Message from the Minister of Research and Innovation

On behalf of the government and all Ontarians, it is my pleasure to acknowledge the staff of the Ontario Institute for Cancer Research (OICR). Thank you for another year of incredible accomplishments in the fight against cancer.

Our government is committed to doing all we can to help find a cure for this terrible disease. There is nothing more powerful than investing in our people. That's why we are supporting the cutting-edge work of OICR. My ministry is dedicated to our common priority of putting great minds together, along with the right tools and resources, to take your best and boldest ideas and turn them into life science innovations. This will not only improve, but also save, lives.

OICR's incredible achievements over these past two years speak volumes to the skill and ingenuity of Dr. Tom Hudson and the team of world-class researchers he has brought under the Institute's fold.

Ontario boasts world-leading expertise in many facets of cancer research and discovery. By bringing together the expertise of leading international researchers, uniting them toward common goals, enabling the sharing of vital information and targeting the most promising areas of cancer research, OICR has already put Ontario on the world stage.

Never has this been more clear than when the Institute was recently chosen by the international cancer research community to coordinate a new global effort to investigate the links between genetics and cancer. The International Cancer Genome Consortium aims to unlock the mysteries of the 50 most common types of cancer tumours that plague humanity.

Serving as both the Secretariat and the Data Centre, OICR will help lead this globally significant effort and ensure that the Consortium's findings are shared worldwide.

This is but the tip of the iceberg in a year of astounding accomplishments for OICR—successes that will lead to better detection, prevention, and treatments for cancer patients here in Ontario and around the world. OICR's many scientific advances bring renewed hope to families that are dealing with the devastating effects of cancer.

Once again, please accept my thanks on behalf of the Ontario government and families across our province for the extraordinary work that you do every day.

Sincerely,

John Wil为了让
Minister of Research and Innovation

For information about the Ontario Institute for Cancer Research, please contact:

RHEA COHEN
Director of Communications
rhea.cohen@oicr.on.ca
416.673.6642

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Mixed Sources

Mixed Sources
Message from
the Chair of the Board of Directors and
the President and Scientific Director

We are pleased to present the annual report of the Ontario Institute for Cancer Research (OICR) for 2007–2008. In just a few short years, OICR has emerged as a leading centre of excellence in cancer research. Launched in December 2005, OICR was created to be a catalyst within the Ontario cancer research community. It has succeeded with a speed, and on a scale, that few could have predicted.

The momentum is evident everywhere. Many top investigators have joined the OICR team across the province and at the MaRS Centre, where they are working in OICR labs that did not exist a year ago. The Institute has invested millions of dollars in state-of-the-art equipment to provide them with the tools to do their research province-wide. A spectrum of programs is now in place, dedicated to translational research that will move discoveries in prevention, detection and treatment of cancer from the bench to the clinic.

As OICR’s programs develop, dynamic partnerships are emerging, both domestic and international, that bring together the minds and the means to tackle complex research questions in cancer.

This report describes OICR’s rapid progress over the past year in moving Ontario to the forefront of discovery and innovation. The benefits of this activity will flow to the Ontario economy with the commercialization of promising discoveries and to Ontario residents as discoveries are turned into tangible treatments, programs and products that benefit patients.

A PLAN FOR THE FUTURE

OICR’s Strategic Plan for its research lays out a blueprint that is based on the strengths and opportunities that exist within Ontario. The focus is on a strategic investment in areas where major breakthroughs are most likely and potential impact is highest. It is an ambitious three-year plan and OICR is fully on track. This first year saw the roll-out of most of OICR’s research programs and innovation platforms and the recruitment of world leaders in cancer research to oversee them.

RECRUITING THE BEST

In the past year, OICR’s strategic research programs have created 233 jobs for researchers and students in institutions around the province. In addition, OICR’s staff at the MaRS Centre in downtown Toronto, where a strong core of scientists is based, grew from 25 to 85 people. The challenges and opportunities afforded by OICR are keeping top talent in Ontario, as well as repatriating and recruiting researchers from outside Canada.

A highly-skilled team of program and platform leaders is now in place, providing excellent leadership to a diverse and multidisciplinary team of investigators working in all parts of the province, including Hamilton, Kingston, London, Ottawa and Toronto. The calibre of these researchers is demonstrated by the honours and awards they received (see page 39). OICR is also training the next generation of cancer researchers. This report includes the story on page 21 of a young investigator who has launched a promising career with support from OICR.
RESEARCH INNOVATION PROGRAMS AND PLATFORMS

Leaders have been appointed for almost all of OICR’s research innovation programs and platforms. In the past year, OICR created an additional platform in Medicinal Chemistry to design compounds that can destroy cancer cells and minimize adverse reactions to cancer patients, in part based on novel targets identified by other OICR-supported programs.

TRANSLATIONAL PROGRAMS

As OICR’s research programs generate new approaches to cancer, the Institute’s translational programs will help bring those discoveries to the clinic sooner. OICR’s Commercialization Group is working to move discoveries to the marketplace. A funding program, launched in 2007, will help transform laboratory discoveries by Ontario scientists into novel treatments and devices for patients. OICR committed $2 million in pre-commercialization funding for four projects in Ontario that are on the way to becoming commercially viable.

NEW LABORATORIES

Science needs a proper environment in which to flourish. Compared to a year ago, OICR now has more than tripled the space it occupies after leasing three additional floors at the MaRS Centre in Toronto’s Discovery District. Facilities for conducting research in bioinformatics and biostatistics and laboratories for research in genomics and medicinal chemistry are staffed and operating. The expansion will allow OICR to hire more scientists without waiting for the completion of Phase II of MaRS.

NEW RESEARCH TOOLS

In the rapidly evolving field of cancer research, the latest and best equipment can make the difference. OICR invested $9.8 million at 11 sites across Ontario last year for equipment to find better ways to fight cancer. OICR also acquired $10 million worth of leading-edge equipment for its genomics and informatics labs located in the MaRS Centre. The equipment includes powerful computers to store and analyze the staggering amounts of data collected daily and technology that can sequence an entire genome in just a week, something that would have been unimaginable a few years ago.

RESEARCH COMMITMENTS

Following expert scientific reviews, OICR approved investments of $40 million over the next four years in the Cancer Stem Cell Program, the Imaging Pipeline Platform and the One Millimetre Cancer Challenge.
WORKING TOGETHER

OICR has forged exciting partnerships over the past year, adding to the valued relationships that already exist. The Institute collaborated with other leading genome centres in launching an unprecedented international cancer genome initiative and joined with California in a unique stem cell research consortium. There is also a dynamic relationship with The Terry Fox Research Institute.

Scientific meetings are fertile grounds for establishing connections. OICR brought together members of Ontario’s cancer research community, scientists, trainees and OICR staff – 250 people – for its first Annual Scientific Meeting in February 2008. The three days of meetings, working group sessions and networking opportunities were fruitful and planning is already underway for next year’s meeting.

OICR connected the public with leading scientists last year through a lecture series held at the MaRS Centre Auditorium. The goal was to introduce Ontarians to the publicly funded researchers they support and to highlight Ontario’s achievements in cancer research. The lectures attracted the general public, researchers and students.

ACKNOWLEDGEMENTS

The staff members of OICR bring remarkable skills and extraordinary energy to everything this organization does, enabling the Institute to move forward with impressive speed.

We are grateful for the continuing support of the Government of Ontario through the Ministry of Research and Innovation, which is making Ontario a world leader in cancer research and innovation.

Left to right: Dr. Thomas Hudson, President and Scientific Director and Dr. John Evans, Chair, Board of Directors
OICR’s Strategic Plan is the blueprint that will guide OICR’s research activities to 2010. There are two streams of research, the innovation programs and the innovation platforms, which are integrated. The knowledge and technologies generated by the programs and platforms will be translated into treatments, tools and programs for use in the clinic.

