

Research bringing you tomorrow's health care today - Ottawa Hospital Research Institute 2009-2010 Annual Report

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Welcome

Welcome to the Ottawa Hospital Research Institute (OHRI), where more than 1,500 dedicated health-care professionals, scientists, trainees and support staff are working together with The Ottawa Hospital and the University of Ottawa to improve the health of residents of Ottawa and citizens around the world.

Our people are playing important roles at all three campuses of The Ottawa Hospital, in nearly all clinics as well as in a number of specialized laboratories. We are at the forefront of exciting new developments in health care, with research geared towards testing novel treatments, finding answers to the most pressing health questions that face our society and ensuring that this knowledge is put into practice. We are also helping to train the next generation of scientists and health-care professionals.

This year for the first time, we are releasing our annual report in partnership with The Ottawa Hospital, to illustrate the close relationship between innovative research and world-class care. We invite you to explore the pages of this report and see how we are making a difference with research that is focused on patients and inspired by patients.

2009-2010 Highlights



Dr. Lynn Megeney and his team discovered that proteins that cleave DNA (and that have traditionally been associated with cell death) also play a crucial role in stem cell maturation. This surprising finding could help researchers develop better strategies to control stem cells and harness them for new therapies. **PNAS. 2010 Mar 2;107(9):4230-5.**

Seven patients at The Ottawa Hospital Cancer Centre took part in a world-first clinical trial of an oncolytic virus called JX-594. The trial showed that the virus could selectively replicate and spread within tumours after intravenous delivery, with minimal side effects. There was also promising evidence of anti-tumour effect at higher doses. More trials are planned.

The **Blood and Bone Marrow Transplant Program** published a 10-year study showing that bone marrow stem cell transplantation can be safely and effectively done in an outpatient setting. This approach has allowed thousands of patients to be treated more conveniently during the day, while also freeing up inpatient beds for

others. The study was led by Advanced Practice Nurse Sheryl McDiarmid. **Bone Marrow Transplant. 2009 Nov 30.**

Dr. Rashmi Kothary and his team discovered a promising new approach for developing treatments for spinal muscular atrophy. They found that this disease affects the scaffold that gives cells their shape, and compounds that target this scaffold can greatly increase survival in a mouse model of the disease. **Hum Mol Genet. 2010 Apr 15;19(8):1468-78.**

Hundreds of medical journals around the world have endorsed a guideline developed by Dr. David Moher to improve how clinical trials are reported. The end result is better and more complete information to help health-care professionals and patients make difficult decisions. **BMJ. 2010 Mar 23;340:c332.**

Dr. Duncan Stewart was awarded \$4.3M from the Ontario government to lead a team of researchers from Ottawa and Toronto developing enhanced stem cell therapies for cardiovascular repair. A clinical trial for heart attack patients is expected to begin this year, with other trials expected in the coming years.

Dr. Carl van Walraven developed a simple index to identify high-risk patients before they are discharged from hospital, so that preventive care can be targeted to reduce unnecessary readmissions and deaths. **CMAJ. 2010 Apr 6;182(6):551-7.**

A stem cell research company founded by Drs. Michael Rudnicki and Lynn Megeney was acquired by Fate Therapeutics, a major U.S. stem cell research company. The move will result in further investments in research at OHRI to help advance the development of stem cell therapies for diabetes, muscle-wasting diseases and other conditions.

A large study showed that promoting the Canadian C-Spine Rule in hospitals can reduce the use of unnecessary neck x-rays without compromising the detection of serious neck injuries. The Rule, developed by Dr. Ian Stiell, also allows patients without neck injuries to avoid lengthy immobilization on a stretcher. **BMJ. 2009 Oct 29;339:b4146.**

Dr. Fraser Scott and his team found that type 1 diabetes may be linked to problems with the gut immune system and its reaction to certain foods. In a small clinical trial, more than half of patients with type 1 diabetes had an abnormal immune response to wheat proteins. **Diabetes. 2009 Aug;58(8):1789-96.**

Dr. Eve Tsai received Canada's Top 40 Under40TM award for her promising work as a spinal cord surgeon and researcher. Dr. Tsai has developed a powerful new technique to visualize nerve fibres in the spinal cord and she is also working with stem cells and nanotechnology to try to stimulate regeneration.



