

Bio-imaging

Cutting-edge optical microscopy equipment and image analysis stations.

Bio-informatics

Innovative tools for creating, analyzing, integrating and consulting biological databases with the use of high-performance computing clusters.

Biophysics

State-of-the-art solutions in NMR spectroscopy for experiments on the structure of proteins, protein-ligand interactions and the characterization of small molecules.

Medicinal chemistry

Synthesis of small, original and specific molecules leading to the discovery of chemical entities that can serve as pharmaceutical tools and that have therapeutic potential.

High-throughput screening

Portfolio of over 110,000 molecules, and integrated robotic systems, to perform a variety of biochemical and cellular assays.

Cytogenetics

Chromosomal analysis of human and mouse cells through traditional cytogenetic techniques and spectral karyotyping.

Flow cytometry

Use of FACS equipment to sort and analyze various physical property of cells in, among other things, immunophenotyping, and the study of both the cell cycle and apoptosis.

Genomics

Cutting-edge technologies in next-generation and capillary sequencing, and in real-time PCR.

Histology

Services in histology, immunohistochemistry, image acquisition, and the generation of tissue microarrays.

Proteomics

Advanced technologies in mass spectrometry allowing for the identification and quantification of proteins and their post-translational modifications based on cell extracts, tissue, and biological fluid.

Transgenesis

Services in DNA microinjection, ES cells in blastocysts, embryo and sperm cryopreservation, mouse line rederivation, and *in vitro* fertilization.


12
core facilities

Statistical data —

Source of users of IRIC's core facilities in 2015-2016

270
Research teams

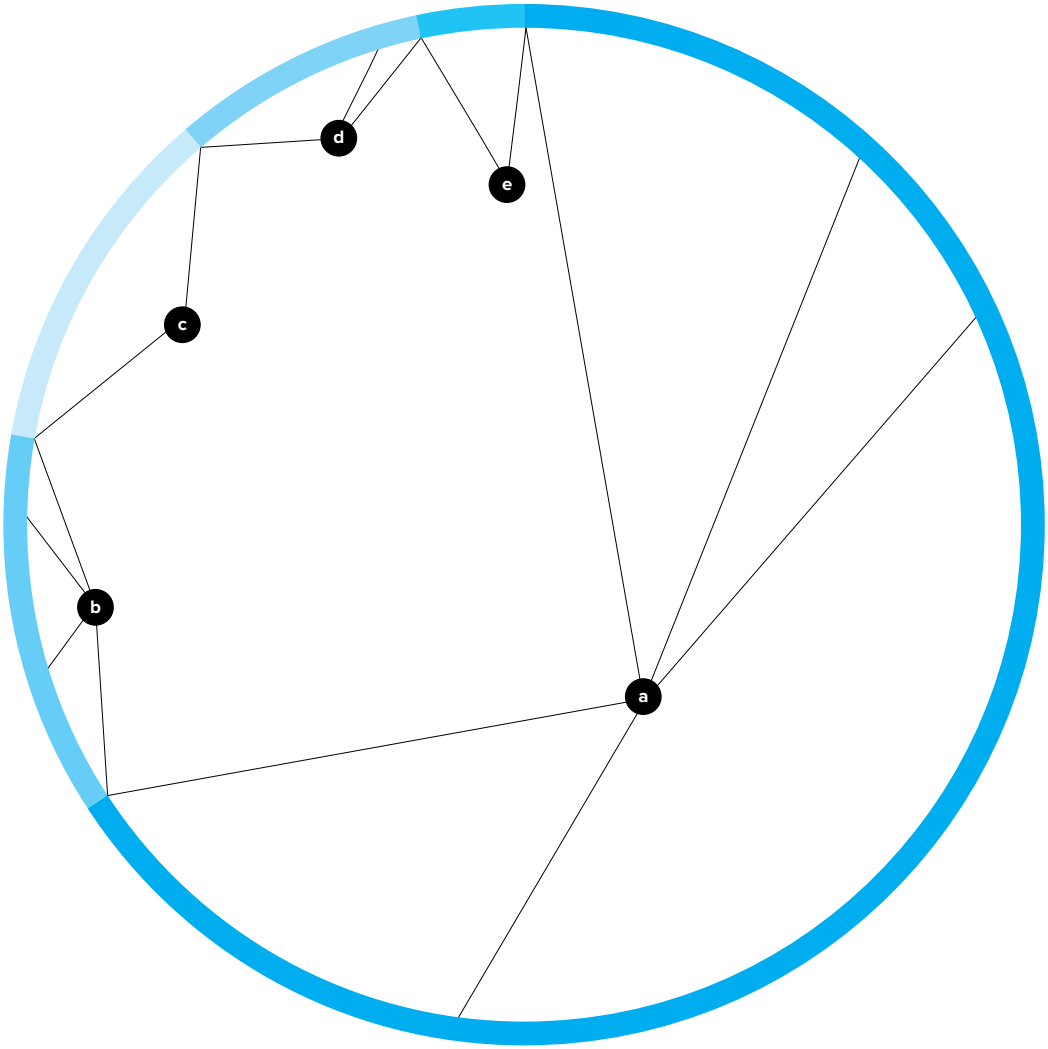
a) 11 % IRIC (28)
b) 25 % UdeM – campus (66)
c) 27 % UdeM – affiliated centres (74)
d) 30 % Public organizations (82)
e) 7 % Industry (20)

Statistical data —

Source of revenues for IRIC's core facilities in 2015-2016

$3,5 M
Revenues

a) 66 % IRIC
b) 12 % UdeM – campus
c) 11 % UdeM – affiliated centres
d) 8 % Public organizations
e) 4 % Industry



IRICoR: capturing and maximizing the value of drug discovery research at IRIC

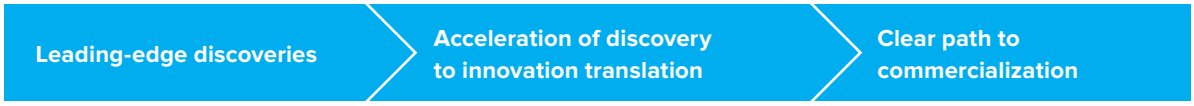
IRICoR (Intsitute for Research in Immunology and Cancer – Commercialization of Research) is a not-for-profit drug discovery, development, and commercialization centre based at IRIC. ● Since 2008, IRICoR's objective has been to rapidly translate highly innovative scientific projects into high value novel therapies in oncology, immunology, and related indications through strong partnerships with the private sector – thereby efficiently bridging the innovation translation gap between early stage academic research and industry and thus allowing patients faster access to breakthrough drugs.

IRICoR relies on a team with solid experience in the following fields: drug discovery, business development, risk capital, protection of intellectual property, and project management. Integrated into IRIC, IRICoR professionals have in-depth knowledge of the Institute's technological capacities and those of its partners, and keep abreast of the Institute's most recent discoveries.

IRICoR's unique model resides in its integration, under a single roof and in a university setting, of high-calibre basic research, access to cutting-edge technological core facilities, and IRIC's drug discovery chain, associated expertise, and business expertise.

Recall that IRIC has one of the largest academia-based medicinal units in Canada, with members mostly from the pharmaceutical industry. These experienced chemists and biologists lend the Institute a unique added value. The IRICoR model fosters the mitigation of risks connected with the discovery and commercialization of new therapeutic approaches.

This hybrid research-business model, among other things, allows the 200 future leaders in life sciences trained annually at IRIC and Université de Montréal to be exposed to learn about the key factors in the commercialization of research, thus contributing to their cross-training and to nourishing a culture of innovation.



IRICoR strives to attract the best drug discovery projects in Québec, Canadian, and foreign universities, helping to transform research into innovation and accelerating the commercialization of cutting-edge products. IRICoR pursues its mission by establishing strong partnerships with the private sector, both in financial terms and in clinical-development expertise.

Project portfolio

IRICoR selects its projects on the basis of their scientific excellence and their commercial potential, supports them strategically, and invests in them directly with a view to moving them rapidly towards commercialization.

At the end of 2015-2016, five new projects were funded, bringing the number of projects to 34 in the IRICoR portfolio. Projects cover the entire drug discovery chain, from the identification of therapeutic targets, to clinical trials. Support for the projects covers the entire gamut from funding, to negotiation of partnerships and licenses that give access to IRIC's core facilities, to project management, and to the protection of intellectual property. IRICoR-supported projects this year led to the filing of 19 patent applications representing 16 patent families.

Projects supported by IRICoR have also led to the development of three drug candidates currently at the clinical evaluation stage. A project in partnership with AmorChem, a Montréal-based venture capital firm, will enter the clinical phase in the coming year.

Creation of companies

2015 saw the creation of ExCellThera, a spinoff company of UdeM based on the discovery by the teams of Dr. Sauvageau and Anne Marinier of the compound UM171, used in the treatment of AML. The molecule UM171 allows for the multiplication of hematopoietic stem cells for transplants. The project, for which Phase I/II clinical studies have begun, is proof of the acceleration that has taken place in the transformation of basic research into innovations with clinical applications: the transition from early "hit" stage to the clinical stage took less than six years.

The income-generating activities of the spinoff company Domain Therapeutics NA continue in Montreal at the NEOMED Institute. The company provides services using nearly 30 biosensors developed in the academic sector. Among other things, these biosensors allow identifying the functional selectivity of a ligand by characterizing its specific signalling pathway.

Visibility

The IRICoR team was invited to present its business model and its project portfolio at 11 national or international gatherings, in addition to taking part in the organization of two meetings on drug discovery, one at the national level and the other at the international level.

Partnerships

IRICoR entered into or extended 13 licensing agreements related to 22 projects.

- The first project, initiated in 2008 and conducted in collaboration with Bristol-Myers Squibb (BMS) by the teams of Anne Marinier (expertise in medicinal chemistry) and Michel Bouvier (expertise in G protein-coupled receptors), is already in Phase II clinical trials in the important cardiovascular disease sector. This collaboration with BMS now includes new projects, bringing to nine the number of projects in the partnership.

- The joint expertise of IRIC and IRICoR also led to the addition of two new joint projects with the Centre for Drug Research and Development in Vancouver and MaRS Innovation in Toronto.

- The Phase II clinical trial in acute myeloid leukemia (AML) in collaboration with the Montreal biopharmaceutical company Pharmascience, and the Leukemia and Lymphoma Society in the United States, continued.

- The partnership agreement with the venture capital firm Amorchem for the funding of two projects as part of Genome Canada's (GC) and Génome Québec's (GQ) Large Scale Applied Research Project Competition in Genomics and Personalized Health continued according to the stages planned at the outset.

IRICoR also established an initial collaboration between various IRIC researchers and the French company Oncodesign, an association that could lead to a broader partnership.

IRICoR activities in the commercialization of drug discovery research are carried out by nearly 150 fulltime-equivalent employees, including highly qualified research, commercialization, and administrative staff.