The Plan emphasizes the multi-disciplinary, multi-institutional approach to meeting the cancer challenge. Over the past year, almost all the program and platform leaders were appointed and a number of major research collaborations were forged. OICR is now poised to achieve its goals, maximizing health and economic benefits for the people of Ontario.
## STRATEGIC PLAN

<table>
<thead>
<tr>
<th>THEMES</th>
<th>INNOVATION PROGRAMS</th>
<th>INNOVATION PLATFORMS</th>
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<tbody>
<tr>
<td>Prevention</td>
<td>Ontario Chronic Disease Cohort</td>
<td>Imaging Pipeline</td>
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<td></td>
<td>John McLaughlin</td>
<td>Aaron Fenster</td>
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<tr>
<td>Early Diagnosis</td>
<td>One Millimetre Cancer Challenge</td>
<td>Bio-repositories</td>
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<tr>
<td></td>
<td>Martin Yaffe</td>
<td>and Pathology</td>
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<tr>
<td>Targets</td>
<td>Cancer Stem Cells</td>
<td>Vacant</td>
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<td></td>
<td>John Dick</td>
<td>Genomics and</td>
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<td>High-Throughput</td>
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<td>Cancer Genomics Program</td>
<td>Screening</td>
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<td>John McPherson</td>
<td>John McPherson</td>
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<tr>
<td>Therapeutics</td>
<td>Selective Therapies</td>
<td>Medicinal Chemistry</td>
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<td></td>
<td>(Terry Fox Research Institute, Ontario Node)</td>
<td>Rima Al-awar</td>
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<td></td>
<td>Robert Rottapel</td>
<td>Informatics and</td>
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<td>Bio-computing</td>
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<td></td>
<td>Immuno- and Bio-therapies</td>
<td>Lincoln Stein</td>
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<td></td>
<td>John Bell</td>
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</tr>
</tbody>
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## TRANSLATION PROGRAMS

- **High Impact Clinical Trials**
  Janet Dancey

- **Health Services Research**
  Craig Earle

- **Patents to Products (Commercialization)**
  Robert Sutherland
THE LEADERS

Thomas Hudson
President and Scientific Director
Ontario Institute for Cancer Research

Rima Al-awar
Platform Leader
Medicinal Chemistry
Ontario Institute for Cancer Research

John Bell
Program Leader
Immuno- and Bio-therapies
Ottawa Health Research Institute

Janet Dancey
Program Leader
High Impact Clinical Trials
Queen’s University

John Dick
Program Leader
Cancer Stem Cell Program
Ontario Cancer Institute
Princess Margaret Hospital
University Health Network

Craig Earle
Program Leader
Health Services Research
Cancer Care Ontario
Sunnybrook Health Sciences Centre

Aaron Fenster
Platform Leader
Imaging Pipeline
Robarts Research Institute
University of Western Ontario

John McLaughlin
Program Leader
Ontario Chronic Disease Cohort
Cancer Care Ontario

John McPherson
Director
Cancer Genomics Program
and High-Throughput Screening Platform
Ontario Institute for Cancer Research

Robert Rottapel
Program Leader
Selective Therapies/Terry Fox Research Institute, University Health Network
St. Michael’s Hospital

Lincoln Stein
Director
Informatics and Bio-computing Platform
Ontario Institute for Cancer Research

Robert Sutherland
Vice-President
Commercialization
Ontario Institute for Cancer Research

Martin Yaffe
Program Leader
One Millimetre Cancer Challenge
Sunnybrook Health Sciences Centre
# Cancer Research Programs and Platforms

## SEED FUNDS AWARDED
IN 2007-2008 (in millions)

<table>
<thead>
<tr>
<th>Amount</th>
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<td>$1.2</td>
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<td>One Millimetre Cancer Challenge</td>
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<td>$1.3</td>
<td>Imaging Pipeline Platform</td>
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<td>Ontario Chronic Disease Cohort</td>
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<td>$2.3</td>
<td>Genomics Platform</td>
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## HIGHLY QUALIFIED PERSONNEL
WORKING ON PROJECTS

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<td>Technicians</td>
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<td>Other</td>
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</tr>
<tr>
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<td>Co-op students</td>
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## COMMERCIAL ACTIVITY GENERATED

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<td>Patent applications</td>
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## COMMUNICATIONS

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PREVENTION

Ontario Chronic Disease Cohort
A better understanding of the risk factors that initiate or accelerate cancer will lead to more effective prevention strategies. The Ontario Chronic Disease Cohort, to be developed in partnership with Cancer Care Ontario, is a prospective epidemiological study of lifestyle and behavioural factors. These risk factors are also pertinent to the development of other diseases, e.g., cardiovascular disease, stroke and diabetes, and the Consortium has attracted the interest of a number of Canadian and international research partners.

EARLY DIAGNOSIS

One Millimetre Cancer Challenge
In 2006, OICR issued a bold challenge to Ontario researchers: find a way to detect small cancerous tumours, perhaps as small as one millimetre or less in size and much easier to cure. Tumours are usually found when they are over one centimetre in size and contain more than 200 million cancer cells. Early detection and diagnosis of a tumour before it grows and spreads is critical in surviving cancer.

OICR’s challenge received an enthusiastic response from Ontario’s scientific community, which resulted in a research program, called the One Millimetre Cancer Challenge. The program aims to develop advanced imaging and screening techniques that can identify tumours when they are one millimetre in size or smaller.

The program harnesses Ontario’s expertise in the field of imaging research. Headed by Dr. Martin Yaffe, an imaging specialist at Toronto’s Sunnybrook Health Sciences Centre, it coordinates and funds efforts by scientists at some of the leading research institutions across Ontario. In early 2008, OICR announced an award of $12.5 million for the One Millimetre Cancer Challenge over the next four years.

The overall approach is to develop more sophisticated imaging tools that can detect functional or molecular changes in the body that occur early on in cancer instead of the more traditional imaging of lumps. Among the intriguing ideas being explored are novel molecular probes that can find cancer and be imaged. These include microbubbles, nano droplets and other agents that can detect new blood vessels or cancer-related changes in body temperature. In the past year, OICR has also provided resources for specialized equipment to help researchers develop these early-detection systems.
TARGETS

Cancer Stem Cells
Cancer stem cells are seen as the most lethal of all cancer cells, responsible for initiating and sustaining the growth of cancer. Furthermore, they may be resistant to treatment and the reason for high relapse rates in many cancers.

Over the past decade, research has produced insights into these tenacious cancer cells, which have a remarkable ability to renew themselves and seed new tumours. Few studies have been done to define the importance of targeting cancer stem cells in a clinical situation. How often do treatment-resistant cancer stem cells limit the ability of oncologists to cure cancer in their patients?

That is one of the pressing questions behind the creation of OICR’s Cancer Stem Cells program. Leading the effort is Dr. John Dick, a Senior Scientist at the Ontario Cancer Institute, the research arm of the University Health Network’s Princess Margaret Hospital. The program draws together 30 leading-edge researchers at three sites in Ontario, with $17 million in funding over the next four years. The program aims to identify ways to selectively target cancer stem cells to kill cancer at its roots so that it will not be able to spread or return after treatment.

To advance their understanding, researchers will study live cells drawn from many human cancers. This requires large sample sizes well beyond the capacity of any single lab. OICR has been working to put staff and systems in place to produce what is needed for this complex research. Their work is aided by the recent purchase of advanced equipment funded by OICR. An instrument has been purchased to perform proteomic analysis on single cells, the first of its kind in the world.