Dr. Andrew Seely and his colleagues developed a mathematical approach to find patterns in real-time heart rate data that are associated with systemic infection (called sepsis or blood poisoning). A pilot trial in 17 patients showed that the system could help detect the onset of sepsis nearly a day and a half earlier than traditional methods. **PLoS One. 2009 Aug 14;4(8):e6642.**

Dr. Hsiao-Huei Chen received the prestigious Henry J. M. Barnett Scholarship from the Heart and Stroke Foundation of Ontario for her work showing that a protein called LMO4 can help protect brain cells from stroke injury.

A group of nurse and physician researchers developed a clinical decision rule to help people with cystic fibrosis decide whether or not to have a lung transplant. A recent clinical trial showed that the tool worked well for patients and a grant from the Canadian Institutes of Health Research will now help disseminate it in hospitals across Canada. **Am J Respir Crit Care Med. 2009 Oct 15;180(8):761-8.**

Dr. Catherine Tsilfidis was awarded a \$1.4M grant to lead a team developing gene therapy to prevent vision loss in people with retinal disease. The grant, from the Canadian Institutes of Health Research and the Foundation Fighting Blindness, will fund five years of pre-clinical research to get the therapy ready for testing in humans.

The Ottawa Hospital, the OHRI and the University of Ottawa have opened a new subunit of the Institute for Clinical Evaluative Sciences (ICES). The facility is based at The Ottawa Hospital's Civic Campus and is called ICES@uOttawa. It will give Ottawa researchers access to highly secure patient data from all across Ontario, so that they can investigate factors that affect health and develop approaches to improve treatment, prevention and diagnosis.

Graduate student Natalie Andrews won the CIHR-Let's Talk Science Synapse Award for outreach to youth. Ms. Andrews has developed an interactive tour of the OHRI's Centre for Cancer Therapeutics. More than 250 high school students have gone on the tour so far.

Where



The Ottawa Hospital Research Institute is based at The Ottawa Hospital, with activities in nearly all clinics at all three Campuses (Civic, General and Riverside). We also have specialized research facilities such as the Sprott Centre for Stem Cell Research and Good Manufacturing Practice Laboratories. We are building a new Centre for Innovative Cancer Research, a Centre for Practice-Changing Research and new regenerative medicine and vision research facilities thanks to support from the Canada Foundation for Innovation and The Ottawa Hospital Foundation.

Regenerative Medicine: Renovating the Body

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Dr. Duncan Stewart and a team at the Ottawa Hospital Research Institute are at the forefront of a new frontier in health research and the quest for better ways to cure disease. They are leaders in a revolutionary new field called regenerative medicine, which seeks to repair and rebuild damaged tissues and organs using the body's own building blocks, including stem cells, genes and biomaterials.

"All of us have stem cells in nearly all organs of the body, but in the adult they appear to have only limited regenerative abilities," says Dr. Stewart. "The aim of our research is to "rejuvenate" these cells and enhance their activity to repair damaged tissues and reverse the effects of disease."

Focus on the Heart

One area of opportunity that Dr. Stewart and his team are investigating is how regenerative medicine can help patients recover from heart attacks.

Heart attack is a common problem caused by a blockage in an artery that supplies blood to the heart. When caught early, a heart attack can usually be stopped by opening up the blocked artery before a significant amount of heart muscle is lost; but unfortunately, even when this is accomplished early, many patients still suffer from large areas of damage that lead to scarring of the heart. This interferes with the pumping ability of the heart, leading to heart failure and other complications which can result in poor quality of life and early death.

Optimism for the Future

What if we could harness our own stem cells to improve healing after a heart attack by reducing the amount of scarring and replacing the damaged area with healthy new heart tissue? That is the promise of regenerative medicine and it is closer than you may think. Dr. Stewart has already shown that the concept works remarkably well in laboratory models; within the next year he will launch a clinical trial to test this approach in 100 heart attack patients in partnership with the University of Ottawa Heart Institute. Stem cells will be collected from each patient's blood and then enhanced in the laboratory by addition of a gene that is critical for their regenerative activity. The enhanced cells will then be injected into the same patient's heart to hopefully repair the damage and make the heart healthy again.