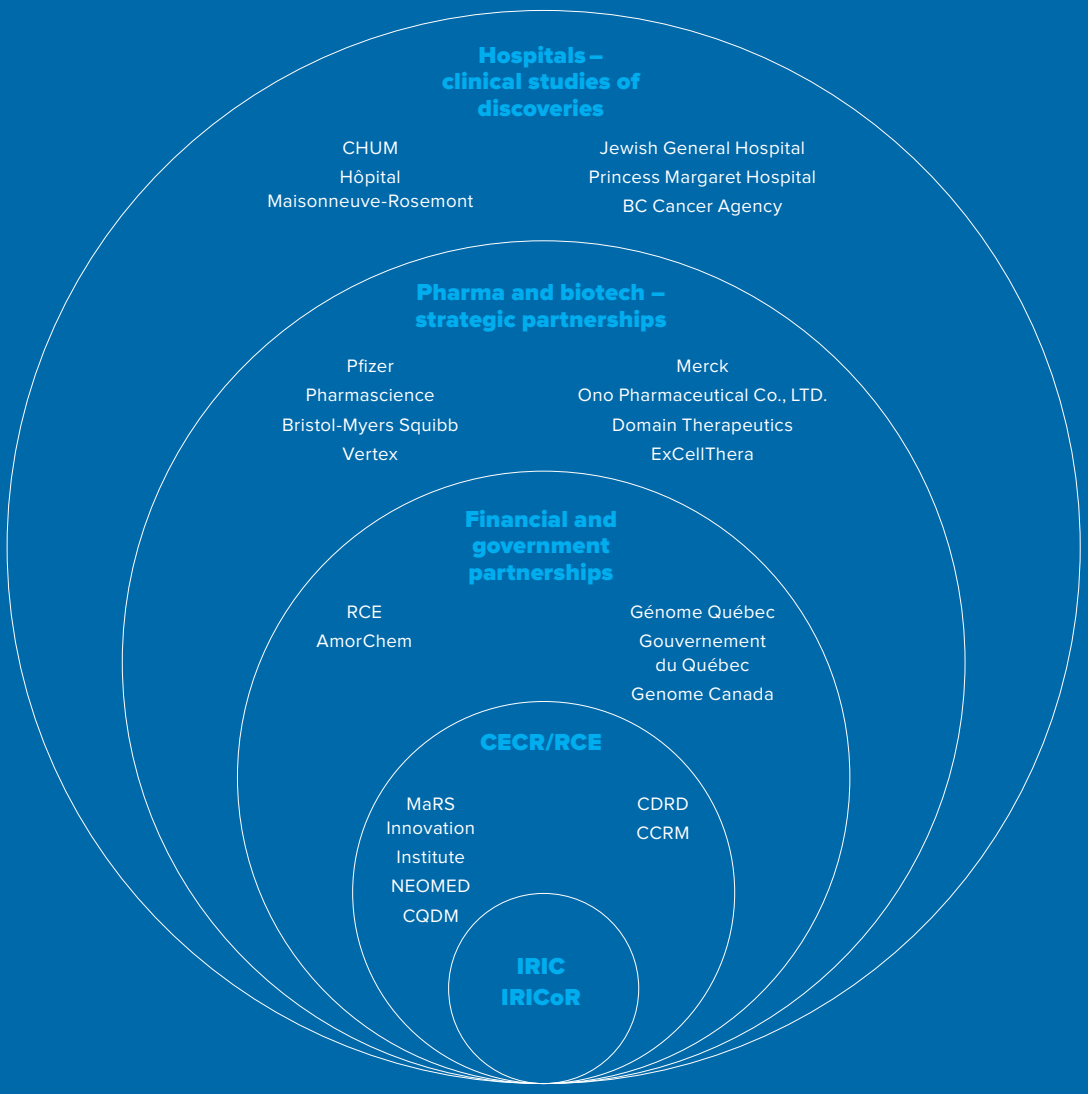
Governance

In the course of the year, Nadine Beauger became the new chief executive officer of IRICoR. She took over from Michel Bouvier, who remains CEO of IRIC. The appointment was made at the Assembly of Members of IRICoR when it met on March 17, 2016, on the recommendation of the organization's board of directors. As stated at the time by IRICoR Board Chair Johane Boucher Champagne, "The Board extends its thanks to Michel Bouvier for all the work he accomplished leading IRICoR over the last four years. Under his leadership, IRICoR has become a key player in academic-based drug discovery and now enjoys international prestige, which translates into considerable socio-economic and scientific benefits."

Funding and revenues

For the 2015-2016 period, funding for research and development (R&D) activities totalled $4.8M from private partners and $11.6M from public funds. Moreover, revenues from research licensing connected with collaboration contracts now reach over $2M.

After eight years of existence, in close cooperation with IRIC/UdeM, IRICoR is proud to be at the heart of the Québec and Canadian ecosystem in commercializing university research and, in the process, contributing actively to the development of the economy.

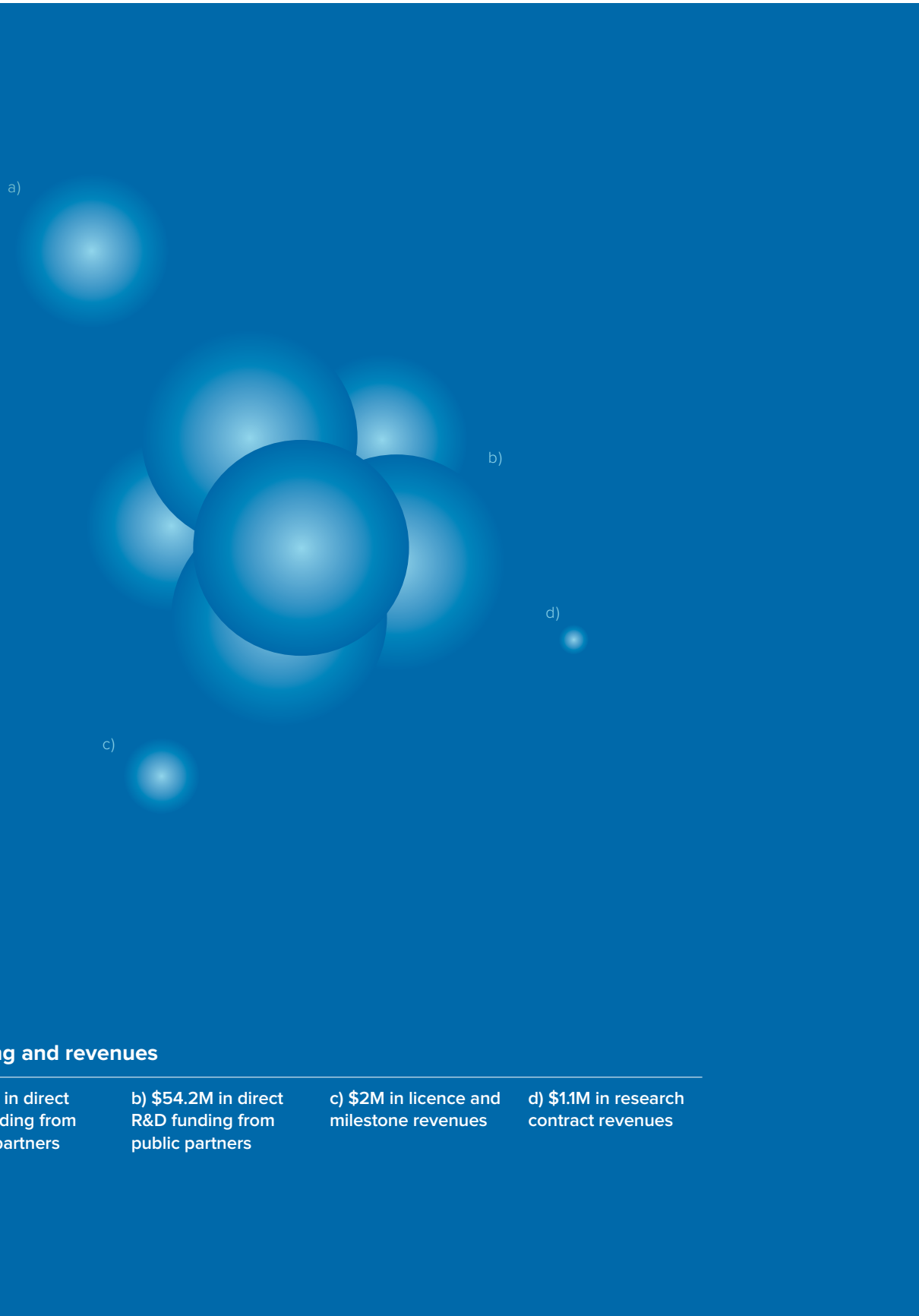


National and international network of university collaborators (selected)

Karolinska Institutet, Université Laval, Cochin Institute, University of Toronto, Anderson Cancer Center (The University of Texas MD), Centre for Commercialization of Cancer Immunotherapy, Max-Planck-Gesellschaft, Quebec Leukemia Cell Bank (BCLQ), Université de Sherbrooke, Research Centre CHU Sainte-Justine, Memorial Sloan Kettering Cancer Center, McGill University, MRC Laboratory of Molecular Biology

Statistical data

From 2008 to April 30, 2016



Funding and revenues

a) $26M in direct R&D funding from private partners

b) $54.2M in direct R&D funding from public partners

c) $2M in licence and milestone revenues

d) $1.1M in research contract revenues

Highlights

- 9 private partners (BMS, Pfizer, Pharmascience, Merck, Domain, AmorChem, Cyclenium, Encycle Therapeutics, STEMCELL Technologies)
- 23 projects in partnerships/licencing signed with industry
- 3 companies created
- 8 patents granted
- 41 patent families developed internally
- 171 patent applications
- 83 projects funded (funding/management/intellectual property/grants)
- 150 fulltime jobs in science and management created and maintained

The new scientific generation: ensuring the long-term success of top-level research

IRIC's Office of Academic Affairs aims to assist students in their academic career, from their arrival at the Institute to their graduation. Every effort is made to provide them with the best possible training. Students have access to the Institute's state-of-the-art facilities, courses of international calibre, many lecture and seminar series, and personalized university and administrative support. Whether enrolled at IRIC for an undergraduate internship or graduate program, students participate actively in the advancement of cancer research while fully developing as scientists.

A leading and innovative training centre

In choosing to pursue their training at IRIC, young researchers receive top-level multidisciplinary instruction in the field of cancer research, and benefit from the varied expertise and exceptional guidance of IRIC's principal investigators.

In 2015-2016, 97 new students joined IRIC to pursue their training and actively participate in advancing research conducted at the Institute. They came from 49 academic institutions located in 13 different countries from the four corners of the globe to be part of the research teams.

Numbers like these attest to the reputation for excellence of IRIC and UdeM nationally and internationally and the ability of these institutions to attract the finest students searching for top-level scientific training in cancer research. At the graduate level, students have access to a great variety of study programs offered by UdeM. In 2015-2016, 63 percent of master's and doctoral students were enrolled in the systems biology training program developed by IRIC investigators.