The Cancer Stem Cells program offers high potential for discovery, according to a review conducted in early 2008 by an international panel of experts in the field.
International Cancer Genome Consortium

Ontario researchers will assume a leading role in the recently launched International Cancer Genome Consortium (ICGC), a unique collaboration involving nine countries and the European Commission with a goal of producing the first database of genetic mutations involved in the major types of cancer.

The largest biomedical research effort since the Human Genome Project, the 10-year ICGC initiative will generate comprehensive catalogues of genomic data on 50 different tumour types. It will generate 25,000 times the amount of data produced by the Human Genome Project. Once the genomic changes that occur in each cancer are identified, researchers will be able to create therapies based on specific genetic targets.

The Consortium will coordinate a large number of research projects and ensure there is no duplication of effort. Each member group will conduct detailed research on at least one specific cancer type, with samples drawn from approximately 500 patients. In Canada, OICR will lead the investigation into genetic changes in pancreatic cancer, a disease with a very high mortality rate. In addition, OICR is taking on the huge task of compiling, organizing and disseminating all the data produced by the global effort, so that researchers can identify relationships between cancers.

OICR recently committed $30 million to the project, with a further $10 million in funding announced by the Government of Ontario in April 2008. OICR is home to the ICGC’s international secretariat. The Institute’s President and Scientific Director Dr. Tom Hudson, a member of the secretariat, was a driving force in ICGC’s creation.

The ICGC’s findings will be rapidly and freely available to all researchers working to develop better ways of diagnosing, treating and preventing cancer.

Current ICGC members:

- **Australia**: National Health and Medical Research Council (Observer Status)
- **Canada**: Genome Canada (Observer status); Ontario Institute for Cancer Research
- **China**: Chinese Cancer Genome Consortium
- **Europe**: European Commission (Observer Status)
- **France**: Institut National du Cancer
- **India**: Department of Biotechnology, Ministry of Science & Technology
- **Japan**: RIKEN; National Cancer Center
- **Singapore**: Genome Institute of Singapore
- **United Kingdom**: The Wellcome Trust; Wellcome Trust Sanger Institute
- **United States**: National Institutes of Health

Left to right: Ontario Premier Dalton McGuinty and Dr. Tom Hudson
ThERAPEUTICS

Selective Therapies: The Terry Fox Research Institute, Ontario Node

Terry Fox inspired countless Canadians to join the fight against cancer. Now, he has inspired the creation of a Canada-wide research institute to translate today’s best science into tomorrow’s cancer treatments.

The Terry Fox Research Institute (TFRI) is a special initiative that will support research projects with the potential to improve the health of cancer patients as quickly as possible.

Just as Terry Fox was able to unite a nation around a common cause, the TFRI is bringing together a national team of clinical and scientific researchers dedicated to finding cancer cures. The Terry Fox Foundation has committed a minimum of $50 million to fund the Institute over five years.

A virtual institute, the TFRI has nodes in several provinces including Ontario, where the provincial government has supported the Institute’s launch with matching funding of up to $15 million over five years through OICR.

The TFRI-OICR collaboration in Ontario will focus on developing cancer therapies that target cancer cells without harming healthy ones. Under the direction of Dr. Robert Rottapel of the University Health Network’s Ontario Cancer Institute, work is underway to assemble teams of clinician-scientists and molecular biologists from across Ontario with expertise in high-throughput screening tools and novel cancer model development. This year will see the establishment of a scientific advisory committee composed of local and internationally recognized leaders in cancer research and provide overall strategic scientific direction to program leaders. Funding for research projects will follow.
**Immuno- and Bio-therapies**

Viruses are turning out to be a powerful ally in the fight against cancer. They can be used to seek out and destroy cancer cells, without harming healthy ones.

A program launched last year by OICR is using potent viruses to develop treatments that would be less toxic for patients than current therapies.

A team of scientists in Hamilton, Ottawa and Toronto has been assembled to move basic laboratory discoveries into clinical trials. In the coming months, two viruses engineered to grow only in tumour cells will be tested in Phase 1 clinical trials.

Under the leadership of Dr. John Bell of the Ottawa Health Research Institute and University of Ottawa, the program has set up a facility in Ottawa to manufacture clinical-grade viruses for human trials. In Hamilton, personnel in a specialized laboratory will examine tumour, blood and other samples to determine the effectiveness of the virus-based compounds.

There is another dimension to this program. The team will be blending oncolytic viruses with immuno-therapies to maximize the body's ability to fight cancer, which has never been done before. By using cellular material to stimulate the immune system of patients, immuno-therapies enhance the body's ability to recognize the cancer as foreign, whereas normal therapies suppress the immune system.

**INNOVATION PLATFORMS**

OICR's innovation platforms are a vital part of everything that the Institute does. These five platforms support the overall thrust toward translating findings into novel methods of early detection, diagnosis and treatment for patients. Innovation platforms are composed of principal investigators and staff scientists who share expertise and develop and apply state-of-the-art technologies in key disciplines.

**Imaging Pipeline Platform**

Just as Google Earth images are bringing details of our planet into sharper focus, technologies being developed in Ontario will allow doctors to see cancer in more detail than ever before.

Scientists at the Robarts Research Institute at the University of Western Ontario in London are now able to detect a single cell using clinical MRI machines. It is just one example of work underway to improve medical imaging so that cancer can be spotted earlier, allowing for more effective treatment.

OICR's Imaging Pipeline Platform brings together imaging researchers from across Ontario in a unified effort to translate laboratory discoveries into imaging software, instruments and techniques doctors can use to diagnose and treat cancer.
In August 2007, Dr. Aaron Fenster, Director of the Imaging Research Laboratories at Robarts Research Institute was appointed to lead OICR’s Imaging Pipeline Platform. Team members, based at academic and hospital research centres across Ontario, are developing customized ultrasound probes, computer software and medical instrumentation that can be tested in clinical trials and, ultimately, integrated into clinical care. Projects involve minimally invasive tools to destroy tumours using the tip of a needle and 3-D guidance devices for needle biopsies.

Seed funding provided by OICR has already moved one discovery from initial concept towards clinical trials. The trials will test a device, developed by two of Dr. Fenster’s students, which fits onto an x-ray mammography system and allows treatment of very small breast lesions with high accuracy.

In the spring 2008, OICR allocated $10 million in funding over four years to the Imaging Pipeline Platform to move forward with research projects in four areas: scale-up cancer imaging probe discovery and chemistry; image processing and instrumentation; three dimensional histology to validate imaging; and validating and evaluating cancer imaging tools to promote use of imaging in more clinical trials.

The Imaging Pipeline Platform and the closely linked One Millimetre Cancer Challenge program will pay particular attention to projects that have high potential for clinical impact in the near future. To test their discoveries, researchers will work closely with clinical colleagues and will discuss with OICR and industry opportunities for patenting and licensing.

Molecular imaging probes are chemical compounds that can detect disease at an early stage or evaluate changes in the patient during treatment. This year, OICR became a key partner in the Centre for Probe Development and Commercialization (CPDC), which attracted almost $15 million from the Government of Canada through the Networks of Centres of Excellence. OICR is providing $4 million over five years to the CPDC.

Headed by Dr. John Valliant of McMaster University in Hamilton, the Centre will help identify which promising probes may be suitable for cancer studies in animal models as well as for clinical use. Safe and effective probes will be commercialized and the CPDC will play a key role in managing the intellectual property (IP) to attract investment in Canada.

When an international panel of experts evaluated OICR’s imaging initiatives earlier this year, panellists were impressed by the program’s scientific approach and by the degree of collaboration across institutions as well as across science and medical disciplines, which they had not seen anywhere else in the world.
Bio-repositories and Pathology Platform

The Bio-repositories and Pathology Platform answers researchers’ needs for high-quality tumour tissue, normal tissue and blood samples and their components such as DNA, RNA and proteins. This platform will support the Ontario Tumour Bank’s tissue collection efforts and align them with the Ontario Cancer Biomarker Network and the Ontario Tumour Repository. Research samples will be banked, stored and distributed to Ontario cancer researchers to advance discovery research, disease classification and the understanding of drug response.

