



Welcome to this special regional edition of CIHR's newsletter, *Your Health Research Dollars at Work*.

The goal of the Canadian Institutes of Health Research is to support research that will improve health, strengthen the health-care system, and develop better health products and services in every region of the country.

We are constantly mindful of the need to deliver on that goal and, in the past fiscal year, CIHR released its new five-year strategic plan, our *Health Research Roadmap*. The plan was the culmination of a series of cross-Canada consultations held with stakeholders to achieve a better understanding of the challenges that our organization should be addressing. The *Roadmap* now forms the foundation of our planning for the next five years.

With our *Roadmap* to guide us, CIHR is focused on addressing five key priorities to create health and wealth for Canada and Canadians:

- Enhancing patient-oriented care and improving clinical results through scientific and technological innovations;
- Supporting a high-quality, accessible and sustainable health-care system;
- Reducing health inequities of Aboriginal peoples and other vulnerable populations;
- Preparing for and responding to existing and emerging threats to health; and
- Promoting health and reducing the burden of chronic disease and mental illness.

As the examples featured in the pages of this special regional edition of *Your Health Research Dollars at Work* show, we are well on our way to getting to where we want to go.

We are funding researchers across the country who are working to find better ways to care for patients, who are helping to make our health-care system work better, and who are partnering with Aboriginal peoples to address health issues affecting their communities. These researchers' efforts are aimed at helping to improve health – and the quality of life – in every corner of Canada.

I hope you enjoy reading about these researchers and their accomplishments.

Alain Beaudet, MD, PhD
President

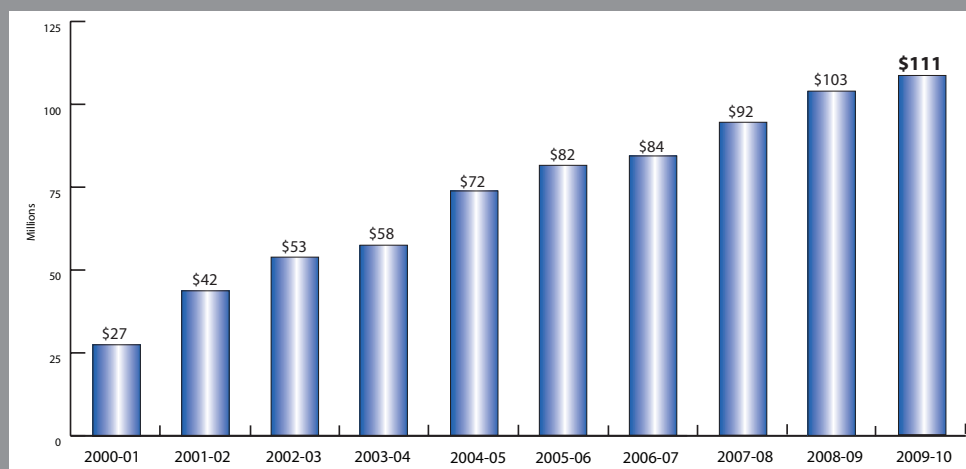
About the Canadian Institutes of Health Research

For the past 10 years, the Canadian Institutes of Health Research (CIHR) has supported better health and health care for Canadians. As the Government of Canada's health research investment agency, CIHR enables the creation of evidence-based knowledge and its transformation into improved treatments, prevention and diagnoses, new products and services, and a stronger, patient-oriented health-care system. Composed of 13 internationally recognized Institutes, CIHR supports more than 13,600 health researchers and trainees across Canada.

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Direct payments are excluded in the figures above.

In 2009-2010, CIHR contributed approximately **\$111** million in funding for health research in British Columbia. The funding helped support researchers working at **47** different research institutions in the province.

New Knowledge

Researchers show evolution of cancer

CIHR-funded researchers **Dr. Samuel Aparicio** and **Dr. Marco Marra** of the **BC Cancer Agency** co-led a study that revealed how breast cancer mutates as it evolves from a primary tumour to metastasized state. The findings were published in a *Nature* cover story. By sequencing the genomes of tumour tissues from a woman at the outset of her cancer and when it recurred nine years later, the researchers showed the primary tumour was a mosaic of cells containing different mutations, which evolved from the outset. The discovery opens new doors to fight cancer, including personalized treatments targeting the genetic makeup of a patient's primary and metastatic tumours.