Integrated into the molecular biology programs of UdeM's Faculty of Medicine, this program offers an accelerated one-year master's degree and a five-year doctorate that includes cellular and molecular biology, immunology, biochemistry, genetics, bioinformatics, proteomics, drug development, and the more clinical aspects of cancer research. IRIC also offers master's and doctoral programs in the following fields: molecular biology, biochemistry and molecular medicine, bioinformatics, chemistry, microbiology, immunology, and pharmacology.

2015 student recruitment event

26

students for master's degrees and doctorates

For the second year, from June 18 to 21, 2015, IRIC organized its student recruitment event to attract the finest prospects in biomedical research. Attesting to the excitement generated by this event, over 147 applications from 81 universities in 19 countries were received this year.

With its innovative programming and interactive design, the event allowed participants to visit IRIC's laboratories and core facilities, meet and discuss with the Institute's investigators and students, learn about the Institute's study programs and graduate projects, and participate in individual interviews with the researchers of their choice.

Forty-one candidates from various countries (Canada, United States, Brazil, France, Germany, Belgium, Switzerland, and India) were selected to take part in three days of recruitment activities in Montreal. More than 205 individual interviews between candidates and researchers took place during the event. Twenty-six students recruited as a result of this activity were able to join one of IRIC's research teams (15 students for master's degrees and 11 for doctorates).

See photo p.52

The IRIC Scientific Day

The 6th IRIC Scientific Day took place on Friday, November 13, 2015. The goal of this event is to bring all IRIC members together to discuss the scientific activities in progress at the Institute. It is a unique opportunity for students, postdoctoral fellows, research officers, core-facility staff, and principal investigators to present their work to their colleagues, orally or in poster form. There were 163 participants at the event this year, providing 16 oral presentations and 51 poster presentations. The best presentations received awards made possible by the sponsors of the event.

The lecturer for the day was Louis Maheu, Professor Emeritus at UdeM's Department of Sociology. This specialist in the operation of university systems delivered a highly relevant and much appreciated talk in relation to the book he co-published with Robert Lacroix, *Les grandes universités de recherche*.

The day also provided the opportunity to present merit scholarships to IRIC doctoral students. Martine Raymond, IRIC's director of academic affairs, presented doctoral scholarships to four IRIC members, worth a total of $10,500.

Walid Fares from Desjardins also presented doctoral scholarships ($5,000 each) from the Desjardins Foundation, which reward students who distinguish themselves for the excellence of their academic excellence and community involvement. The two winners were Justyna Kulpa and Khaled Ben El Kadhi.

See photo p.52

Six students winners of the IRIC conference awards competition

On Friday, January 29, 2016, IRIC conferred its first conference awards. The awards of $1,000 each provided master's and doctoral students, and postdoctoral fellows, with the opportunity to present their research at conferences taking place outside Québec in 2016. The 2015-2016 conference award competition was made possible thanks to the support and generosity of IRIC members as part of the internal fundraising campaign "Donnez pour qu'ils vivent," as well as through the sale of LA TÊTE CHERCHEUSE beer from microbrewery Brasseurs Illimités. In this way, IRIC was able to award five IRIC conference awards and one "Simple Malt" conference award.

See photo p.52

Summer School in Systems Biology

Organized since 2006, IRIC's Summer School in Systems Biology is aimed at offering top-notch training in cancer research. It includes a series of theoretical courses covering a variety of themes connected to the cell and molecular biology of cancer, the molecular genetics of eukaryotes, immuno-oncology, model organisms, and experimental approaches based on systems biology.

The School also offers practical laboratory courses designed to teach various techniques linked to molecular biology, cell analysis, protein expression and purification, analysis of the biochemical and biophysical properties of proteins, functional genomics, bioinformatics, and the use of model organisms. During these practical courses, students carry out a number of small-scale research projects requiring the use of IRIC's core facilities. In 2015, 34 students (23 from IRIC) were able to take courses at the Summer School.

Among these 34 students, five female students from Brazil who stood out at the second edition of IRIC's International Summer School, held at the São Paulo Cancer Institute (ICESP) of the University of São Paulo (USP) in January 2015, were invited to attend certain practical courses.

See photo p.53

IRIC Next Generation Awards program

For a fifth consecutive year, the IRIC Next Generation Awards program enabled Canadian students (16 this year) at the undergraduate level with an outstanding academic record to receive a merit scholarship in order to do a research internship with an IRIC team during the summer of 2015. The awards are worth $4,250 for a 12-week internship, or $5,670 for a 16-week internship.

The granting of these awards is made possible thanks to the participants and to the generous contribution of donors to IRIC's Great Challenges Against Cancer, organized annually to benefit the IRIC Great Challenges Fund, including a generous donation from the Fondation Famille Diane et Léon Gosselin.

See photo p.53

IRIC on the road

In the fall of 2015, IRIC participated in a series of higher education fairs organized at various Canadian universities. These recruitment activities make it possible for students to meet representatives of educational institutions and research centres in order to learn more about study programs, available internships, admission criteria, and scholarship possibilities.

In October, an IRIC representative also joined UdeM's Office of Admissions and Recruitment to take part in a tour in France. Jointly organized by several Québec schools, the Study in Québec tour is designed to promote Québec universities at major French universities with the goal of recruiting undergraduate, master's, and Ph.D. students hoping to continue their studies in Québec.

See photo p.53

IRIC Student Association (AEIRIC)

The AEIRIC mandate is to represent master's and doctoral students, interns, and postdoctoral researchers in institutional matters. The AEIRIC contributes to IRIC's development and to maintaining the quality of student life through active participation, on the one hand, by carrying out institutional programs and projects, and on the other hand, by fostering interactions among students, postdoctoral fellows, and other members of the IRIC team through the organization of various academic, scientific, and social activities.

See photo p.53

a) Participants and organizers of the second student recruitment event

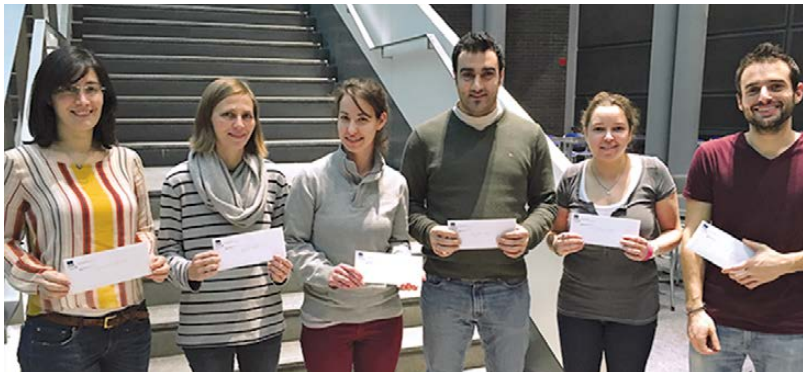
b) The IRIC Scientific Day
Left to right:
Michel Bouvier, Chief Executive Officer of IRIC; Martine Raymond, Director of Academic Affairs of IRIC; the winners of the IRIC doctoral scholarship, Laura Simon, Nicholas Iannantuono, Yayha Benslimane and Myreille Larouche; Marc Therrien, Scientific Director of IRIC.

c) Conference award winners
Left to right:
Ozlem Nezahat Arat, Abigail Gerhold, Céline Laumont, Haytham Mehsen and Tatiana Traboulsi (IRIC awards); Simon Mathien, ("Simple Malt" award).

a)

b)

c)



d) The organizers and teachers of IRIC's International Summer School held in Brazil in January 2015, accompanied by the five Brazilian students invited to take part in the 2015 edition of IRIC'S Summer School in Systems Biology.
Left to right: Trang Hoang (IRIC), Suellen da Silva Gomes Herbster (USP), Maria Nagai (ICESP), Tatiane Katsue Furuya Mazzotti (USP), Sylvie Mader (IRIC), Ema Elissen Flores Diaz (USP), Sébastien Carréno (IRIC), Julie Mantovani (IRIC), Pierre Thibault (IRIC), Naieli Bonatto (USP), Aline Nazareth de Paiva Paixao Becker (USP). Absents: Roger Chammas (ICESP), Philippe P. Roux (IRIC), Diogo Veiga (IRIC).

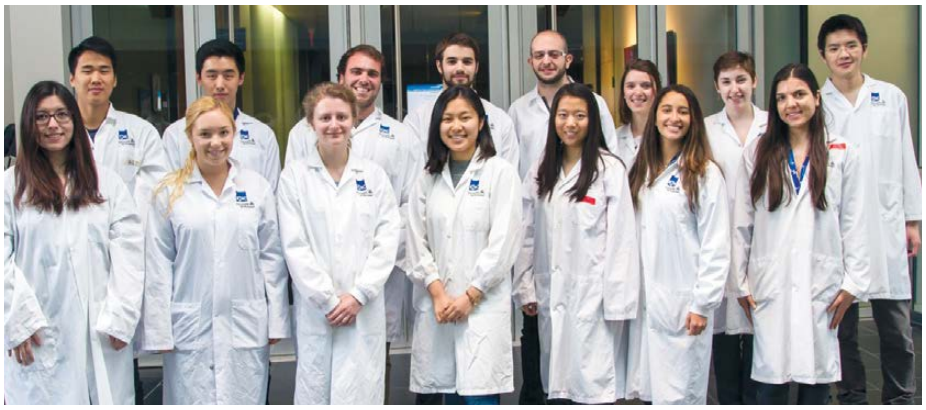
e) The winners of the 2015 IRIC Next Generation Awards
Front row, left to right: Destiny Lu-Cleary, Julia Rybkina, Justine Vinet, Flora Jung, Lia Huo, Valeria Vendries, Anissa Chirico. Back row, left to right: Felix Zhou, Andy Zhen, Mitchell Demers, Stéphane Lopes Paciencia, Aldo Zakhour, Caroline Labelle, Nicole Boyle, Frank (Zhexian) Liu. Absent: Brendan Lapointe Raizenne.

f) Patrick Lacasse, Project Manager for Student Recruiting

g) AEIRIC
Left to right: Éric Vaillancourt-Jean (President), Hervé Gerbe (Treasurer), Audrey Connolly (Academic Affairs Representative), Samuel Jacques (Social Life Representative), Myreille Larouche (Secretary), Maude Dumont-Lagacé (Internal Affairs Representative), Kenza Garreau (Social Life Representative), Ryan Pinkham (Student Recruitment Representative), Hillary Pearson (Scientific Affairs Representative). Absent: Simon Mathien (Summer School Representative).

d)

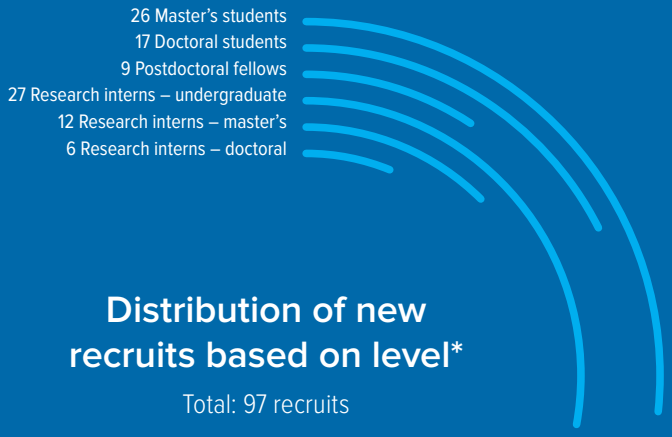
e)



f)

g)