As part of the platform, OICR will also develop a research program in molecular pathology and cytopathology. This research group will be developed with appropriate highly qualified personnel including research pathologists interested in developing methods for tissue preservation and molecular analysis.

Genomics and High-Throughput Screening Platform

The field of genomics is exploding with possibilities as highly advanced technologies offer insights into the human genome that were not possible before. OICR is putting the power and promise of these cutting-edge technologies into the hands of leading investigators with its genomics platform.

The platform was launched with the appointment of Dr. John McPherson as Cancer Genomics Director and Senior Principal Investigator. A Canadian, McPherson was recruited back to Canada from Baylor College of Medicine in Houston, Texas.
Dr. McPherson oversees research at OICR’s two genomics labs, which began operations last fall. A team of investigators, technicians and students is already at work in the approximately 10,000 square feet of research space located at the MaRS Centre in downtown Toronto. With two sequencing platforms, the labs house some of the most advanced genomic equipment in the world. One platform can sequence more than one billion bases (known as a gigabase) of DNA in four days. A gigabase is about one-third of the human genome.

The equipment will help to identify genes critical to the development of cancer. Researchers will then use these markers to develop diagnostic procedures and treatments as quickly as possible. The Genomics Platform will provide support for research in other OICR programs. Under Dr. McPherson, it will also lead OICR’s plan to map the genetic mutations involved in pancreatic cancer as part of the International Cancer Genome Consortium (see page 12).

In a separate genomics program, researchers at OICR working in collaboration with scientists at Cancer Care Ontario announced last summer that they had successfully identified a specific genetic variation on chromosome 8 that is associated with colorectal cancer. This discovery could result in new methods to test for colorectal cancer that could be used as part of a screening program.

**Medicinal Chemistry Platform**

This year, OICR added a platform to help in the discovery and development of compounds that can effectively destroy cancer cells while minimizing adverse reactions in cancer patients. The Medicinal Chemistry Platform, which was recommended by OICR’s Scientific Advisory Board, will focus in part on novel targets identified by Ontario-based research programs. Following an international search, the Institute recently appointed Dr. Rima Al-awar, who was the Head, Route Selection Group, Chemical Product Research and Development at Eli Lilly and Company in Indianapolis, Indiana, to lead this platform. Dr. Al-awar will develop and implement a research plan to build capacity within chemistry and form collaborations with academic, not-for-profit and commercial institutions.
Informatics and Bio-computing Platform

The field of informatics and bio-computing has expanded rapidly in recent years to handle the staggering amounts of data now being generated by sophisticated technologies like DNA microarrays and high-throughput genotyping.

Before long, OICR’s genomics labs and other programs will be generating so much biological data on a monthly basis that, printed off on letter-sized paper, the stack would reach ten kilometres into the sky.

The Institute’s Informatics and Bio-computing Platform will process and store these vast amounts of data so that they can be quickly and accurately mined for clues about cancer.

OICR recruited Dr. Lincoln Stein, a researcher in genome informatics at Cold Spring Harbor in New York, to head up the platform. Dr. Stein leads a growing team with special skills in computer science, medicine and biology.

Based at OICR’s offices, the team has been busy designing the hardware, software and other components needed to process, store and interpret the data generated in OICR’s labs. They have acquired a 100 server cluster with 800 central processing units, totalling a little over one petabyte of usable disk storage and 30 other servers to handle what will be one of the world’s largest health informatics databases.

OICR supports open-source software for genomic analysis and will be sharing its resources with the cancer research community in its goal to accelerate cancer research and bring treatments to the clinic faster.

With laboratories producing increasingly complex and large datasets, there is a shortage of experts in bioinformatics to manage this information. OICR is helping to fill the gap by hosting a series of training sessions offered by the Canadian Bioinformatics Workshops (www.bioinformatics.ca).
TRANSLATION PROGRAMS

High Impact Clinical Trials
OICR's greatest challenge is to bridge the gap between discoveries and patients. Clinical trials are a critical link in this process. Improving efficiency, supporting personnel and increasing recruitment of patients into trials is fundamental to OICR's work. The Institute also aims to establish the very best high impact clinical trials in the world. As a major first step, OICR funded an initiative last year involving the Ontario Clinical Oncology Group and the National Cancer Institute of Canada's Clinical Trials Group to electronically capture data as part of clinical trials. Prior to the implementation of this software, data on each patient was handwritten on a form and faxed to a centre for input, leading to errors and delays. The software will overcome these problems.

Health Services Research
OICR is creating an innovative program that will advance the health services research agenda in Ontario. The initiative will use evidence-based methods to evaluate the benefits, risks and costs of new diagnostic and therapeutic interventions. It will also shed light on barriers to dissemination of new health services and products. OICR recruited an internationally recognized leader for this program. Dr. Craig Earle, a Canadian health services researcher at Harvard University, has moved to Toronto to lead the Health Services Research Program. In establishing this program, Dr. Earle will work closely with the Cancer Care Ontario (CCO) Chairs, the recipients of OICR Investigator Awards and the Health Services Research Network established by CCO and the Institute for Clinical Evaluative Sciences at Sunnybrook Health Sciences Centre.
Patents to Products (Commercialization)
Too many promising discoveries never make it out of the lab and into the market.
OICR wants to bring the benefits of discovery not only to the residents of Ontario but to cancer patients everywhere. The Commercialization Group is accelerating the development of innovative cancer therapies by removing barriers to the commercialization of cancer research in Ontario.

When it comes to commercialization, one of the most daunting obstacles is the so-called developmental ‘valley of death’, a gap in funding between public granting agencies and private investors. To bridge this gap, OICR’s Commercialization Group initiated a funding program this past year that will help transform laboratory discoveries by Ontario scientists into novel treatments and devices for patients. Already, $2 million has been invested in four promising early-stage technologies, including a diagnostic tool, an imaging and therapeutic platform and two treatments for cancer. The Commercialization Group is also working hard to attract investors for these and other projects.

In just one year, Dr. Robert Sutherland, OICR’s Vice-President, Commercialization, has built a team with a broad range of expertise in areas such as technology transfer, clinical trials management, business and research. They are guided by an “Ontario First Policy” which encourages the maximum participation of Ontario firms in the development, use and commercialization of inventions arising from OICR research projects. Negotiations are currently underway that may lead to significant collaborations and funding from several companies.

The commercialization team is also assembling an inventory of cancer-related IP in Ontario. This will allow sophisticated analyses of large IP databases to identify potential bundling of related IP to maximize scientific and economic value.

“OICR is at both ends of the spectrum of translational research, by supporting basic research and then helping to ensure results are moved into the clinic,” says Dr. Michael Julius, Vice-President of Research at Sunnybrook Health Sciences Centre. “For Sunnybrook Research Institute, OICR’s investment has already opened up exciting possibilities for commercialization. OICR is an important partner in our mission to invent the future of health care.”
The Next Generation

OICR’s major investment in cancer stem cell research is making Ontario an exciting place for the next generation of cancer researchers.

Cancer stem cells are a rare subset of cancer cells that are changing the way researchers think about the disease. These cells have been shown to cause the growth of certain tumours and blood cancers and are resistant to most forms of treatment. Many scientists believe that identifying cancer stem cells and compounds that destroy them could lead to treatments that limit tumour growth and eliminate recurrence of cancer.