Listeria vaccine prevents asthma in mice

A **University of British Columbia** researcher has developed a vaccine that prevents asthma in mice. "It's a fully preventive vaccine. It works 100%," says **Dr. Tobias Kollmann**, whose work is funded by CIHR. Dr. Kollmann and his colleagues use a vaccine prepared from *Listeria* bacteria that appears to cause the immune system to shift away from the allergic response to an anti-allergic one that persists for the life of the mouse. Allergies often precede asthma. Preliminary findings appeared in the journal *Vaccine*. Dr. Kollmann is now testing the vaccine to see if it can cure asthma in mice that already have the condition. He is hopeful it could also be useful in preventing peanut allergies and other allergies that plague so many Canadians.

Simon Fraser University researcher helps map enzyme activity in gut

A team of six Canadian scientists, including **Simon Fraser University's Dr. Mario Pinto** and **University of Waterloo's Dr. David Rose**, has mapped the molecular structure of two enzyme activities in the intestinal lining that convert starch from food into glucose, which is then absorbed into the bloodstream and used as energy or stored as fat. Published in the *Journal of Biological Chemistry of the American Society for Biochemistry and Molecular Biology*, the findings could have important implications for the treatment of diabetes.

Did You Know...

...that **Simon Fraser University** is home to the **Centre for the Study of Gender, Social Inequities and Mental Health?**

It's one of the three new CIHR-funded regional research centres aimed at filling the knowledge gap regarding the interactions among gender, mental health and substance use including health inequities and gender disparities. The Centre's Principal Investigator, **Dr. Marina Morrow**, is working to develop policy approaches that address the social and structural determinants of mental health.

Canada's Best

Helping people with cancer choose complementary therapies

Dr. Lynda Balneaves, a CIHR New Investigator Award holder, helps people make informed decisions about complementary therapies as they battle cancer.

"We know that many people get their advice from family and friends," says Dr. Balneaves, who is Principal Investigator for the **University of British Columbia/BC Cancer Agency** Complementary Medicine Education and Outcomes (CAMEO) Research Program. "That's not to say it's bad information, but it's often not evidence-informed."

Recent surveys suggest almost 80% of women with breast cancer complement their mainstream therapies with vitamins, minerals and herbal remedies or try mind-body therapies such as relaxation techniques, guided imagery and meditation. While use of complementary and alternative therapies is increasing, people often don't know where to turn for solid information.

Partly on the strength of her CIHR-funded research, Dr. Balneaves has received more than \$1.5 million in grants to start CAMEO and begin developing decision support programs and decision-making aids. "We're one of the rare research programs that is having an immediate impact on cancer care. We're providing services and evaluating them within a research model to fill a gap in health care."

Commercial Opportunities

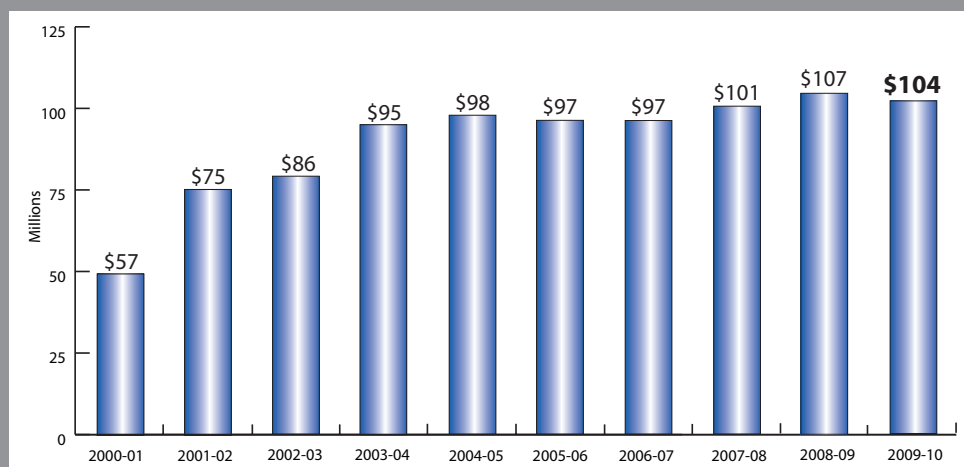
Prostate Centre builds on partnership with drug firm

The **Vancouver Prostate Centre** has extended its collaboration with **AstraZeneca** that will see the **Centre of Excellence for Commercialization and Research** receive \$700,000 over two years towards research into treatment-resistant prostate cancer.