Dr. Stewart is anxious for the study to begin, and optimistic about its possible results. He is also excited about the many other regenerative medicine projects at the Ottawa Hospital Research Institute, which are showing promise in areas such as muscle disease, multiple sclerosis, diabetes, blindness and spinal cord injury.

"I believe that in the near future, regenerative medicine will play an increasingly vital role in the care of our patients who are suffering from organ damage and failure," says Dr. Stewart. "I also believe that The Ottawa Hospital will be at the forefront of this transformation in health-care, with Ottawa patients among the first to benefit."

Who



Research is a team activity at OHRI involving physicians, nurses and other health-care professionals, as well as basic scientists, trainees and specialized support staff.

Scientists

OHRI has 106 scientists leading teams of 5-30 people each. Scientists have MDs, PhDs or both and spend the majority of their time on research. All OHRI Scientists are also professors at the University of Ottawa and many are active physicians at The Ottawa Hospital.

Investigators

Investigators are generally physicians, nurses, or other health-care professionals at The Ottawa Hospital. They devote significant time to research while also being very active in clinical practice. OHRI has more than 350 investigators.

Trainees

OHRI has approximately 400 trainees who conduct much of the hands-on research at OHRI and come up with many of the innovative ideas. Trainees include graduate students, postdoctoral fellows, undergraduates, summer students and volunteers. Most are undertaking research at OHRI as part of a degree at the University of Ottawa.

Support staff

OHRI depends on more than 700 highly specialized support staff to conduct ground-breaking research. Support staff administer clinical trials, manage research programs and operate sophisticated laboratory equipment. They also take care of health and safety, commercialization, finance and other areas of administration.

Cancer Centre: Better Access for our Community

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Expanding our Cancer Centre means TOH can better care for the community closer to home, provide easier access and less added inconvenience for patients, their caregivers or loved ones. In January, a new building was expanded at the General Campus to host cancer and research services, and in April, a satellite site opened at the Queensway Carleton Hospital (QCH). Located at the QCH, the Irving Greenberg Family Cancer Centre is a unique partnership that increases access to care and, when deemed appropriate by the cancer care team, ensures many patients from the west end of the city and the Ottawa Valley do not have to travel to the east end of Ottawa for necessary treatment. "While some chemotherapy will still be at our main campus, the new cancer centre means that we are taking the needs of patients and families into consideration, reducing wait and travel times," says Paula Doering, Vice-President of Clinical Programs at The Ottawa Hospital and Regional Vice-President of Cancer Services. "Patients will be treated in a new, beautiful, purpose-built facility designed for its intended use."

Designed for Excellence

The expanded Cancer Centre at the General Campus and the Irving Greenberg Family Cancer Centre were designed for delivering chemotherapy and radiation and offer appropriate, private and comfortable space for patients, caregivers and family. “We built a leading Cancer Centre with sufficient space to host patients and family members or caregivers who generally accompany patients to their appointments,” says Doering.

Cancer care touches lives with innovative therapies designed to meet the needs of today’s health-care system. “We have a full complement of health-care professionals aligned to treat patients and provide services, information and expertise to their families and caregivers, including a Psychosocial Oncology Program that helps cancer patients—and their families—from diagnosis and treatment to survivorship and end-of-life issues,” says Doering. “Our expanded program is groundbreaking in every sense of the word.”

Research Providing New Treatments

The new building at the General Campus includes a new Centre for Innovative Cancer Research, which is currently being built on the third floor. “Research allows us to provide innovative care for our patients today and also develop new therapies for tomorrow,” says Dr. Michael McBurney, who leads the Ottawa Hospital Research Institute’s cancer research team. “This new floor will give our researchers the tools they need to quickly move discoveries from bench-to-bedside, so that therapies developed in Ottawa, such as cancer-fighting viruses, can be available to the people of Ottawa sooner.”

Here Today

The expanded Cancer Program enables TOH to see more patients, reduce wait times, and expedites cancer care in general in the region. Next steps for Doering and her team include “transferring knowledge to other care providers in the community so we can continue to deliver improved care, cancer awareness, follow-up treatment and better patient outcomes,” she says.

“We are excited about the opportunities the new centres bring and will continue to look for ways to better serve our community,” concludes Doering.