Dr. Laurie Ailles, a Scientist in the Division of Stem Cell and Developmental Biology at the Ontario Cancer Institute, the research arm of the University Health Network’s Princess Margaret Hospital, recently relocated to Ontario after completing a three-year postdoctoral fellowship and two years as a senior research associate at Stanford University in California. A native of Canada, Dr. Ailles chose to pursue her research in Toronto because it is a world-leading hub of research in cancer stem cells.

Dr. Ailles has identified a marker for head and neck squamous cell carcinoma that allows her team to extract cancer stem cells, which can be divided into subsets and assayed for tumour-initiating potential. She now plans to study the biological properties of cancer stem cells and the signalling pathways that promote their self renewal. This is important because when a stem cell divides it has the ability to produce not only another stem cell but all of the progeny cells that make up most of a tumour. Dr. Ailles’ work will help identify therapies with the potential to target and eliminate cancer stem cells and thus limit tumour growth.

Dr. Ailles’ research is funded in part through an OICR Investigator Award. She is also working closely with other OICR-funded researchers in the Institute’s Cancer Stem Cell Program, including Dr. John Dick, the Toronto-based scientist who proved the existence of cancer stem cells in the mid-1990s.

“The Discovery District in Toronto is an exciting place to build my career,” says Dr. Ailles. “Ontario’s vision for cancer stem cell research, and for cancer research generally, is the most impressive I’ve seen anywhere. I think the programs OICR is investing in and the way they are arranged is going to lead to some really significant discoveries.”
The Cancer Research Fund (CRF) supports investigator initiated translational cancer research that is independent of OICR’s large-scale Cancer Research Program. Funds are awarded for translational cancer research projects based on the excellence of the research. They range from validation of novel drug targets and development of new treatments and diagnostic tools, to their clinical validation and application.

Funds are made available through annual grant competitions, with selections based on recommendations generated by scientific peer review panels. To date, CRF has supported proposals in four major areas:

- Pre-clinical validation of potential therapeutic targets, development of new agents, genetic/proteomic studies;
- Clinical evaluation of new therapeutic agents/modalities;
- Clinical trials companion studies;
- Special Request for Proposals to address unique research needs.

Since 2002, approximately 500 Ontario researchers have applied to the CRF, and 126 projects were funded in more than 22 institutions, for a total in excess of $64 million. The awards have the potential to benefit a large number of patients affected by cancer through support of projects involved in a wide range of cancer types, including breast, prostate, lung and colorectal cancer. Moreover, the funds are an investment that benefits Ontario’s research and innovation as well as its economy through support of highly qualified personnel and the advancement of intellectual property and commercialization of research.
PROJECT TYPE ROUNDS 1-11

- Companion Studies: 12
- Clinical Trials: 21
- Translational: 93

FUNDED PROJECTS

<table>
<thead>
<tr>
<th>ROUND</th>
<th>DATE</th>
<th>PROJECTS FUNDED</th>
<th>FUNDS AWARDED (in millions of dollars)</th>
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<tr>
<td>11</td>
<td>November 2007</td>
<td>17</td>
<td>$8.2</td>
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TOTAL: 126 projects, $64.8 million
CANCER TYPE AND NUMBER OF PROJECTS*  
NUMBER OF PROJECTS IN ROUNDS 1-11

<table>
<thead>
<tr>
<th>Cancer Type</th>
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<tr>
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<td>Colorectal</td>
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<td>Head and Neck</td>
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<tr>
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<tr>
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<td>Multiple Cancers</td>
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<td>Melanoma</td>
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<tr>
<td>Other</td>
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<td>Prostate</td>
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HIGHLY QUALIFIED PERSONNEL WORKING ON 103 PROJECTS IN ROUNDS 1-9*

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<td>Medical fellows</td>
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*Some projects have an impact on more than one type of cancer.

COMMERCIAL ACTIVITY GENERATED BY 103 PROJECTS IN ROUNDS 1-9

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<td>Patents granted</td>
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<td>Invention disclosures</td>
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<tr>
<td>Patents pending</td>
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<tr>
<td>Patent applications</td>
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COMMUNICATIONS ARISING FROM 103 PROJECTS IN ROUNDS 1-9

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<tr>
<td>Poster presentations</td>
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<td>Other publications</td>
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<tr>
<td>Papers in peer-reviewed publications</td>
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<tr>
<td>Oral presentations in Canada</td>
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</table>

*In 2007–2008 categories have been refined to better reflect the research workforce.
DR. ANN CHAMBERS

Osteopontin is a protein which normally plays a role in bone development. However, it also seems to make tumours more aggressive and more likely to metastasize. Dr. Ann Chambers’ goal is to understand the effect of osteopontin on cancer cells, and ultimately to find ways of interrupting the process of metastasis.

Dr. Chambers, Director of the Translational Breast Cancer Research Unit at the London Regional Cancer Program, has developed a test to measure blood osteopontin levels in breast cancer patients. High levels of this protein are associated with poor patient outcomes. Risk of mortality seems to increase with increased levels of osteopontin.

While osteopontin levels may help in determining prognosis, the exact role of this protein is not fully understood. Osteopontin is a signalling protein which affects different cells in many parts of the body. It is not cancer-specific. Increased blood levels are seen in sepsis, inflammation and other conditions.

“We’re trying to understand which cells are affected by osteopontin signalling,” says Dr. Chambers. “This may suggest drug targets but we need a great deal more research to get to that stage.”

In the meantime, if osteopontin levels do prove to be highly predictive of breast cancer outcome, a test based on these protein levels may help detect the likelihood of recurrence.
DR. ROBERT KERBEL

Anti-angiogenic drugs, agents which block the growth of blood vessels in tumours are being increasingly used for the treatment of a variety of cancers. One challenge is determining the effectiveness of these drugs early on in patients, given that traditional criteria, such as rapid tumour shrinkage, may not apply, as they do to conventional chemotherapy. Dr. Robert Kerbel is investigating ways to measure and increase the efficacy of these drugs.

Dr. Kerbel, Senior Scientist in Molecular and Cellular Biology at Sunnybrook Research Institute in Toronto, and a Canada Research Chair in Tumour Biology, Angiogenesis and Antiangiogenic Therapy, has developed a blood test that measures the level of certain blood plasma proteins which rise or fall with anti-angiogenic drug treatment. The test provides a potential marker for drugs’ effectiveness and allows researchers to easily obtain data on dose response. Simple, direct and inexpensive, the blood test developed by Dr. Kerbel has obvious potential advantages over more elaborate diagnostic procedures using MRI or CT-scans. In addition the rapid rise in a number of proteins induced by antiangiogenic drugs may have a direct impact on how resistance can develop to such drugs and how treatment with them can affect the outcome of metastasis.

The simple blood test could help clinicians determine an optimal dose that achieves the critical balance between maximal anticancer benefit and minimal drug toxicity. Getting the dose right is also important for therapy, and from a cost perspective, as these drugs are very expensive. “Our test could help maximize the benefits of therapy and control costs of treatment,” says Dr. Kerbel. His lab’s blood test is currently being evaluated in clinical trials.

Breast cancer cells engineered to express a light-emitting protein show spontaneous metastasis after surgical removal of the tumour.
Multiple myeloma and ovarian cancer are among the most challenging malignancies to treat. Myeloma is almost 100 per cent lethal and ovarian cancer, because it is often identified very late, has a poor prognosis. Dr. Linda Penn, a molecular biologist at Princess Margaret Hospital in Toronto, is investigating the innovative use of statins, typically prescribed for cholesterol control, in therapy for these two cancers. In some patients, statins cause apoptosis (cell death) in cancer cells without damaging healthy neighbouring cells.

Dr. Penn’s research shows that tumour cells of some cancers “hijack” the mevalonate pathway an intracellular signalling mechanism which is vital to cell life. Statins target the mevalonate pathway and knock it out. “Malignant cells don’t have sensors in place to say something’s wrong and trigger appropriate feedback, so the cell dies,” explains Dr. Penn.