The research is aimed at discovering, at the molecular level, how specific inhibitors of cell signalling pathways can block the androgen receptor, a protein that plays a key role in resistance to treatment.

"We are very pleased that a continued collaboration with AstraZeneca will further our research and help us to meet our objectives," says **Dr. Martin Gleave**, Executive Director of the Vancouver Prostate Centre and a CIHR-funded researcher.

CIHR supports the national Centre of Excellence for Commercialization and Research program.



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In 2009-2010, CIHR contributed approximately **\$104** million in funding for health research in the Prairies. The funding helped support researchers working at **33** different research institutions in the three provinces.

New Knowledge

Controlling key protein vital to cancer treatment

A protein called p85 that affects cell division is known to control the ‘on’ switch in almost every form of cancer, but new results now show that p85 also controls the ‘off’ switch, says **Dr. Deborah Anderson**. “The focus of our research is primarily trying to determine mechanisms, how cells behave normally and how they become disease-bearing,” Dr. Anderson, senior research scientist with the **Saskatchewan Cancer Agency**, told the *Star-Phoenix* newspaper. She believes controlling the amount and function of the p85 protein could help treat some cancers. “Knowing about this dual role for p85 will impact our application of new therapies towards these switches and help our understanding of patient responses to improve cancer treatments.”

More grocery stores, less obesity

Dr. Kim Raine of the **University of Alberta** co-authored a report in *BMC Public Health* that concluded that Edmonton residents who live in areas with the lowest ratio of fast food and convenience stores to grocery stores and produce vendors have the lowest rates of obesity. “We showed a direct connection to the odds of being obese,” says Dr. Raine, who led a CIHR-funded project called *An Ecological Perspective on the Promotion of Healthy Weights*. “None of this is causal, of course. But it is giving us more evidence that the environment influences your health.”

Stress can cause the brain to misread its signals

CIHR-supported researchers at the **University of Calgary** have found that neurons in the hypothalamus – the part of the brain that produces hormones that react to stress and control body temperature, hunger, moods and sex drive – can misinterpret chemical “off” signals for “on” during times of acute stress. A protein known as KCC2 manages the process through which brain cells receive different chemical signals instructing them to switch on or off. Working with rats, the researchers found that stress affects KCC2 activity so that off becomes on. Understanding how to re-set this switch may hold the key to managing stress-related disorders. The study, led by **Dr. Jaideep Bains**, was published online in *Nature Neuroscience*.

Did You Know...

...that an international team headed by **Dr. Bernard Thébaud** at the **University of Alberta** has used stem cells to heal and protect the lungs of newborn rats?

The research could help premature babies, many of whom have chronic lung disease. “This is the first attempt to use stem cells to cure lung disease in babies,” Dr. Thébaud told Canwest News Service. “We believe that in three to five years, we could start clinical trials (in babies) on this, which is pretty fast.” The research team includes physicians and scientists from Edmonton, Montreal, Chicago and Tours, France.

Canada's Best

Exploring the link between healthy incomes and health

If poverty disappears, does health improve? That's the question **Dr. Evelyn Forget** of the **University of Manitoba** seeks to answer. She has gone deep into old files to find out.

Dr. Forget spent three years comparing the administrative health care records of the citizens of Dauphin, Manitoba, between 1974 and 1978, to those of similar residents in other Manitoba communities. At that time, Dauphin was part of a government-sponsored labour market experiment that guaranteed its almost 13,000 citizens an annual income.

She found that people appear to live healthier lives when they don't have to worry about poverty. “Overall, hospitalizations in Dauphin declined relative to the control group,” says Dr. Forget, who presented her findings at the **Institut national d'études démographiques** in Paris. “We also looked at accidents and injuries and they also declined.”