Data and statistics



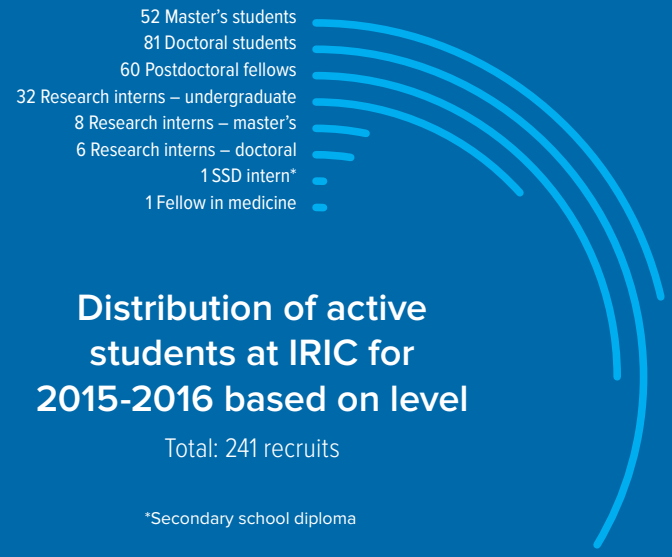
Distribution of new recruits based on level*

Total: 97 recruits

*Some students are included in more than one category (e.g., in the same year an intern becomes a student).

Countries of origin of new IRIC recruits

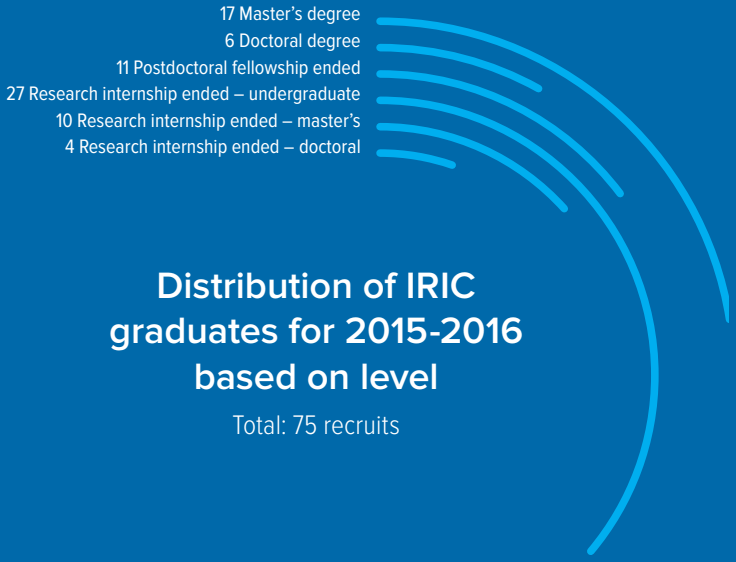
Total: 88 recruits



Distribution of active students at IRIC for 2015-2016 based on level

Total: 241 recruits

*Secondary school diploma



Distribution of IRIC graduates for 2015-2016 based on level

Total: 75 recruits

Grants and nominative awards

Québec

Cole Foundation

Doctoral
Karine Bourdages
Jérôme Roger
Alexandre Rouette
Swati Shetty
Camille Simon

Postdoctoral
David Kachaner

Clinician
Vincent-Philippe Lavallée

Natural Sciences and Engineering Research Council of Canada (NSERC)

Christine Desroches Altamirano
Samuel Rochette

Desjardins Foundation

Khaled Ben El Kadhi
Justyna Kulpa

Fonds de recherche du Québec – Nature and Technologies Fund (FRQNT)

Master's
Blandine Monjarret

Doctoral
Chongyang Li
Neethi Nandagopal

Fonds de recherche du Québec – Health Funds (FRQS)

Master's
Jessica Gagnon
Guillaume Lépine

Doctoral
Karine Bourdages
Gwenaëlle Gavory
Guillaume Laflamme
Charles St-Pierre
Éric Vaillancourt-Jean
José-Carlos Zeledon Orellana

Postdoctoral
Eugénie Goupil
Tan Ning (Sarah) Tsao

Groupe de recherche universitaire sur le médicament (GRUM)

Étienne Durette

Canada

Human Frontier Science Program

Irène Baccelli

Canadian Institutes of Health Research (CIHR)

Master's
Elizabeth Ottoni
Louis-Philippe Picard
Assya Trofimov

Doctoral
Fanny Bergeron-Labrecque
Maude Dumont-Lagacé
Peter Kubiniok
Krystel Vincent

Postdoctoral
Jasmin Coulombe-Huntington
Jonathan Yeh

Outside Canada

France

Erwan Morgand

Oman

Al-Khabouri Shaima

UdeM

Molecular biology program awards

Merit awards – master's

Maïssa Babouder
Christian Bernard
Benjamin Dumont
Albert Feghaly
Hervé Gerbe
Yu Yan He
Marianne Issac
Kevin Leguay
Amir Medjtoh
Devi Mohanakumari Venugopal
Soumil Narayan
Elma Ndreu
Ndeye Khady Thiombane
Yu Wei Zhang

Writing awards – master's

Amani Daoud
Swati Shetty

Merit awards – doctoral

Khaled Ben El Kadhi
Yahya Benslimane
Camille de Jamblinne de Meux
Amogh Gopinathan Nair
Salwa Haidar
Nicholas Iannantuono
Haytham Mehsen
Marjorie Lapouge
Sara Marullo
Virginie Mondin
Pierre Priam
Sami Nourreddine
Laura Rivest-Khan
Dhanaraman Seetharaman Thillai
Yogitha Thattikota

Writing awards – doctoral

Houssam Ismail
Justyna Kulpa
Alexandre Rouette

UdeM

Biochemistry Department award

Assya Trofimov

Cellular Dynamics of Macromolecular Complexes (CDMC) award

Julie Robitaille

Faculty of Medicine recruitment award

Master's
Ema Elissen Flores Díaz
Ndeye Khady Thiombane
Yu Yan He

Doctoral
Amogh Gopinathan Nair
Franck Simon

End-of-study scholarships from the Faculty of Graduate and Postdoctoral Studies

Master's
Hillary Pearson

Doctoral
Frédéric Lamoliatte

Merit awards of from the the Faculty of Graduate and Postdoctoral Studies

Sibylle Pfammatter
Camille Simon

B awards for direct access from bachelor's to doctoral from the Faculty of Graduate and Postdoctoral Studies

Louis-Philippe Picard
Guillaume Lépine

Master's awards for Canadian candidates non-resident of Québec (D awards) from the Faculty of Graduate and Postdoctoral Studies

Anca Apavaloei
Ema Elissen Flores Díaz
Amir Medjtoh
Elma Ndreu
Narayan Soumil
Srivatsava Viswanadha
Yu Wei Zhang

Awards for exemption from differential tuition fees for international students from the Faculty of Graduate and Postdoctoral Studies

Amogh Gopinathan Nair
Nandita Noronha

IRIC grants and nominative awards

IRIC Next Generation Awards (undergraduate)

Nicole Boyle
Anissa Chirico
Mitchell Demers
Lia Huo
Flora Jung
Caroline Labelle
Brendan Lapointe Raizenne
Frank (Zhexian) Liu
Stéphane Lopes Paciencia
Destiny Lu-Cleary
Julia Rybkina
Valeria Vendries
Justine Vinet
Aldo Zakhour
Andy Zeng
Zhou Felix

Master's Perseverance Awards

Christian Bernard
Christine Desroches Altamirano
Benjamin Dumont
Albert Feghaly
Kenza Garreau
Hervé Gerbe
Yu Yan He
Marianne Issac
Kevin Leguay
Amir Medjtoh
Devi Mohanakumari Venugopal
Blandine Monjarret
Soumil Narayan
Ryan Pinkham
Ndeye Khady Thiombane

Prominence and recognition

The members of IRIC contribute to the advancement of knowledge and in so doing to the Institute's prominence. Moreover, some of them, in the course of the year, received awards for their research work or for their contribution to the community. Such visibility is indispensable for further solidifying the Institute's reputation for excellence and its ability to attract the finest talents. Raising awareness of IRIC, along with the various communications and media-relations projects, were the responsibility of Manon Pepin, Director of Communications and Media Relations, and Olivier Dilain, Advisor in Communications and Media Relations.

Science à la carte

Each year IRIC presents the "Distinguished Scientists Lecture Series," under the direction of the Work-Life Committee, chaired by Étienne Gagnon, principal investigator with the Cancer Immunobiology research unit. This program, intended for graduate and postdoctoral students and members of Montreal's biomedical community, invites well-known researchers from Canada and around the world to present their most recent scientific breakthroughs. During the period covered by this report, some 30 lecturers came to present their findings at IRIC.

Visibility: a year rich in happenings

IRIC is becoming more and more of a presence in the media and on social networks. Over 40 press releases were published in the course of the year, a number of which were picked up by various media outlets, boosting visibility of IRIC and spreading word of its research, as well as its various fundraising activities.

The Office of Communications and Media Relations, moreover, conducted its first promotion campaign during World Cancer Day, aiming to solicit donations from the general public by way of a contest. The Office also implemented several public-relations campaigns throughout the year, in particular for the second edition of the Audacious benefit evening, as well as for the sixth edition of IRIC's Great Challenges Against Cancer.

Quite a few film crews came to take advantage of the Institute's cutting-edge facilities to produce videos. One of them, aired on Canal Savoir (Learning Channel), shed further light on the molecule UM171, discovered in 2014 by the teams of principal investigator Dr. Guy Sauvageau, and Anne Marinier, principal Investigator and director of the medicinal chemistry core facility.

IRIC is also on view in the interactive exhibit on the observation deck Au Sommet Place Ville Marie, which illustrates life in Montreal and in which pictures of our laboratories and core facilities can be seen.

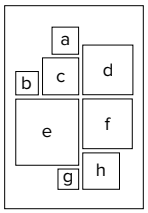
Promotion of the Institute's various activities continues to attract the attention of the general public and the media, helping to consolidate its reputation.

Mobilization of the IRIC community

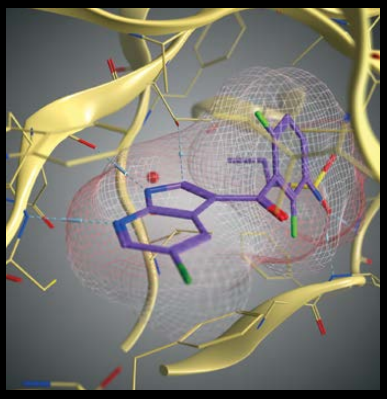
Also worthy of mention is the commitment of IRIC's Social Life Committee, which throughout the year promotes the visibility and mobilization of the IRIC community by way of a series of social activities. The committee was coordinated by Marie-Christine Ménard, Head of Human Ressources, and Mira-Sue Mallet, Human Resources Analyst.