Dr. Penn’s team is working to determine why cells of some types of cancer die in response to statin therapy while others do not. Having drugs that are already approved and readily available means that her team can quickly exploit this information. Dr. Penn’s long-term goal is to incorporate statins into traditional therapy regimes, thus increasing their ability to target and kill tumour cells. She hopes to start clinical trials within about three years.

The molecular target of the statin family of drugs, HMG-CoA reductase (Figure 1), is differentially regulated in sensitive and insensitive tumour cells exposed to statins (Figure 2). This suggests these immediately available and inexpensive cholesterol control agents may be used as anti-cancer therapeutics in sensitive cancer patients.

**Figure 1**

**Figure 2**
Chemotherapy saves lives but the side effects can often be devastating. Dr. Jim Petrik, Professor of Biomedical Sciences at the University of Guelph, is working to identify novel treatments that reduce ovarian tumour formation and inhibit disease progression without producing unacceptable side effects.

Like all solid tumours, ovarian tumours require blood vessels to grow. Scientists have discovered that a small, naturally-occurring protein called thrombospordin-1 (TSP-1) inhibits blood vessel formation (angiogenesis). Dr. Petrik’s team aims to put this human protein to use in treating ovarian tumours. “We can potentially use this protein to inhibit tumour formation, or to ‘starve’ established tumours of their blood supply and shrink them,” explains Dr. Petrik.

TSP-1 not only inhibits tumour growth but reverses abnormal vascularization. This may make it even more effective in cancer therapy. Typically, rapid-growth tumours have abnormal blood vessels. This presents an obstacle to treatment, because if a tumour’s blood supply is poor, chemotherapy is inefficient. Treatment with TSP-1 results in smaller, better-perfused tumours which are easier to “knock out” with chemotherapy.

Dr. Petrik is currently exploring the potential for using TSP-1 in combination with traditional chemotherapy to make cancer therapy more effective. The result may be reduced chemotherapy dosage and therefore fewer treatment side effects. Clinical trials could begin in the next few years.
DR. GERALD PRUD’HOMME

Most cancer drugs target the primary site of cancer. However, if the cancer metastasizes to other tissues and organs, the patient’s chance of survival decreases. Dr. Gerald Prud’homme, Professor of Laboratory Medicine and Pathobiology at the University of Toronto, has been working to determine if a drug called Tranilast can slow or even halt metastasis.

Tranilast has been used in parts of Asia for over 20 years to treat allergies and fibrosis. It has a recognized immunosuppressive effect and inhibits cytokines such as Transforming Growth Factor Beta (TGF-Beta), which play a role in cancer.

Recognizing its potential in cancer therapy, Dr. Prud’homme began to explore the effect of Tranilast on cancer and metastasis in particular. He found that Tranilast inhibits the growth of primary tumours to some extent but can dramatically slow metastasis.

Tranilast could potentially be used to prevent the spread of cancer, in combination with a traditional chemotherapy agent designed to kill tumour cells. “This is not a toxic drug,” Dr. Prud’homme stresses. “It has been given to humans for a long time to treat diseases that are not life-threatening and it has been well tolerated.” These features give Tranilast a significant advantage over developmental drugs which have not yet been tested in humans.

If research continues to produce positive results, clinical trials of Tranilast in cancer therapy could start in three to five years.
DR. JOHN VALLIANT

Breast cancer is the most commonly diagnosed cancer among women in Canada. To provide physicians with new tools to detect tumours and to determine earlier on whether the disease has spread, Dr. John Valliant, Acting Director of the McMaster Institute of Applied Radiation Sciences, is developing new molecular imaging probes.

Molecular radioimaging probes are chemical compounds that target specific biochemical markers of disease. These compounds are prepared using medical isotopes and their distribution and localization at cancer sites can be detected using nuclear imaging techniques.

Dr. Valliant and his team are working to identify a new generation of radioactive probes which will selectively bind to proteases which are found in and around malignant, fast-growing tumours. They will then track these markers and locate tumours using advanced imaging techniques including Single Proton Emission Computed Tomography (SPECT) and Positron Emission Tomography (PET). These methods are extremely sensitive and can be used to detect the formation of primary and secondary tumours very early in their genesis.

To find a suitable probe, Dr. Valliant’s team has developed a means to prepare libraries of peptide ligands that bind to proteases and which can be tagged with clinically relevant medical isotopes. Utilizing this new technology, the team is now working to select the lead peptide for more advanced testing. At the same time, the researchers have developed new technologies to produce imaging agents in high purity in a manner that maximizes uptake of the probe in tumours.

Being able to detect and classify aggressive tumours in breast cancer patients would be a significant leap forward. “At the moment there are few non-invasive methods to detect and characterize the metastatic potential of breast cancer tumours,” explains Dr. Valliant. “By monitoring proteases, it may be possible to classify tumours based on their potential to metastasize which will help physicians select the most appropriate treatments at a relatively early stage. Application of our new probe discovery and production technologies will expedite the discovery of lead compounds for this and other relevant cancer targets.”
Clinical Trials Programs

Clinical trials are a vital step along the road to the development of cancer treatments. That is why OICR is promoting speed, quality and access to cancer clinical trials for patients in Ontario.

The initial goal of doubling patient enrolment has already been achieved. Between 2004 and 2007, the percentage of cancer patients enrolling in Ontario clinical trials increased to almost 12 per cent. This is one of the highest enrolment rates in North America.

These results have helped to create real momentum among cancer clinical trials professionals, who believe Ontario can do even better. In a productive session held earlier this year, OICR brought together 70 professionals responsible for the day-to-day administration of cancer clinical trials to discuss how to build on recent successes to make Ontario a leader in cancer clinical research.

One initiative that emerged from this session is a pilot project to create a central office that could negotiate a single budget and contract and facilitate one ethics review for all member institutions. The pilot project will be expanded in 2008 to include more cancer centres and hospitals.

To provide Ontario clinical trials staff with the tools and information needed to perform their duties as efficiently as possible, OICR conducted training workshops last year for approximately 150 professionals. OICR subsidizes these workshops significantly to ensure equal access to training for personnel across Ontario.

OICR re-designed the website www.OntarioCancerTrials.ca to make it easier to find clinical trials in Ontario. Updated daily, the site has grown to include more than 490 clinical trials.

OICR is grateful for the support of Clinical Trials Advisory Council (CTAC), established in 2007, which provides advice on the future directions for the clinical trials programs. CTAC members are representatives of the cancer treatment centres.

"OICR’s Clinical Trials Programs have been instrumental in developing the clinical research infrastructure in Ontario," says Dr. Padraig Warde, Medical Director of the Clinical Research Unit at Princess Margaret Hospital in Toronto. "OICR has built the scaffolding to allow researchers to conduct clinical trials in an efficient and timely manner. This will help us get new treatments into the clinic more quickly."

Left to right: Lois Favacho, Administrative Assistant, Diana Au, Database Coordinator, Kay Friel, Director, Clinical Trials Programs
Protecting Patients’ Rights

Protecting Patients’ Safety

Improving Efficiency
Clinical trials are often conducted at many different sites. Until recently, this entailed a separate ethics review at each site, creating a lot of paperwork and prolonging the approvals process across Ontario.

The Ontario Cancer Research Ethics Board (OCREB), a centralized provincial research ethics board (REB) provides a more coordinated approach to ethics review at multiple institutions.

Once a study is approved by OCREB, any of the centres using OCREB as their research ethics board for that study can quickly get ethics approval. For these studies, OCREB takes the place of the institution’s own research ethics board. By eliminating duplication, OCREB’s approach improves efficiency and reduces workload of the other centres considerably. The rights and safety of study participants are protected at the highest of standards.