The people of Dauphin also seemed to fare better in terms of mental health. “During the 1970s we still hospitalized people with mental health issues. If you believe that poverty is related to stress, you should see an effect there. Hospitalizations for mental health issues were down significantly.”

Commercial Opportunities

Cold case file: an innovative approach to asthma

Dr. Richard Leigh of the **University of Calgary** is researching the role that the rhinovirus – the bug behind the common cold – plays in the development of asthma.

His studies have shown that individuals who get frequent colds develop scarring in their bronchial tubes, a condition called airway remodelling. “Scarring is natural and part of any wound repair process,” says Dr. Leigh, a GlaxoSmithKline-CIHR Professor in Inflammatory Lung Disease.

“In asthma there is an over-exuberant wound response to the rhinovirus. This over-exuberance leads to remodelling and causes structural change and a narrowing of the airways.”

Dr. Leigh is curious to see how these infections result in the development of asthma. While his work is still in the early stages, there is industry interest in this approach to battling asthma.

“At this point, we are planning a clinical study for the fall, in which we will experimentally infect subjects with the common cold virus and measure some of the mediators involved in the airway remodelling process. Once established, we believe that there would be corporate interest in something like that,” says Dr. Leigh.



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In 2009-2010, CIHR contributed approximately **\$340** million in funding for health research in Ontario. The funding helped support researchers working at **142** different research institutions in the province.

New Knowledge

Scientist unveils secret behind resistance to antibiotic

A CIHR-funded researcher has discovered how bacteria become resistant to a powerful antibiotic commonly used to treat superbug infections. **McMaster University's Dr. Gerry Wright**, chief author of the study published online in *Nature Chemical Biology*, found the mechanism that triggers bacterial resistance to vancomycin. The discovery could help scientists develop resistance-proof antibiotics. "We needed this knowledge to be able to move forward," Dr. Wright told Canwest News Service, adding that it "opens up a whole new series of ways" to overcome antibiotic-resistant bacteria.

Blood vessel discovery could aid diabetics

Dr. David Hess of the **University of Western Ontario** has found a way to stimulate the growth of new blood vessels, a breakthrough that could help long-time diabetics who have peripheral artery disease because of reduced blood flow in their limbs. Using human bone marrow, Dr. Hess isolated three types of stem cells that work together to form new blood vessels. He purified them to eliminate contaminating cells and injected them into mice to improve blood flow and regenerate damaged leg capillaries. The results of the research, which was funded in part by CIHR, were published in the journal *Blood*.

Stroke breakthrough: cells live even if blood flow stops

A research team led by **Dr. Michael Tymianski**, a neurosurgeon at **Toronto Western Hospital**, has found a way to suppress an ion channel called TRPM7 to keep rats' brain cells alive when the blood flow is interrupted. The findings, published in *Nature Neuroscience*, could help prevent the devastating effects of stroke – in which the brain is deprived of oxygen and nutrients, and cells die. The study was supported by CIHR funding.

Did You Know...

...that children falling off playground equipment are almost five times more likely to fracture an arm if they land on a wood-chip surface compared to granitic sand?

A study conducted by CIHR-funded researchers at **SickKids Hospital** and **York University** found that a properly maintained sand surface can prevent many such playground injuries.

Canada's Best

Looking out for the children

One theme stands out in the remarkable research career of **Dr. Michael H. Boyle**: an unwavering commitment to finding better ways to evaluate and improve the effectiveness of services for children in need.

Winner of the Health Researcher of the Year in Health Services and Systems and Population Health Research, Dr. Boyle has been at the centre of some of the most important work done in his field over the past three decades.

In the early 1980s, Dr. Boyle, Canada Research Chair in the Social Determinants of Child Health at **McMaster University**, and the late **Dr. Dan Offord** undertook the Ontario Child Health Study, the first large-scale observational study of children in their family environments. The landmark project raised concerns about children's unmet mental health needs and how living environments can adversely affect a child's mental health. His work helped prompt the federal government to establish the first Child Development Initiative in the 1990s to strengthen development opportunities for disadvantaged children.

