

CIHR/CMAJ: TOP ACHIEVEMENTS IN HEALTH RESEARCH

Celebrating top achievements in health research 2011

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The Canadian Institutes of Health Research (CIHR) and the *CMAJ* host an annual competition to celebrate top achievements in health research in Canada. Launched in 2008, the awards highlight achievements that have “improved our understanding of health and human diseases; significantly improved the health of Canadians (and others) and/or provided more effective products and health services; had significant impact within the field (e.g. important advancement in knowledge or a major improvement in patient benefit, diagnosis or an improved function that enhances healthcare delivery.”¹ Four categories of achievements are eligible for the award: biomedical, clinical, health systems and services, and social, cultural, environmental and population health.

In the third competition (2011), six winners were chosen by an international review committee. Essays by the winners of the two highest-ranking achievements are available at www.cmaj.ca under “Special reports.” Following are synopses of all six winning achievements.

Glucagon-like peptides for metabolic and gastrointestinal disorders

Who: Dr. Daniel Drucker is Professor, Department of Medicine, University of Toronto, and Senior Scientist, Samuel Lunenfeld Research Institute, Mount Sinai Hospital, Toronto, Ontario.

What: Treatments for type 2 diabetes have traditionally been characterized by incomplete efficacy, the need to self-monitor blood glucose levels and adverse effects such as weight gain and hypoglycemia. For more than 25 years, Dr. Drucker has studied how gastrointestinal hormones control the ingestion, absorption and disposal of nutrients. In 1987, he described the action of a novel peptide hormone, glucagon-like peptide-1 (GLP-1), on insulin-producing islet cells. This finding yielded a new area of investi-

gation — specifically, the physiologic relevance of GLP-1 and related peptides. Based on Dr. Drucker’s work on GLP-1 and dipeptidyl peptidase-4 (DPP-4), several new classes of drugs have been developed to treat type 2 diabetes. By reducing the need for self-monitoring blood glucose levels and lowering the risk of hypoglycemia and weight gain, these agents (GLP-1 receptor agonists and DPP-4 inhibitors) have improved the lives of patients with diabetes. The success of these agents has broadened scientific investigation into how gut hormones exert their actions in various tissues.

Caring for mothers and protecting the unborn

Who: Dr. Gideon Koren, Dr. Irena Nulman, Katarina Aleksa, Joey Gareri, Adrienne Einaronson and Dr. Shinya Ito for the Motherisk Program, Hospital for Sick Children, University of Toronto, Toronto, Ontario.

What: There is a serious knowledge gap concerning which medications are safe for unborn babies and which should be avoided during pregnancy. The Motherisk program at the Hospital for Sick Children in Toronto was founded in 1985 to counsel women and health professionals on fetal–maternal toxicity, to conduct large-scale laboratory and clinical research, and to translate this new knowledge into counseling. The Motherisk team has shown that fetal exposure to illicit drugs can be detected in neonatal hair and meconium. Their work has established the fetal safety of numerous drugs (e.g., quinolones) and documented the fetal risk of other substances and medications (e.g., alcohol, corticosteroids.) Research into neonatal pain, morning sickness, prevention of neural tube defects, and the effects of postpartum pain control on the breastfed infant have resulted in changes in clinical guidelines and practice. With a deliberate emphasis on knowledge transfer, Motherisk has revolution-

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ized the area of medication safety in pregnancy and affected the way women are cared for during pregnancy, both in Canada and worldwide.

Biomarkers and diagnostic assays for autoimmune diseases

Who: Dr. Marvin Fritzler is Professor, Department of Medicine, University of Calgary, Calgary, Alberta, and Chair, Alberta Research and Innovation Authority.