The coordinated approach is catching on. More than 50 per cent of Ontario centres now use OCREB as their REB of record for multi-centre oncology research, including a majority of academic institutions (see list at www.oicr.on.ca/OCREB/institutions.htm). Last year, the number of submissions to OCREB increased to 73 from 56 the previous year.

OCREB is able to deliver expert ethics reviews thanks to a high-calibre membership that is highly knowledgeable about the complex field of cancer clinical trials in addition to research ethics. Monthly open dialogues with local centres provide a forum for education and ensure continuous refinement of the OCREB process.

In March 2008, OCREB conducted its first user study, with encouraging results. The survey, completed by 72 investigators, study coordinators and ethics coordinators who use OCREB, showed that 90 per cent of respondents consider OCREB’s overall services to be good or excellent.

“OCREB is a valuable service that saves me a lot of time by reducing the amount of paperwork and duplication of effort that’s involved in seeking ethics approval for multi-centre trials,” says Dr. Edmond Chouinard, Medical Oncologist at Cambridge Memorial Hospital.

“As the only medical oncologist at my hospital, it’s very time-consuming to submit a protocol if you have to do all the work by yourself. OCREB allows me to invest my time in my patients and clinical research, rather than in paperwork, when there’s a provincial applicant taking the lead. OCREB’s monthly teleconferences are a valuable opportunity to learn about and discuss current research issues and to provide feedback to OCREB, which wants to make the process even better.”

Dr. Ronald Heselgrave
Chair, OCREB

Janet Manzo
Executive Director, OCREB

Dr. Raphael Saginur
Chair, OCREB Advisory Committee
Ontario Tumour Bank

Developing better diagnostic tools and drug therapies often involves working with tissue samples. The Ontario Tumour Bank (OTB) is an indispensable resource that provides academic and industry-based cancer researchers with an extensive inventory of biospecimens and data.

The OTB’s collection now includes nearly 45,000 samples from 4,700 donors. High-quality samples from more than 30 disease sites provide researchers with crucial information about a wide range of cancers. These samples are collected from participating medical centres across Ontario, following a rigorous set of procedures and ethical guidelines.

The need for biospecimens is considerable. Last year, OTB distributed more than 1,200 samples to researchers, representing two and a half times more samples than the previous year.

One of the unique aspects of the program is the comprehensive nature of the clinical data. More than 140 separate pieces of information are collected on each case, covering histology, staging, treatment, toxicities, family and patient history, and outcomes. This makes OTB one of the best annotated tumour banks in the world.

“Research-grade tissue can be difficult to obtain,” says Dr. Denis Bourbeau, Project Manager of the Genomics and Health Initiative of the National Research Council, whose researchers use OTB samples to identify new drug targets and protein-based therapeutics. “The OTB is a dependable source of high-quality samples, collected and managed in a very professional manner. It’s a great asset to have in Canada.”

Participating Hospitals / Medical Centres
Credit Valley Hospital
Hamilton Health Sciences
Kingston General Hospital
London Health Sciences Centre
The Ottawa Hospital
Excellence
Awards

OICR extends its congratulations to the following cancer researchers who were recognized for their significant contributions:

**DR. MICK BHATIA**  
Director and Senior Scientist, McMaster Stem Cell and Cancer Research Institute  
University of Guelph 2008 Alumni Medal of Achievement

**DR. ERIC BROWN**  
Associate Professor and Chair, Canada Research Chair in Chemical Biology, McMaster University  
2008 Canadian Cystic Fibrosis Foundation’s Robbie Award for Most Promising New Research

**DR. JOHN DICK**  
OICR Program Leader – Cancer Stem Cells  
G.H.A. Clowes Memorial Award, American Association for Cancer Research, 2007 International Society of Experimental Hematology Don Metcalf Award, 2007 Diamond Jubilee Award (with Dr. James Till and Dr. Ernest McCulloch), National Cancer Institute of Canada

**DR. AARON FENSTER**  
Platform Director, Imaging Pipeline, OICR  
2008 Hellmuth Prize for Achievement in Research  
University of Western Ontario

**DR. STUART FOSTER**  
Senior Scientist, Imaging Research  
Sunnybrook Research Institute  
Premier’s Discovery Award for Innovation Leadership

**PETER GEORGE**  
President and Vice Chancellor of McMaster University and Chair of the Council of Ontario Universities  
Member, OICR Board of Directors  
Order of Ontario

**DR. MARTIN HOLCIK**  
Scientist, CHEO Research Institute  
Faculty of Medicine Young Professor Award for 2007  
University of Ottawa Young Researcher Award for 2007

**DR. TAK MAK**  
Director, The Campbell Family Institute for Breast Cancer Research at the Ontario Cancer Institute, the research arm of the University Health Network’s Princess Margaret Hospital  
Order of Ontario

**DR. NAOMI MATSUURA**  
Postdoctoral Fellow, Sunnybrook Research Institute  
Polanyi Prize

**DR. TONY PAWSON**  
Distinguished Investigator, Samuel Lunenfeld Research Institute  
Japan’s Kyoto Prize in the Basic Sciences Category

**DR. AARON SCHIMMER**  
Scientist in the Division of Cancer Genomics and Proteomics at the Ontario Cancer Institute, the research arm of the University Health Network’s Princess Margaret Hospital  
Named a Scholar in Clinical Research by the Leukemia and Lymphoma Society of America  
Royal College Gold Medal in Medicine from the Royal College of Physicians and Surgeons of Canada  
Joe Doupe Young Investigator Award from the Canadian Society for Clinical Investigation/Royal College of Physicians and Surgeons of Canada

**DR. FRANCES A. SHEPHERD**  
Scott Taylor Chair in Lung Cancer Research at the University Health Network’s Princess Margaret Hospital  
Order of Ontario  
Premier’s Summit Award for Medical Research

**DR. DAVID WALDE**  
Director of the Oncology Program at Sault Area Hospital  
Order of Ontario
To the Directors of Ontario Institute for Cancer Research

We have audited the balance sheet of Ontario Institute for Cancer Research as at March 31, 2008 and the statements of operations and surplus and cash flows for the year then ended. These financial statements are the responsibility of the Institute’s management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation.

In our opinion, these financial statements present fairly, in all material respects, the financial position of the Institute as at March 31, 2008 and the results of its operations and its cash flows for the year then ended in accordance with Canadian generally accepted accounting principles.

[Signature]
Smich Nixon LLP
Licensed Public Accountants
Chartered Accountants
Toronto, Ontario
May 30, 2008

A copy of the complete audited financial statements is available upon request.
## BALANCE SHEET

As at March 31

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<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ASSETS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>$9,740,461</td>
<td>$4,885,662</td>
</tr>
<tr>
<td>Other receivables</td>
<td>1,727,554</td>
<td>1,017,980</td>
</tr>
<tr>
<td>Inventory</td>
<td>466,849</td>
<td>683,706</td>
</tr>
<tr>
<td>Prepaid expenses</td>
<td>765,942</td>
<td>209,176</td>
</tr>
<tr>
<td>Current portion of deferred expenses</td>
<td>124,848</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total current assets</strong></td>
<td><strong>12,825,654</strong></td>
<td><strong>6,796,524</strong></td>
</tr>
<tr>
<td>Deferred expense</td>
<td>821,920</td>
<td>-</td>
</tr>
<tr>
<td>Property and equipment</td>
<td>20,532,915</td>
<td>5,834,722</td>
</tr>
<tr>
<td>Equipment under capital lease</td>
<td>29,716</td>
<td>-</td>
</tr>
<tr>
<td>Note receivable</td>
<td>401,988</td>
<td>500,000</td>
</tr>
<tr>
<td><strong>Total assets</strong></td>
<td><strong>34,612,193</strong></td>
<td><strong>13,131,246</strong></td>
</tr>
</tbody>
</table>

|                  |         |         |
| **LIABILITIES**  |         |         |
| Current liabilities |         |         |
| Accounts payable and accrued liabilities | $8,528,533 | $2,799,689 |
| Current portion of obligation under capital lease | 11,990 | - |
| **Total current liabilities** | **8,540,523** | **2,799,689** |
| Obligation under capital lease | 18,969 | - |
| Term loan        | 500,000  | 500,000  |
| **Total liabilities** | **9,059,492** | **3,299,689** |

|                  |         |         |
| **DEFERRED CONTRIBUTIONS** |         |         |
|                  | 23,733,177 | 8,782,218 |

|                  |         |         |
| **SURPLUS**      |         |         |
| Unrestricted     | 1,819,524 | 1,049,339 |
| **Total surplus** | **34,612,193** | **13,131,246** |
# Statement of Operations and Surplus