Commercial Opportunities

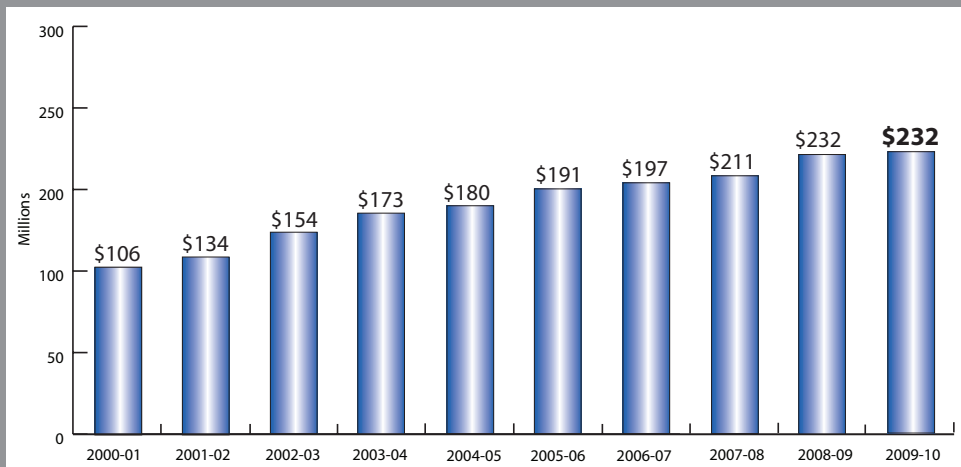
A next-generation solution to hospital hand cleansing

Dr. Geoff Fernie, Vice-President of Research at **Toronto Rehab**, has devised a sophisticated solution to the persistent problem of inadequate hand cleansing by hospital medical staff.

Dr. Fernie and his team have developed an ID badge with a built-in electronic eye that tracks up to the ceiling where zones of potential infection sites – a patient's bed, for example – are marked with tiny infrared beacons. The badge registers when a doctor or nurse moves into and out of the zone and records whether they clean their hands. If they forget, they get a beeping or vibrating reminder. As an added incentive, an LED light on the badge glows green when its wearer's hands are clean.

Dr. Fernie, who is also a Professor at the **University of Toronto**, is patenting the technology and, with funding from CIHR, has a clinical trial in the works to test the system in a 50-bed hospital unit.

"We have a licensee, the **AJ Hart Group**, who has worked with us from the very beginning," says Dr. Fernie. "But this is becoming too big, so we're developing business plans for a relationship with a larger organization – a company with more capacity to get this out."



Direct payments are excluded in the figures above.

In 2009-2010, CIHR contributed approximately **\$232** million in funding for health research in Quebec. The funding helped support researchers working at **91** different research institutions in the province.

New Knowledge

Blood stem cell breakthrough by Montreal researchers

A team from the **Institute for Research in Immunology and Cancer** at the **University of Montreal** succeeded in scaling up large quantities of stem cells from a small number of blood stem cells obtained from bone marrow. The multi-disciplinary team, directed by CIHR-funded researcher **Dr. Guy Sauvageau**, published its findings in *Cell*. The breakthrough has been hailed as key to advancing the development of novel treatments for patients waiting for bone marrow transplants.

Can/Am team tracks how immune system battles herpes

A team of Canadian and US researchers discovered how the cold-sore-causing Type 1 herpes simplex virus (HSV-1) is identified and attacked by the body's immune system. **University of Montreal** researchers, working with **Washington University** and **Pennsylvania State University** scientists, found that the nuclear membrane of a cell in mice infected with HSV-1 indicates the presence of the virus and stimulates immune system to go after it. **Dr. Michel Desjardins**, a Canada Research Chair in Cellular Microbiology, was senior author of the CIHR-supported study, which was published in *Nature Immunology*.

Anti-viral offers hope to cancer patients

A common anti-viral drug called ribavirin may help in treating cancer, according to a clinical trial led by **Dr. Katherine Borden** of the **Institute for Research in Immunology and Cancer** at the **University of Montreal**. The study, published in the journal *Blood*, found that patients with acute myeloid leukemia showed striking improvements after they took ribavirin.

Did You Know...

...that, after a rigorous peer review process, **McGill University** researchers have been awarded \$5 million to lead national studies on the possible toxic effects of two household chemicals?