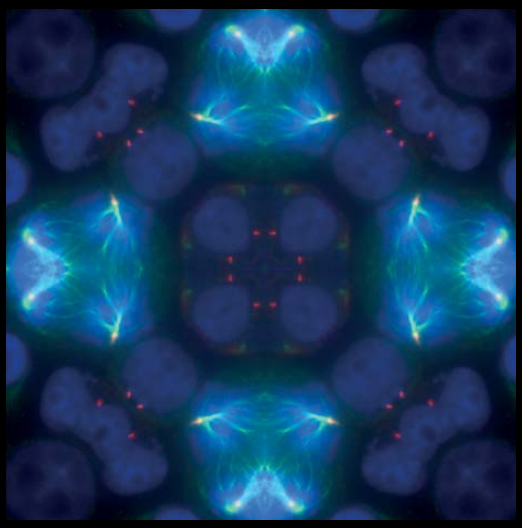
“Réflexion Science” competition for scientific work

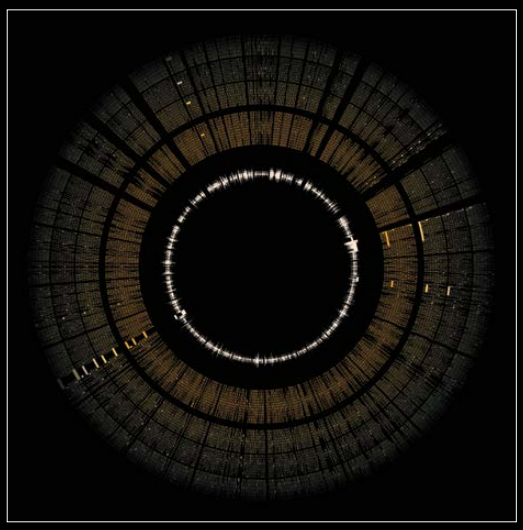
Building on the success of the first edition, the competition for scientific work inaugurated in 2014 was renewed in 2015. The Internal Scientific Promotion Committee, chaired by principal investigator Pierre Thibault, selected the eight best scientific works from among the proposals received (photo, microscopy, immunofluorescence, varied structures). The works selected were printed and distributed at strategic spots in the Institute and were offered to sponsors at the annual Audacious benefit evening. This competition was sponsored by Zeiss, a world leader in imaging.

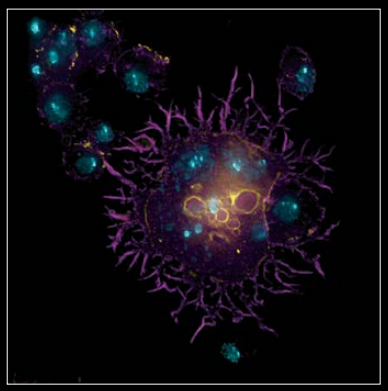


a) Haytham Mehsen, *Cell Division*
b) Cedric Plutoni, *1*
c) Alexandre Beautrait, *Au cœur du site catalytique de B-RAF*
d) Sami Nourreddine, *Mitoleidoscope 2*
e) Rana Amini, *The cycle of life*
f) Caroline Labelle, *Leucémies*
g) Genevieve Boucher, *Compounds similarity*
h) Khaled Ben El Kadhi, *Concanavalin*









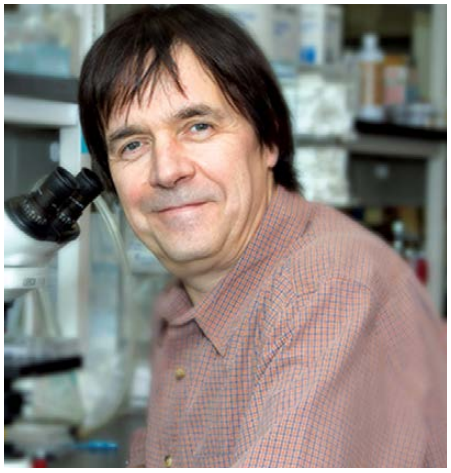
Highlights — Vincent Archambault, winner of the 2015 GE Healthcare New Investigator Award

Principal investigator at IRIC and assistant professor in the Department of Biochemistry and Nuclear Medicine in the UdeM Faculty of Medicine, Vincent Archambault received the 2015 GE Healthcare New Investigator Award at the 58th annual conference of the Canadian Society for Molecular Biosciences (CSMB) held June 14 to 17, 2015, in Halifax, Nova Scotia.

This award is presented annually to a young Canadian researcher in the field of biochemistry or molecular and cellular biology, and acknowledges outstanding achievement on the part of independent investigators with fewer than ten years' experience. Special attention is afforded to independent thought and the originality of the work.

IRIC's CEO Michel Bouvier pointed out that this reward was a sign of recognition of the impact of the work of Vincent Archambault, who is a multitalented teacher committed to demonstrating the importance of life sciences.

Dr. Claude Perreault, winner of the 2015 Prix Michel-Sarrazin



Principal investigator at IRIC, professor in the Department of Medicine at UdeM's Faculty of Medicine and hematologist at Maisonneuve-Rosemont Hospital, Dr. Claude Perreault is the winner of the 2015 Prix Michel-Sarrazin. The award is presented annually by the Club de recherches cliniques du Québec to a veteran Québec scientist who, through his or her dynamism and productivity, has contributed in an important way to the advancement of biomedical research.

A hematologist and immunogeneticist by training, Dr. Claude Perreault is one of the founding members of IRIC and has been a principal investigator at the institute since 2005. In addition to his research and training activities, he practices as a clinician at Maisonneuve-Rosemont Hospital, where he created the histocompatibility laboratory and founded the bone marrow transplant unit. At IRIC, Dr. Perreault and his team study cells that govern the function of the immune system, known as T lymphocytes, in order to better understand and improve the functioning of that system with the aim of creating a vaccine against cancer and preventing the aging of the immune system.

Dr. Guy Sauvageau, winner of the ACFAS Léo-Pariseau award

Dr. Guy Sauvageau, principal investigator at IRIC, professor at UdeM's Faculty of Medicine, and hematologist at Maisonneuve-Rosemont Hospital, has received the Léo-Pariseau award from the Association francophone pour le savoir (known as ACFAS).

The ACFAS awards celebrate researchers who have distinguished themselves throughout their careers and who have had a considerable impact in their areas of research as well as on the sharing of knowledge around the world. In that sense, these awards constitute, along with the Prix du Québec, one of the highest scientific distinctions for the Québec community.

Co-founder of IRIC, scientific director from 2003 to 2013, and president and CEO of the Institute from 2007 to 2014, Dr. Sauvageau has been involved in the race against cancer for a number of years.

Last year, Dr. Sauvageau was the recipient of numerous awards in recognition of his contributions surrounding the discovery of the UM171 molecule in collaboration with Anne Marinier, principal investigator and director of medicinal chemistry, including Radio-Canada Scientist of the Year and *La Presse* Personality of the Year in the science category, while his breakthrough with regard to stem cells was voted Discovery of the Year by *Québec Science* magazine.

Several IRIC students rewarded for the quality and importance of their publications and their research work

Every year a considerable number of students receive awards for the excellence of their work at IRIC.

Among the highest distinctions, the Academic Medal from the Governor General of Canada is certainly one of the most prestigious. The student who received this honour was also rewarded with the Prize for Best Doctoral Thesis from the Association des doyens des études supérieures au Québec (ADÉSAQ).

A student also received the prestigious Vanier Scholarship from the Canadian Institutes of Health Research (CIHR). This federal doctoral research award program was designed to attract the finest students from here and elsewhere to doctoral programs.

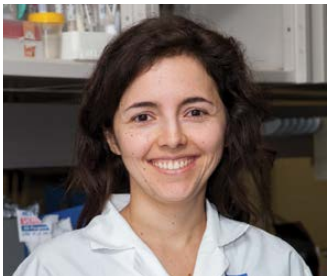
Two students were winners of the New Investigator Award from the International Society for Experimental Hematology (ISEH) at their annual meeting, held this year in Kyoto.

One student won the Étudiants-researchers étoiles award from the Fonds de recherche du Québec.

Five grants were also awarded to students and postdoctoral fellows by the Cole Foundation.

In addition, this year, IRIC handed out conference awards to six of its students so they could have the opportunity to present their work at a conference taking place outside Québec at some point during 2016.

Given the intense nature of these competitions, the outstanding results testify once more to the quality of IRIC students and the research projects entrusted to them.



Diana Paola Granados, postdoctoral fellow under the supervision of Dr. Claude Perreault.

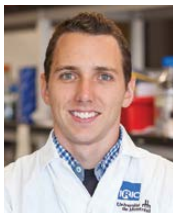
Diana Paola Granados received the Governor General's Academic Medal (Gold) and the Prize for Best Doctoral Thesis from ADÉSAQ.

The Governor General's Academic Medals honour Canadian students whose success at secondary school and university has been outstanding. Over the years it has become the most prestigious award for a student attending a Canadian educational institution.

The Prize for Best Doctoral Thesis from ADÉSAQ, offered in partnership with the Fonds de recherche du Québec – Society and Culture funds (FRQSC), is conferred on students whose work has been exemplary during their doctoral studies.

Peter Kubiniok, doctoral student under the supervision of Pierre Thibault.

Winner of the prestigious CIHR Vanier Scholarship, for his thesis entitled *Dynamical pharmacoproteomic studies to discover kinase substrates and inhibitor interaction sites.*



Bastien Gerby, postdoctoral fellow in the laboratory of Dr. Trang Hoang, and Julien Patenaude, doctoral student in the laboratory of Dr. Claude Perreault.

Winners of the New Investigator Award from the International Society for Experimental Hematology (ISEH) for the presentation by Bastien Gerby entitled “Targeting pre-leukemic stem cells in T-acute lymphoblastic leukemia” and the one by Julien Patenaude entitled “Elucidating the post-natal role of SCA1+ thymic mesenchymal cells.”

Vincent-Philippe Lavallée, doctoral student under the direction of Dr. Guy Sauvageau.

Winner of the Étudiants-researchers étoiles award from Fonds de recherche du Québec for publication of the article “The transcriptomic landscape and directed chemical interrogation of MLL-rearranged acute myeloid leukemias.”

Left to right: Karine Gauvin Bourdages, Elisa Tomellini, Camille Simon, Diogo Veiga, Swati Ganesh Shetty.

Students and postdoctoral fellows who won a scholarship from the Cole Foundation for research having an impact on leukemias and other related illnesses in children and young adults.

Philanthropy: putting humanity first

Philanthropy is a doctrine of life that puts humanity first. The many generous benefactors of IRIC seek to improve the lives of those around them by coming together to offer substantial support for cancer research. They contribute directly to drug discovery and more effective cancer treatments, thus succeeding in helping cancer patients and their loved ones. ● Events such as the Audacious benefit evening and the IRIC Great Challenges Against Cancer have enabled us to significantly expand the base of our support among donors from both the business community and the general public. The IRIC community is grateful and extremely touched by the support and generosity of these donors.