Year ended March 31  

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenue</strong></td>
<td></td>
<td></td>
<td>$32,291,219</td>
<td>$8,406,569</td>
</tr>
<tr>
<td>Grant funding</td>
<td>$32,291,219</td>
<td>$8,406,569</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fee and workshop revenue</td>
<td>–</td>
<td>779,525</td>
<td>779,525</td>
<td>681,427</td>
</tr>
<tr>
<td>Non grant interest</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>3,772</td>
</tr>
<tr>
<td>Other grant funding</td>
<td>192,489</td>
<td>1,203,742</td>
<td>1,396,231</td>
<td>388,552</td>
</tr>
<tr>
<td>Rental income</td>
<td>216,977</td>
<td>–</td>
<td>216,977</td>
<td>–</td>
</tr>
<tr>
<td><strong>Total Revenue</strong></td>
<td>32,700,685</td>
<td>10,389,836</td>
<td>43,090,521</td>
<td>20,757,720</td>
</tr>
<tr>
<td><strong>Expenses</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amortization</td>
<td>1,795,013</td>
<td>–</td>
<td>1,795,013</td>
<td>106,337</td>
</tr>
<tr>
<td>Audit</td>
<td>58,357</td>
<td>5,124</td>
<td>63,481</td>
<td>32,417</td>
</tr>
<tr>
<td>Capital expenses</td>
<td>251,119</td>
<td>7,278</td>
<td>258,397</td>
<td>17,460</td>
</tr>
<tr>
<td>Contracted services</td>
<td>407,335</td>
<td>292,815</td>
<td>700,150</td>
<td>848,418</td>
</tr>
<tr>
<td>Grants, CRF and electronic data capture</td>
<td>–</td>
<td>6,226,445</td>
<td>6,226,445</td>
<td>2,777,946</td>
</tr>
<tr>
<td>Honoraria</td>
<td>126,345</td>
<td>65,830</td>
<td>192,175</td>
<td>100,874</td>
</tr>
<tr>
<td>Information system support</td>
<td>889,863</td>
<td>358,558</td>
<td>1,248,421</td>
<td>318,445</td>
</tr>
<tr>
<td>Insurance</td>
<td>56,380</td>
<td>–</td>
<td>56,380</td>
<td>43,797</td>
</tr>
<tr>
<td>Investigator and research support</td>
<td>16,411,772</td>
<td>–</td>
<td>16,411,772</td>
<td>10,132,369</td>
</tr>
<tr>
<td>Legal</td>
<td>66,375</td>
<td>14,990</td>
<td>81,365</td>
<td>51,110</td>
</tr>
<tr>
<td>Marketing and communications</td>
<td>273,887</td>
<td>28,700</td>
<td>302,587</td>
<td>214,934</td>
</tr>
<tr>
<td>Office and general</td>
<td>479,860</td>
<td>173,292</td>
<td>653,152</td>
<td>285,971</td>
</tr>
<tr>
<td>Rent</td>
<td>2,685,369</td>
<td>49,500</td>
<td>2,734,869</td>
<td>799,370</td>
</tr>
<tr>
<td>Research operations, internal</td>
<td>2,770,380</td>
<td>–</td>
<td>2,770,380</td>
<td>–</td>
</tr>
<tr>
<td>Salaries, benefits and recruiting</td>
<td>5,433,762</td>
<td>1,181,013</td>
<td>6,614,775</td>
<td>2,651,303</td>
</tr>
<tr>
<td>Support service fees</td>
<td>480,163</td>
<td>262,500</td>
<td>742,663</td>
<td>505,515</td>
</tr>
<tr>
<td>Travel</td>
<td>262,107</td>
<td>123,282</td>
<td>385,389</td>
<td>308,395</td>
</tr>
<tr>
<td>Workshops and conferences</td>
<td>252,598</td>
<td>22,995</td>
<td>275,593</td>
<td>27,503</td>
</tr>
<tr>
<td><strong>Total Expenses</strong></td>
<td>32,700,685</td>
<td>9,619,651</td>
<td>42,320,336</td>
<td>20,072,508</td>
</tr>
<tr>
<td><strong>Excess of revenues over expenses</strong></td>
<td>–</td>
<td>770,185</td>
<td>770,185</td>
<td>685,212</td>
</tr>
<tr>
<td><strong>Surplus, beginning of year</strong></td>
<td>–</td>
<td>1,049,339</td>
<td>1,049,339</td>
<td>364,127</td>
</tr>
<tr>
<td><strong>Surplus, end of year</strong></td>
<td>$</td>
<td>–</td>
<td>$1,819,524</td>
<td>$1,819,524</td>
</tr>
</tbody>
</table>
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Vice-President, Commercialization

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Vice-President, Operations

MICHELE NOBLE
Corporate Secretary
Message from the Minister of Research and Innovation

On behalf of the government and all Ontarians, it is my pleasure to acknowledge the staff of the Ontario Institute for Cancer Research (OICR). Thank you for another year of incredible accomplishments in the fight against cancer.

Our government is committed to doing all we can to help find a cure for this terrible disease. There is nothing more powerful than investing in our people. That's why we are supporting the cutting-edge work of OICR. My ministry is dedicated to our common priority of putting great minds together, along with the right tools and resources, to take your best and boldest ideas and turn them into life science innovations. This will not only improve, but also save, lives.

OICR’s incredible achievements over these past two years speak volumes to the skill and ingenuity of Dr. Tom Hudson and the team of world-class researchers he has brought under the Institute’s fold.

Ontario boasts world-leading expertise in many facets of cancer research and discovery. By bringing together the expertise of leading international researchers, uniting them toward common goals, enabling the sharing of vital information and targeting the most promising areas of cancer research, OICR has already put Ontario on the world stage.

Never has this been more clear than when the Institute was recently chosen by the international cancer research community to coordinate a new global effort to investigate the links between genetics and cancer. The International Cancer Genome Consortium aims to unlock the mysteries of the 50 most common types of cancer tumours that plague humanity.

Serving as both the Secretariat and the Data Centre, OICR will help lead this globally significant effort and ensure that the Consortium’s findings are shared worldwide.

This is but the tip of the iceberg in a year of astounding accomplishments for OICR—successes that will lead to better detection, prevention, and treatments for cancer patients here in Ontario and around the world. OICR’s many scientific advances bring renewed hope to families that are dealing with the devastating effects of cancer.

Once again, please accept my thanks on behalf of the Ontario government and families across our province for the extraordinary work that you do every day.

Sincerely,

John Milloy
Minister of Research and Innovation

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For information about the Ontario Institute for Cancer Research, please contact:

RIEKA COHEN
Director of Communications
riea.cohen@oicr.on.ca
416.673.6642