One group will investigate the impact of brominated flame retardants, found in everything from cushions to electrical wiring, on the reproductive health of children. The other will study the effects of phthalates, used to soften plastic, on male reproductive health.

Canada's Best

Researcher of the year took genetics to new level

When **McGill University's Dr. Nahum Sonenberg** started his PhD studies in Israel in the late 1960s, there was a tremendous sense of excitement in the field of genetics.

Researchers had just deciphered the genetic code, and Dr. Sonenberg set out to learn more about mRNA translation – the process by which genetic information is turned into proteins. Over the years, his pioneering research has revealed important information about how the translation process is initiated, and how it is controlled or can be blocked.

By improving our understanding of how the body controls protein production, Dr. Sonenberg – named Canada's Health Researcher of the Year in Biomedical and Clinical Research – opened the door to new treatments for a wide range of diseases.

His research has led to a potential cancer drug, now in clinical trials, that blocks the translation of proteins required for cell division. It also has led to greater understanding of HIV/AIDS. In addition, Dr. Sonenberg and his research team have made important discoveries about body-weight control and memory formation.

Commercial Opportunities

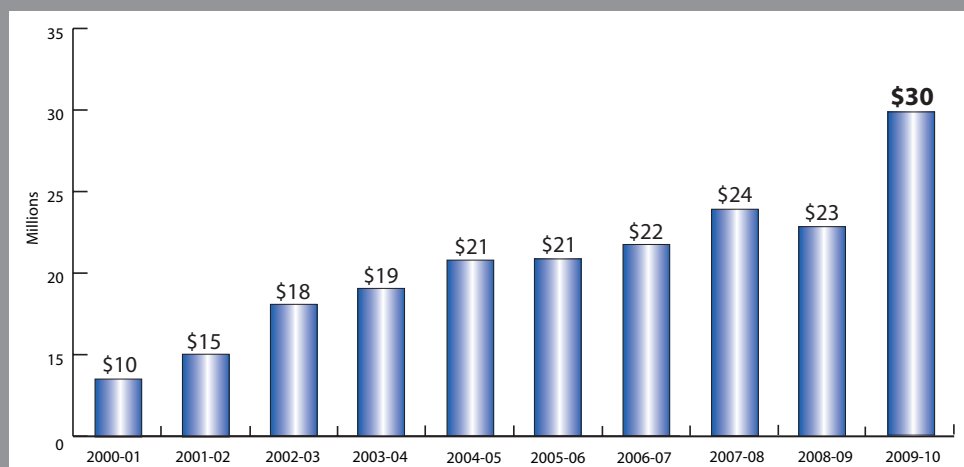
Company's product line built on biomarker discoveries

IBEX Technologies Inc., a Montreal-based biotech company, has developed a line of arthritis assays based on the biomarker discoveries of CIHR-funded researcher **Dr. Robin Poole**.

Dr. Poole, Professor Emeritus at **McGill University**, has dedicated four decades of his life to the battle against arthritis, directing the Joint Diseases Laboratory at **Montreal's Shriners Hospital for Children** from the lab's inception in 1977 until he retired in 2005.

Paul Baehr, President and CEO of IBEX, estimates the arthritis assays (kits to determine the presence and amount of different substances in blood and urine that indicate joint disease activity) make up a quarter of company revenues and help keep it profitable.

"With a small company, any additions to the product line and revenues are very meaningful," says Mr. Baehr. "In addition to the assays we currently market, there are new assays that will flow from patents that are in the process of being filed on work initiated by Dr. Poole."



Direct payments are excluded in the figures above.

In 2009-2010, CIHR contributed approximately **\$30** million in funding for health research in Atlantic Canada. The funding helped support researchers working at **19** different research institutions in the region.

New Knowledge

New technology + old technique show promise in diagnosing osteoarthritis

Dr. Christopher Riley, a surgeon and researcher at the **Atlantic Veterinary College** at the **University of Prince Edward Island**, is working to develop a cheap and reliable way to diagnose osteoarthritis. Magnetic resonance imaging is the best tool for diagnosing arthritis – but it's not always practical. With a CIHR Regional Partnership Program award, Dr. Riley and his team are testing infrared spectroscopy, an older, less expensive technique. Advances in computing technology allow for more sophisticated applications of spectroscopy, such as Dr. Riley's use of infrared light to determine the types of chemical bonds in joint fluid and blood serum. He and his team have already detected the osteoarthritis "fingerprint" in the joint fluid of horses, and are looking at rabbits and dogs. They hope to expand their study to include humans.