What



The Ottawa Hospital Research Institute (OHRI) includes more than 1,500 people conducting research at The Ottawa Hospital, in partnership with the University of Ottawa. Our goal is to improve the health of people in Ottawa and around the world, while providing exceptional training and collaboration opportunities.

Our underlying philosophy is to create an environment that fosters exceptional research as well as the translation of research findings into practical applications. Our work is geared towards answering important health questions (both in the lab and in the clinic), creating new therapies and health technologies, and developing strategies to ensure that health decision-makers are aware of and are using evidence to inform their decision-making.

The OHRI was formed in 2001 to help bring together all the research activities at The Ottawa Hospital, in partnership with the University of Ottawa. Today, The Ottawa Hospital is a leading academic health science centre, serving more patients than any other hospital in Canada and the OHRI is recognized as a top centre for health research.

Financial Overview

Revenue Distribution 2009-2010

 Revenue Distribution 2009-2010

Expenditure Distribution 2009-2010

 Expenditure Distribution 2009-2010

Top 10 sources of peer-reviewed funding

 Top 10 sources of peer-reviewed funding

Vision and Priorities

The Ottawa Hospital Research Institute has developed a new Vision:

To give our patients and their loved ones new hope through research that makes tomorrow's health-care possible today.

This vision expresses our commitment to research that is focused on patients and inspired by patients. We approach our work with compassion and dedication each day, knowing that every question we answer and every problem we solve could eventually impact many people, including our loved ones. As basic scientists, physicians, nurses, trainees and other researchers, we are committed to translating our results into benefits for patients and society and making tomorrow's health-care possible today.

To support our new vision, we have developed two strategic research priorities:

Regenerative and Biological Therapeutics

This priority is designed to foster "bench to bedside" research – turning basic discoveries in cellular and molecular biology into new regenerative and biological therapeutics to improve health.

Practice-Changing Research

This priority is designed to put knowledge to work – performing high-quality clinical research that can inform health decisions and ensuring that results are optimally applied to improve health.

We have also developed a cross-cutting strategic research theme:

Vascular Health

This theme is designed to foster an exciting area of research that focuses in the role of blood vessels in health and disease. This theme cuts across all of our existing programs, fits well with our partners and addresses a major challenge for the health and well-being of Canadians.

Success Stories

Celebrating Our Successes and the Teams Who Made Them Possible:

Each year we reflect on the previous twelve months as we prepare ourselves for the year to come. This year, we can look back with pride and a sense of team accomplishment when we consider the successes we achieved together.

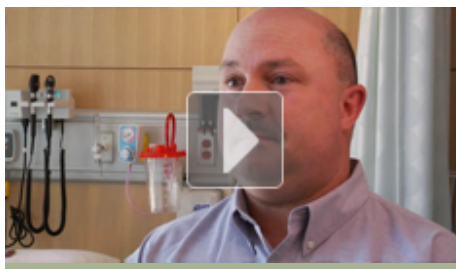
Success is measured in different ways, but at The Ottawa Hospital and the Ottawa Hospital Research Institute we take pride in the success we see with patient care, research, management, development, crisis response and the evolution of our hospital.

We've selected three stories showcasing the values and team effort that have enabled us to work towards our vision of providing each patient with the world-class care, exceptional service and compassion we would want for our loved ones.



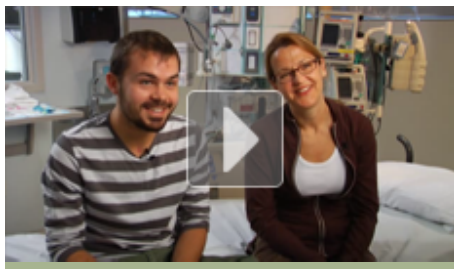
Regenerative Medicine: Renovating the Body

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Cancer Centre: Better Access for our Community

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One Life: An H1N1 Patient's Story

We're all accustomed to the common cold or flu, which normally takes affect with changes of the season and follows a predictable pattern. The H1N1 influenza strain, however, is anything but normal.

One Life: An H1N1 Patient's Story

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We're all accustomed to the common cold or flu, which normally takes affect with changes of the season and follows a predictable pattern. The H1N1 influenza strain, however, is anything but normal.