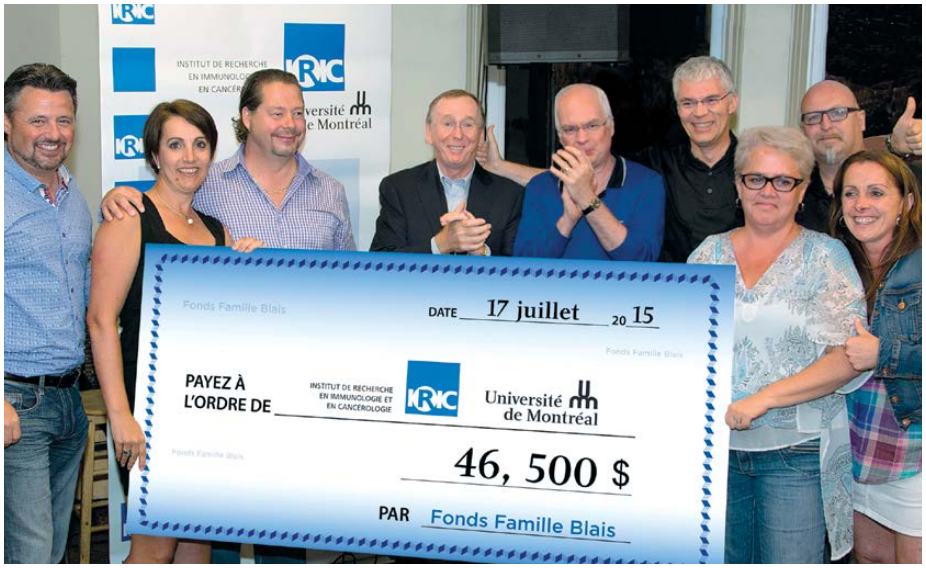
Highlights — success of the second edition of the Audacious benefit evening: over $800,000 collected

Left to right: Marc-André Blanchard, Co-president of the evening, Chair and CEO of McCarthy Tétrault; Serge Godin, founder and Chairman of the Board of CGI; Ginette Godin, wife of Serge Godin; Michael Sabia, co-president of the evening, President and CEO of Caisse de dépôt et placement du Québec; Monique F. Leroux, co-president of the evening and CEO of Desjardins Group; Michel Bouvier, CEO and principal investigator at IRIC; Guy Breton, Rector of UdeM.

In the framework of the second edition of Audacious, IRIC's annual benefit event – this year under the honorary co-presidency of Mr. Marc-André Blanchard, Chairman of the Board and CEO of McCarthy Tétrault; Monique F. Leroux, President and CEO of Desjardins Group; and Michael Sabia, President and CEO of Caisse de dépôt et placement du Québec – IRIC paid tribute to Serge Godin, Founder and Chairman of the Board of CGI, whose commitment these last few years has contributed significantly to IRIC's development. While the evening was devoted to fun – no small thanks to host Gregory Charles – everyone was aware of the seriousness of the cause, namely supporting IRIC's ground-breaking research in the fight against cancer.

Thanks to the audaciousness and commitment of the members of the Fundraising Committee, partners, sponsors, numerous donors, and volunteers, the evening raised over $800,000, which was turned over to the Audacious Fund, whose mandate is to invest in the four major priorities of IRIC, namely research, training the researchers of tomorrow, research projects with great potential for innovation, and the acquisition of leading-edge equipment.

New record of $46,500 raised at the annual Blais Family Fund Golf Tournament benefiting IRIC



Left to right: Robert Lemieux, Cyntia Plouffe, Ronald Rochon, Pierre Blais, Nathalie Gauthier, Chantal Hébert, Steven Fortier, members of the organizing committee of the Outaouais/Blais Family Fund Golf Tournament, surround Michel Bouvier, Chief Executive Officer of IRIC, and Dr. Guy Sauvageau, Principal Investigator at IRIC. Absent from photo: Jean-Guy Laframboise and Gyslain Boudreault, also members of the organizing committee.

The sixth edition of the annual Blais Family Fund Golf Tournament for the benefit of IRIC, presided by Ronald Rochon, Vice-President of Sales and Marketing at Parquets Alexandra, brought together over 170 golfers from the Outaouais region, including a number of representatives of the business community along with principal investigators and staff members from IRIC. Thanks to the dedication, generosity, and enthusiasm of organizing committee members, the benefit event succeeded in raising a record total of $46,500. The amount will go to projects involving high risk and high impact, since these projects have great potential for innovation but are difficult to fund through traditional granting agencies.

IRIC Great Challenges Against Cancer: taking up the challenge to defy cancer

Left to right: Daniel Cyr, Director of Administrative Services and Operations at Fabrique de la paroisse Notre-Dame de Montréal; Marcel Leblanc, Vice-President and Director of the Grand Prix Cycliste de Montréal; Marie-Josée Gervais, Executive Director of Défis du Parc; Robert Patenaude, spokesman for IRIC; Diane and Léon Gosselin, donors to IRIC; Marc Therrien, Scientific Director of IRIC.

2015 winners of Perseverance Awards from IRIC, accompanied by: Marc Therrien, Scientific Director of IRIC; Martine Raymond, IRIC's Director of Academic Affairs; Diane and Léon Gosselin, donors to IRIC; Robert Patenaude, spokesman for IRIC.

Led by Dr. Robert Patenaude, founder of IRIC's Great Challenges Against Cancer, hundreds of cyclists and runners entered the sixth edition of this annual fundraiser. It all happened as part of the IRIC Mount Royal Tour, on September 13, organized in partnership with the Grand Prix Cycliste de Montréal, Notre-Dame-des-Neiges Cemetery, Ville de Montréal, and UdeM, and the Défis du Parc national de la Mauricie, on September 26 and 27.

Over $235,000 was collected at the event, which made it possible to grant 15 Perseverance Awards to master's students in the molecular biology program and 16 IRIC Next Generation Internship Awards to bachelor's students, so that they could take part in summer internships. Since 2009, thanks to the dedication of participants and the generosity of numerous donors, IRIC's Great Challenges Against Cancer has allowed for the distribution of 167 scholarships totalling more than $1.725 million, including a significant amount thanks to the precious donation of the Fondation Famille Diane et Léon Gosselin.

Donations with tangible results, a true source of inspiration for IRIC

IRIC is pleased to be able to count on the commitment of exceptional donors who recognize the gravity of cancer and believe in the importance of research in conquering this illness.

The Marcelle and Jean Coutu Foundation: a renewed, mobilizing generosity

Marie-Josée, Marcelle and Jean Coutu.

The Marcelle and Jean Coutu Foundation, continuing its longstanding relationship with the Institute, renewed its invaluable support with a donation of $5.5 million towards the creation of a Drug Discovery Chain Fund. This exemplary donation has enabled IRIC to recruit elite researchers and fund specific high-risk, high-impact projects.

A donation of $500,000 from the Fondation Marcel et Rolande Gosselin for the IRIC chemolibrary

Front row, left to right: Paul Jutras, trustee of Fondation Marcel et Rolande Gosselin; Valérie Menard; Micheline Patenaude; Stéphanie Ménard; Jacques André Gratton, trustee of Fondation Marcel et Rolande Gosselin; Michel Bouvier, Chief Executive Officer of IRIC. Second row, left to right: Jules Brossard, trustee of Fondation Marcel et Rolande Gosselin; Gil Desaulets, General Manager of the UdeM Office of Development and Alumni Relations; Anne Marinier, Principal Investigator and Director of Medicinal Chemistry at IRIC; Gérald Boismenu, member of the board of directors of IRIC and Vice-Rector of Academic Development and Institutional Transformation of UdeM.

The Fondation Marcel et Rolande Gosselin made a generous donation of $500,000 to the Institute to fund the synthesis of new innovative molecules with the goal of expanding the chemo-library's collection. Because of the foundation's desire to support causes that make a difference, this new collection of molecules will allow the Institute's researchers to target breakthrough therapeutic approaches.

Élaine and Réal Raymond contribute generously to IRIC research with a $100,000 donation

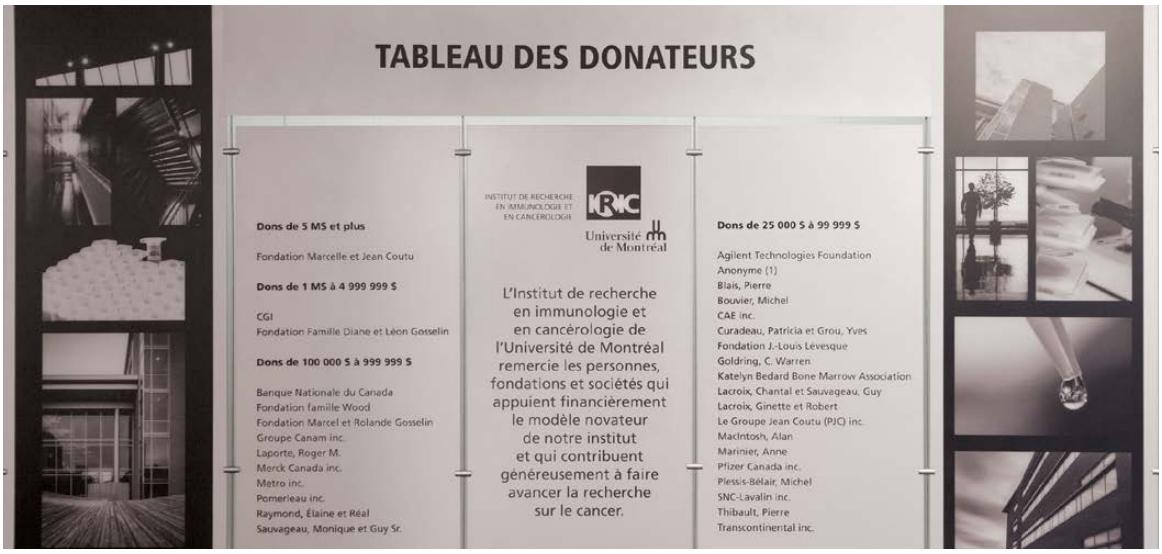
From left to right: Marc Therrien, Scientific Director of IRIC; Nathalie Mercier, niece of Élaine and Réal Raymond; Réal Raymond, corporate director; Robert Tessier, Chairman of the Board of IRIC; Élaine Raymond; Michel Bouvier, Chief Executive Officer IRIC.

Élaine and Réal Raymond demonstrated their philanthropic commitment by making a donation of $100,000 in support of IRIC and its research programs. This generous contribution allows the Institute to further strengthen its commitment to the search for new solutions in defeating cancer. This was an exceptional gesture on the part of private donors who believe in the importance of investing in the finest talents and contributing to the development of concrete treatments to defeat cancer.