International effort unveils key spinal cord neuron

A CIHR-funded researcher, working in collaboration with scientists in the United States and Scotland, has discovered a new kind of neuron in the spinal cord that may play a key role in treating spinal cord injury and motor neuron diseases such as amyotrophic lateral sclerosis (ALS). "We've long known that nerve cells, called motor neurons, send signals from the spinal cord directly to muscles to make them move," says **Dalhousie University's Dr. Rob Brownstone**. "What we've discovered is a new population of nerve cells in the spinal cord that are key in regulating the amount of muscle force needed for certain movements, such as walking." The findings were published in *Neuron*.

Outreach centres extend research benefits across Newfoundland and Labrador

With funding from CIHR, **Memorial University** is establishing a provincial network of outreach offices to conduct research on human genetic disorders and population health. The offices will help to translate key research findings into information that community and health care providers can use, and to inform health policy with the aim of improving delivery of care in rural and remote areas of the province. The Memorial team has developed key partnerships with the Government of Newfoundland and Labrador, Department of Health and Community Services, Central Health Corporation and rural physicians who will directly benefit from the evidence-based research that emerges from the work.

Did You Know...

...that, after an extensive peer review process, professors at the **University of New Brunswick** secured nearly \$1 million in grant funding for research into women's health issues?

Dr. Judith Wuest will receive \$484,950 over three years to look at the feasibility of primary health care intervention for women who have left abusive partners. **Dr. Nicole Letourneau** will get \$499,829 over three years to study telephone-based support programs for new mothers suffering from postpartum depression. The funding comes in part from the CIHR.

Canada's Best

Dalhousie researcher honoured for outstanding drug design

Dr. Donald F. Weaver exemplifies the “bench top to bedside” philosophy of drug design – always attempting to link basic science with clinical science.

For his work in the design and synthesis of novel drugs for the treatment of chronic neurologic disorders, such as epilepsy and Alzheimer's disease, Dr. Weaver received the 2009 Research Award. The winner is chosen by the Prix Galien Canada jury to honour outstanding contributions to the diagnosis, prevention or treatment of disease.

Dalhousie University's Dr. Weaver designs drugs by selecting “target molecules” that are essential to how a disease progresses and then, using computer-assisted molecular design, coming up with novel molecules that can be synthesized to fight the disease.

He is a key player in an independent team of international, multidisciplinary scientists attempting to design a drug to prevent the onset of Alzheimer's. The team was given a special \$1-million grant through the American Health Assistance Foundation to fight the devastating disease in which beta amyloid protein “plaques” and tau protein “tangles” wreak havoc on brain cell communication.

“Our lead compound is very effective in mice with conditions similar to Alzheimer's,” Dr. Weaver told the *Alzheimer's Research Review*. “It can be delivered orally, inhibits aggregation of these proteins, protects brain cells from beta amyloid damage, restores normal memory functioning and shows no toxicity at high doses.”

Commercial Opportunities

Memorial researchers patent cancer detection procedure

Two cancer researchers at **Memorial University** have successfully patented a cancer detection process.

Dr. Ken Kao, a CIHR-funded Professor of Biomedical Science, and **Dr. Cathy Popadiuk**, Associate Professor in the Division of Gynecologic Oncology, secured the patent for an invention involving the Pygopus gene.

“We have figured out the mechanism by which cancer cells hijack Pygopus and used this knowledge to develop a diagnostic kit for cancer detection,” Dr. Kao told Memorial University's *The Gazette*.

Required for normal embryo development, Pygopus fuels cells so they keep growing and dividing – but must be carefully controlled after birth because cancer cells can use the gene inappropriately to out-compete normal cells and form tumours.

The next step will be to find a commercial partner to push the development of the invention forward. “Commercial development of a product is the only way medical technology advances can reach the patient,” says Dr. Kao, who adds that any royalties earned will go back into research.