Most cold or influenza sufferers recover in a week, but some 'flu victims can have more serious implications, especially children and seniors with respiratory diseases. Serious implications caused by H1N1 included incapacitating a previously healthy individual for 5 to 10 days, leading to pneumonia, bronchitis, paralysis and coma. Other dreadful consequences were the possible aggravation of underlying chronic heart and lung disease and—in some instances—death.

Treating patients with H1N1 put a tremendous burden on the staff at TOH's Intensive Care Unit. It also placed H1N1 patients in dire circumstances as the disease is difficult to treat and cure. H1N1 had tough physical implications for the patient to endure, but also exposed their families and loved ones to a great deal of emotional pressure and stress. Facing an unknown future, both the patient and family worried about the possible outcomes, which included succumbing to the disease.

Garth Griffiths contracted H1N1 and was cared for at our General Campus Intensive Care Unit (ICU). Garth spent days in a coma and his family and TOH ICU staff didn't waste any time fighting for his life. One person in particular wasn't giving up hope for Garth's recovery.

Chantal Pilon, an ICU nurse was one of many who stood by Garth's side, even risking her own health to ensure that Garth recuperated. Chantal was committed to caring for ICU patients of all ages, but never before experienced patients like Garth - young adults clinging to life on ventilators with an illness she hadn't seen before.

Chantal refused to be swayed by her patient's low chance of survival. After days of living in uncertainty, Garth's battle was a success as he prevailed through paralysis—caused by the H1N1 virus—and regained his health. He

even participated in several ground-breaking research studies while in the ICU, knowing that the results of these studies could help to improve care for many others in the future. Today, Garth, Chantal and TOH ICU staff can share their story and bring a very real and human experience to an illness that stunned the medical profession and captivated the minds and fears of the public.

Leadership Team

The OHRI is a not-for-profit corporation governed by a Board of Directors that includes members of the University of Ottawa, The Ottawa Hospital, The Ottawa Hospital Foundation and the community.

Chair

Ken Newport, Biotech entrepreneur

Vice-Chair and Treasurer

Ian Mumford, Chief Operating Officer, Canadian Blood Services

Directors

Dr. Jacques Bradwejn	Dean, Faculty of Medicine, University of Ottawa
Ian Curry	President and CEO, DNA Genotek
Don Hewson	President and CEO, HBS Marketing
Dr. Jack Kitts	President and CEO, The Ottawa Hospital
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Randall Marusyk	Managing Partner, MBM Intellectual Property Law
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Dr. Mona Nemer	Vice-President, Research, University of Ottawa
Lynn Pratt	Partner, Deloitte & Touche LLP
Dr. Denis Prud'homme	Dean, Faculty of Health Sciences, University of Ottawa
Dr. Duncan Stewart	CEO and Scientific Director, Ottawa Hospital Research Institute Vice-President of Research, The Ottawa Hospital and Professor of Medicine, University of Ottawa
Bashir Surani	Member of The Ottawa Hospital Board of Governors
Dr. Lynne Watt	Partner, Gowling Lafleur Henderson LLP
Shirley Westeinde	Chair, Westeinde Group of Companies
Carole Workman	Executive Director, Canadian Association of University Business Officers

Senior Management Team

The OHRI's Senior Management Team provides scientific and administrative leadership for the Institute.

Dr. Duncan Stewart	CEO and Scientific Director
Dr. Jay Baltz	Associate Scientific Director, Trainees
Dr. Dean Fergusson	Acting Program Director, Clinical Epidemiology
Dr. Antoine Hakim	Program Director, Neuroscience
Robert Hanlon	Chief Operating Officer
Dr. Rashmi Kothary	Associate Scientific Director
Dr. Michael McBurney	Program Director, Cancer Therapeutics
Dr. Leo Renaud	Associate Scientific Director
Dr. Michael Rudnicki	Program Director, Regenerative Medicine
Dr. Alexander Sorisky	Program Director, Chronic Disease
Dr. Valerie Wallace	Acting Program Director, Vision
Dr. Phil Wells	Associate Scientific Director, Clinical Research

Contact Us

For more information about the Ottawa Hospital Research Institute, please visit our website at www.ohri.ca or contact us at info@ohri.ca or 613-761-4395.

For any feedback or comments about this Annual Report, please contact:

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◆ The Ottawa Hospital