New features

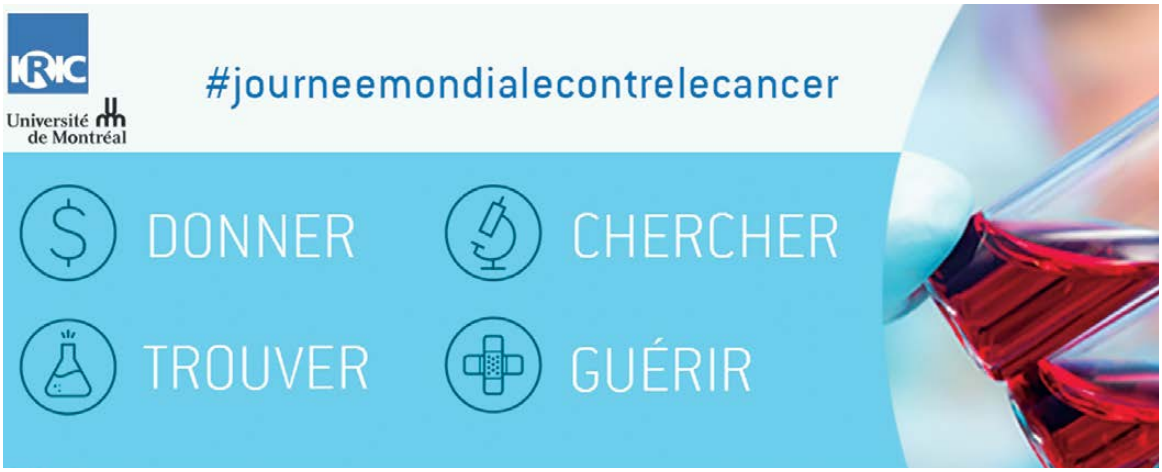
IRIC erects an honour roll for donors

In March 2016, IRIC erected an honour roll to recognize its donors.



Contest for the 2016 World Cancer Day

As part of World Cancer Day on February 4, 2016, the Institute held its first annual campaign among its donors. The social network campaign raised over $4,000 by offering participants the chance to take part in a contest to win a stay at Château Frontenac, courtesy of Ivanhoé Cambridge.



List of donors

The IRIC executive wholeheartedly thanks all the individuals, foundations, and companies who believe in its innovative model and contribute generously to the success of the Institute. It is by acting together that donors, researchers, and partners can fulfill IRIC's mission.

DONATIONS of $5M and over

Marcelle and Jean Coutu Foundation

DONATIONS of $1M to $4,999,999

CGI
Fondation Famille Diane et Léon Gosselin

DONATIONS of $100,000 to $999,999

Canam Group Inc.
Fondation Marcel et Rolande Gosselin
Laporte, Roger M.
Merck Canada Inc.
Metro Inc.
National Bank of Canada
Pomerleau Inc.
Raymond, Élaine et Réal
Sauvageau, Monique et Guy Sr.
Thermo Fisher Scientific
Wood Family Foundation

DONATIONS of $25,000 to $99,999

Agilent Technologies Foundation
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Blais, Pierre
Bouvier, Michel
CAE Inc.
Curadeau, Patricia and Grou, Yves Duguay, Mathieu
Fondation J.-Louis Lévesque
Goldring, C. Warren
Katelyn Bedard Bone Marrow Association
Lacroix, Chantal and Sauvageau, Guy Lacroix, Ginette and Robert Lavoie, Rico
Le Groupe Jean Coutu (PJC) Inc.
Marinier, Anne
Otéra
Pfizer Canada Inc.
Plessis-Bélair, Michel
RBC Foundation
Residential Land
SNC-Lavalin Inc.
Thibault, Pierre
Transcontinental Inc.

DONATIONS of $10,000 to $24,999

152245 Canada Inc.
3249531 Canada Inc.
Anonymous (5)
Bisson, André
Bouchard, Yves
Chouinard, Yvon
Fonds de charité des employés de la CUM
Fournier, Daniel
Hébert, Josée
Hoang, Trang
Industrial Alliance, Insurance and Financial Services Inc.
Ivanhoé Cambridge
KingSett Capital Inc.
Lamarre, Bernard
Lavigne, Robert
MacIntosh, Alan G.
Mader, Sylvie
Major, François
McCarthy Tétrault Foundation
Meloche, Sylvain
Morris and Rosalind Goodman Family Foundation
Nolet, J. Gilles
Panet-Raymond, Robert
Patenaude, Robert
Perreault, Claude
Provencher, France
Saputo Inc.
Société de gestion COGIR S.E.N.C.
Stonehenge Management LLC
The Gold and Cummings families
The Manufacturers Life Insurance Company
Transat A.T. Inc.
TVM Life Science Management Inc.

DONATIONS of $1,000 to $9,999

2699222 Canada Inc.
4518080 Canada Inc.
6858031 Canada Inc.
8517894 Canada Inc.
Acciona Infrastructures Canada Inc.
Achard, Stéphane
Aéroports de Montréal
AGF Group Foundation
AIM Holdings LP
Amaya Gaming Group Inc.
Anonymous (44)
Aon Reed Stenhouse Inc.
Apollo
Atelier de menuiserie Allaire & fils Inc.
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Autorité des marchés financiers
Banville, Jacques
Barbara Shore & Associates Inc.
Barnes & Thornburg LLP
BCF S.E.N.C.R.L.
Bell Canada
Benoit, Claire
Bernard, Léa
Berthelet, Danny
Berthiaume, Guy
Bertrand, Luc
Bérubé, Dominique
Bérubé, Josée
Bessette, Guy
Blais, Michel
Blanchard, Marc-André
Blondin, Bruno
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Boisvert, Yves
Boivin, Pierre
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Borden, Katherine
Boucher, Fernand
Boucher, Patrick
Bougie, Jacques
Bourassa Savaria Foundation
Bourque, Nathalie
Boyle, Pierre
Brake Parts Inc.
Branchaud, Joël
Britton Electric Co. Ltd.
Brookfield
Brunet, Jocelyn
Buono, Elvio
Caillé, Alain
Caisse populaire Desjardins de la Basse-Lièvre
Carréno, Sébastien
Cellot, Sonia
Chagnon, Pierre
Charbonneau, Alain
Chartrand, Jean
Chartrand, Pierre
Chevalier de Colomb conseil 8515
Chevrier, Robert
Chiasson, Réjean
CIMA+
Cliche, Yvan
Climatisation Bâti-Vac Inc.
Colin, Patrick
Collège des médecins du Québec
Concept D.S. Itée
Côté, Pierre-Paul
Crine, Philippe
Dansereau-Trahan, Stéphanie
Davies Ward Phillips & Vineberg
Delage, Éric
Delisle, Jean-Sébastien
Deloitte Canada Foundation
Demers, Marie-Ève
Desgens, Daniel
Desjardins Securities Inc.
Desjardins Venture Capital Inc.
Desrosiers, Éric
Dion, Réal
Ducharme, Daniel
Duchesneau, François
Dupuis, Charles
Duranceau, Alfred M.
Emery, Gregory
Équipements Poirier et Fils
Événements GPCQM
Fabi, Jean-François
Fédération des caisses Desjardins
Fidelity Investments Canada ULC
Filteau, Éric
Fondation Christal de roche
Fondation communautaire du grand Québec

DONATIONS of $1,000 to $9,999 (continued)

Fondation Jean Gaulin
Fondation Lise et Richard Fortin
Fonds de solidarité
des travailleurs du Québec FTQ
Fortin, Jacques
Fox, Francis
Gagné, Christian
Gaumond, Jacques
Gaz Métro
Gazifère Inc.
Génome Québec
George, Valérie Anne
Gestion Fremican inc.
Gestion IPM
Gestion Univalor
Girard, Robert
Gironne, Claude
GMP Securities L.P.
Goudreau Gage Dubuc S.E.N.C.R.L.
Gravel, Jacques
Gravel, L.-Pierre
Gravel, Yvan M.
Grégoire, Jean-Pierre
Gresset, Jacques
Groupe conseils Grou, La Salle Inc.
Groupe DCB inc.
Groupe Deschênes Inc.
Groupe Maurice Denis & Fils Inc.
Groupe Québec Amérique
Groupe Vespo
Guindon, Bernard
Haviernick, Martine
Hérault, Olivier
Héroux Devtek
Honeywell
Huberdeau, Diane
Huzulak, Brent
Hydro-Québec
Innovative Medicines Canada
Inspec-Sol Inc.
Intact Insurance
Investors Group Financial Services Inc.
ITG Canada Corp.
Jalbert, Pierre
Janvier, Kevin
Jet Equipment & Tools Ltd.
Jodoin Lamarre Pratte
Architectes Inc.
Jodoin, Vivianne
Kesler, Brenda
Klein, Steven
Kwok, Benjamin
Labelle, Robert
Laberge, Jean
Lachance, Silvy
Lafleur, Éric
Lafleur, Marquis
Lalande, Raymond
Lalande, Sylvie
Lamarre, Daniel
Lamoureux, Cristine
Lapointe, Josée
Lapointe, Philippe
Larose, Jacques
Lavoie, Gilles
Le Site
Lê, Phu-Tao
Lebel, Anne
Lebœuf, Jean-Marc
Lefebvre, Yvan
Legault, François M.
Lemmel, Albert
Lépine, Yves
Les métaux Tremblay inc.
Lespérance, Michel
Lessard, Julie
Lord, Robert
Lortie, Lucie
Maddox, Paul
Maheu, Louis
Malo, Félix
Malo, Jocelyn
Malo, Michel
Marchand, Claude Françoise
Marchand, Jean
Marier, Guy
Marinier, Hélène
Martin, Fernand
Martin, Peter
Martin, Richard
McCollough, Robert
MCFI Group Ltd.
McNeil, Jean
Ménard, Claude
Ménard, Marie-Christine
Menkès Shooner Dagenais
LeTourneux Architectes
Métro Richelieu Inc.
Mevotech Inc.
Miller Thomson L.L.P.
Milot, Éric
Ministère des finances du Québec
Mongeau, Nathalie
Motulsky, Bernard
Murphy, Glen
Nichols, Vincent
Noël, Gilles
Normandeau, Michel
Ogilvy Renault
Optimal Payments
Osler, Hoskin & Harcourt
S.E.N.C.R.L./s.r.l.
Oxford Properties Group Inc.
Painchaud, Gisèle
Paquin, Gilles
Parent, Mario
Parquets Alexandra Inc.
Pasquin St-Jean et associés
Pépin, Manon
Pépinière du Golf 2010
Perreault, Daniel
Perron, Johanne
Placement Gabriel Gagnon inc.
Plomberie Outaouais
Plouffe, Cyntia
PricewaterhouseCoopers
S.R.L./S.E.N.C.R.L.
Pro-Jet Démolition Inc.
Prologue Inc.
Provost, Valérie
Prudon, Delphine
Publicité les enfants Inc.
Quevillon, Yves
Racette, André
Ratelle, Francine
Raymond Chabot Grant Thornton
Raymond, Martine
Raynault, Mathieu
RBC Capital Markets
Rinfret-Raynor, Maryse
Riou, Céline
Robic, S.E.N.C.R.L.
Rogers Group of Companies
RONA Inc.
Rousseau, Henri-Paul
Roy, Denis-Claude
Roy, Jean
Roy, Louise
Roy, Martine
Roy, Sébastien
Ruel, Réjean
S&E Services Limited Partnership
Sabbatini, Luc
Sabourin, Thomas
Saine, François
Savard, Guy
Savoy, Jacqueline
Scotiabank
Scotiabank Les Galeries de Hull
Shaub Maddox, Amy
Société de gestion Marcel Bédard Inc.
Société en commandite BHI
Société Générale (Canada)
St-Jacques, Pierre
T. D. Smith Transport
TD Commercial Banking
TechnoMed Solutions Inc.
Telesystem Ltd.
Teralys Capital Inc.
Tessier, Robert
Tétreau, Bernard
The Boston Consulting
Group of Canada Limited
The Centre for Drug Research and
Development
The Guarantee Insurance
Company of North America
Théo Mineault Inc.
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Thomas, Chantal
Trahan, Michel
Trempe, Isabelle
Turgeon, Robert
Turgeon-Hénault, Claire
Tyers, Michael
Unibéton
Uni-Select Inc.
Vachon, Louis
Valiquette, Manon
Vibien, Anne
Vignault, François
Wallingford-Blais, Gail
Walter Technologies
Wilson, Rénald
WSP Global Group Inc.
Yelle, Marcel
Zumwalt, Michael

Financial portrait in 2015-2016

Multiple sources of revenue are required to meet the costs of laboratory operations, researcher salaries, research support programs, and scholarships.

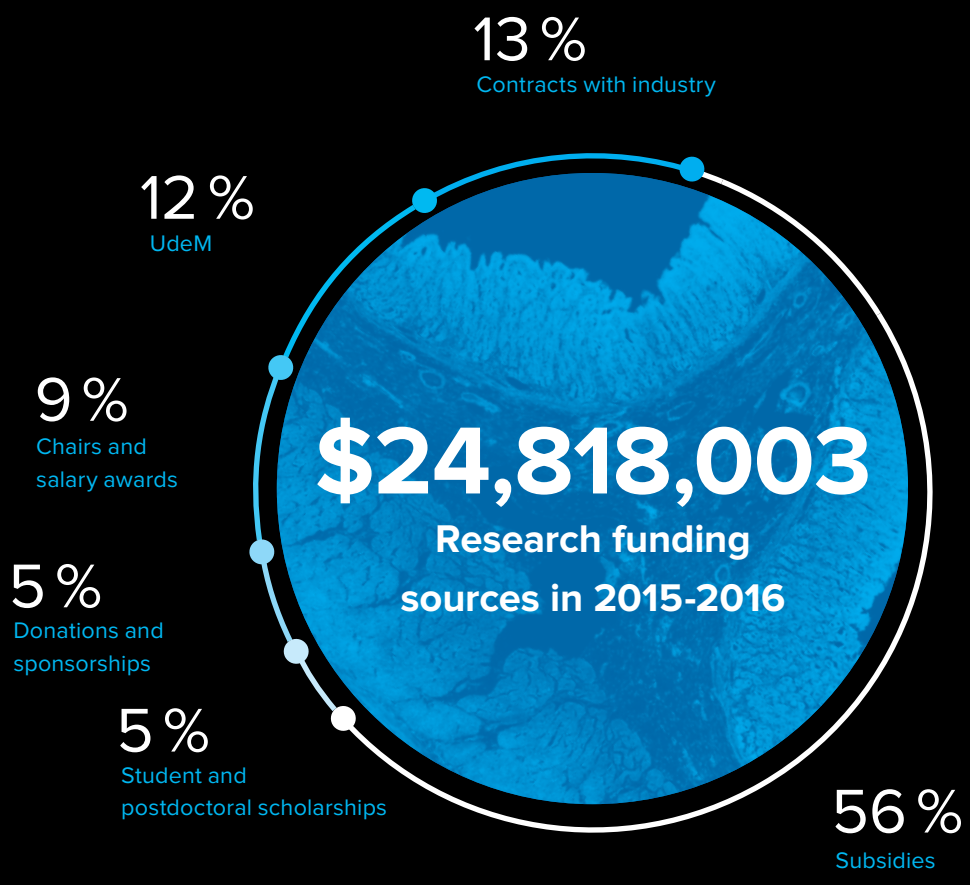
- Under the responsibility of Richard Martin, the Administrative Services team includes Patrick Gendron, Head of Information Technologies; Vincent Huard, Head of Finance; Marie-Christine Ménard, Head of Human Resources (replaced during the year by Luc Nadeau); Manon Pepin, Director of Communications and Media Relations; Stéphane Pinsonneault, Director of Infrastructure and Specialized Equipment, and Manon Valiquette, Head of Scientific Core Facilities.

Revenues	Operating	Research	Capital assets	Total
UdeM	$5,538,986	$3,050,692		$8,589,679
Grants	$4,648,801	$13,817,360	$12,060,358	$30,526,520
Student and postdoctoral awards		$1,243,731		$1,243,731[1]
Chairs and salary awards		$2,298,658		$2,298,658
Contracts with industry		$3,145,573		$3,145,573
Core facilities – external clients	$1,333,110			$1,333,110[2]
Donations and sponsorships		$1,261,989		$1,261,989[3]
Other	$40,479			$40,479
TOTAL	**$11,561,377**	**$24,818,003**	**$12,060,358**	**$48,439,739**

Expenses				
Salaries and employee benefits	$6,609,869	$18,800,372		$25,410,241[4]
Supplies and services	$1,994,708	$7,507,509		$9,502,217
Maintenance and repairs	$2,877,824	$212,358		$3,090,182
Scientific equipment	$199,850	$72,713	$8,510,358	$8,782,920
Fit-up of laboratories			$3,550,000	$3,550,000
TOTAL	**$11,682,251**	**$26,592,951**	**$12,060,358**	**$50,335,560**

1. Includes the IRIC Great Challenges Against Cancer scholarships, IRIC members Ph.D. awards, IRIC Next Generation Internship Awards, and IRIC Awards.
2. Excludes the amounts from IRIC researchers ($1,573,480), these being included in research grant revenues.
3. Solely donations and sponsorships received. Excludes the IRIC Great Challenges Against Cancer scholarships, IRIC Members Ph.D. awards, IRIC Next Generation Internship Awards, and IRIC Awards.
4. Includes principal investigator salaries paid by UdeM.

Statistical data



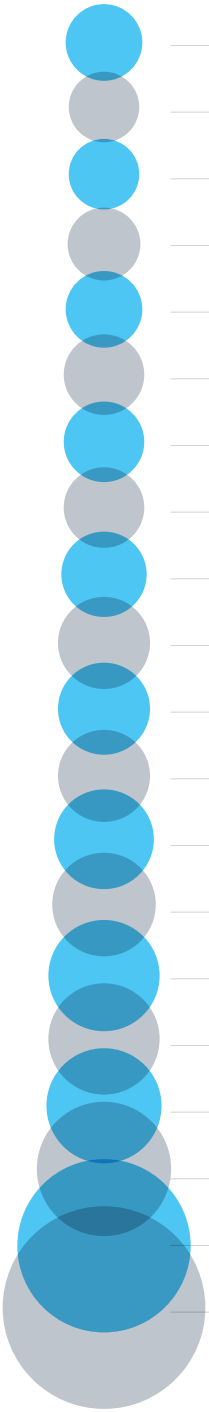
Main Organizations with peer committees having funded research funds and scholarships in 2015-2016

- Bill and Melinda Gates Foundation (Gates)
- Canada Foundation for Innovation (CFI)
- Canada Research Chairs (CRC)
- Canadian Cancer Society Research Institute (CCSRI)
- Canadian Institutes of Health Research (CIHR)
- Cancer Research Society (CRS)
- Fonds de recherche du Québec – Nature et technologies (FRQNT)
- Fonds de recherche du Québec – Santé (FRQS)
- Genome Canada and Génome Québec (GC and GQ)
- Human Frontier Science Program (HFSP)
- Leukemia & Lymphoma Society – United States and Canada (LLS)
- Ministère de l'Économie, de la Science et de l'Innovation (MESI)
- National Institutes of Health (NIH)
- Natural Sciences and Engineering Research Council of Canada (NSERC)
- Quebec Breast Cancer Foundation (QBCF)
- Université de Montréal (UdeM)

Statistical data

Funding sources in 2015-2016

Excluding scholarships

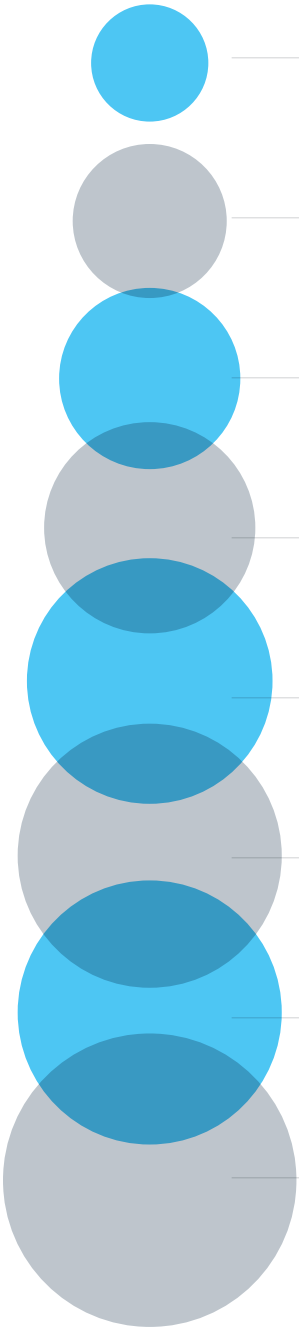


$319,034	Others
$121,920	FRQNT
$125,000	FCSQ
$130,978	HFSP
$360,000	SRC
$422,050	NIH
$485,914	CRSNG
$553,618	FRQS
$796,922	LLS
$1,261,989	Donations
$1,333,110	PF (outside IRIC)
$1,330,600	Gates
$1,582,635	IRSCC
$2,041,667	CRC
$3,130,965	Génome Québec
$3,145,573	Contracts
$3,685,710	MESI
$4,906,342	IRSC
$8,589,679	UdeM
$12,872,302	FCI

Total: $47,196,008

Student scholarships and postdoctoral fellowships in 2015-2016

Research funding coming from organizations with peer committees for nominative student and postdoctoral fellow awards



$38,500 CRSNG

$52,320 HFSP

$65,000 FRQNT

$122,750 Cole

$194,372 UdeM

$205,000 FRQS

$215,223 IRSC

$285,050 Donations

Total: $1,243,731

Management team

IRIC is the culmination of the efforts of host of individuals impassioned by a common vision: creating a research centre with an innovative approach for generating tangible results in the fight against cancer. Thanks to its many collaborations and its distinctive model, IRIC is today one of principal hubs in the fight against cancer in Canada.

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Marc Therrien
Scientific Director and principal investigator, IRIC

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