What: Early and accurate diagnosis, individualized care and predicting the risk of severe disease are important in the care of patients with autoimmune disorders. Dr. Fritzler's research focus has been identifying novel autoantigens that are the targets of the B cell immune response in diseases such as systemic lupus erythematosus, systemic sclerosis, Sjögren syndrome, idiopathic ataxia, rheumatoid arthritis and cancer. During his post-doctoral fellowship, Dr. Fritzler showed that autoantibodies directed against histones were novel biomarkers in drug-induced lupus. This seminal study became the impetus for other projects that identified and characterized other biomarkers in autoimmunity. In conjunction with Dr. E. Chan at the Scripps Research Institute (La Jolla, California), Dr. Fritzler's laboratory identified target antigens in novel cytoplasmic structures known as GW bodies. GW bodies have since become the subject of intense worldwide research, because they are involved in posttranscriptional control of gene regulation. Virtually all of Dr. Fritzler's discoveries of novel autoantigens have been translated into new diagnostic assays or biomarkers that are in wide use in clinical diagnostic and research laboratories around the world.

Optimizing pediatric emergency care

Who: Dr. Terry Klassen, Dr. David Johnson, Dr. Martin Osmond, Dr. Amy Plint and Lisa Hartling for Pediatric Emergency Research Canada.

What: Pediatric Emergency Research Canada (PERC) was established in 1995 to address knowledge gaps in the care of acutely ill and injured children presenting to the emergency department. A nation-wide research network, PERC has generated important new knowledge that has substantially improved the outcomes for these children. Key advances have been made in three common childhood problems: croup, bronchiolitis and mild head injuries. A series of randomized controlled trials showed the effectiveness of corticosteroids given to children with croup by

cutting admissions and return visits to hospital by half while reducing health care costs and parental stress. PERC conducted the largest randomized controlled trial to date involving infants with bronchiolitis, which showed that dexamethasone and epinephrine may act synergistically, resulting in a significant reduction in rates of admission to hospital. PERC also led a large study of computed tomography in children presenting with mild head injuries, enabling the derivation of a practical clinical decision rule. PERC's research program has been enhanced by its emphasis on training and mentorship in addition to a broad perspective on knowledge translation, thus ensuring that the results from research have direct and immediate influences on clinical care.

Resynchronization therapy and implantable defibrillators in heart failure

Who: Dr. Anthony Tang and George Wells for the Resynchronization/defibrillation in Ambulatory Heart Failure Trial (RAFT) investigators.

What: Mortality and rates of admission to hospital for patients with heart failure remain high, despite optimal medical treatment. Implantable cardioverter defibrillators reduce mortality among patients with mild to moderate heart failure and cardiac resynchronization therapy improves outcomes among those with more advanced disease. Dr. Tang and George Wells wondered whether adding cardiac resynchronization therapy to implantable defibrillator therapy in patients with mild to moderate symptoms would prevent progression of heart failure and death. Designed to answer this important question, the RAFT study showed that combining these therapies significantly reduced mortality and rates of admission to hospital among patients with mild to moderate heart failure, wide QRS complex and systolic dysfunction. A follow-up meta-analysis confirmed that adding cardiac resynchronization therapy to optimal medical therapy and an implantable cardioverter defibrillator therapy significantly reduced mortality. The results of the RAFT project have led to changes in clinical care for patients with mild to moderate heart failure.

Changing the face of stroke care

Who: Dr. Michael Hill, Dr. Shelagh Coutts, Dr. Andrew Demchuck and Dr. Eric Smith for the Calgary Stroke Program.

What: In 1995, a landmark study showed that thrombolysis for ischemic stroke was an efficacious treatment. The Calgary Stroke Program

began that same year with three neurologists and a stroke-prevention clinic. Since then, the program has evolved into a multidisciplinary clinical research group that includes stroke neurology, vascular neurosurgery, interventional neuroradiology, neuroscience nursing, rehabilitation medicine and other areas of health care. The program has provided definitive research on imaging for treatment decisions in acute major stroke and on the management of transient ischemic attack and minor stroke, thus changing practice in Canada and beyond. A national collaboration that examined the safety of intravenous tissue plasminogen activator directly led to its licensure in Canada. As a fully integrated stroke centre, the program provides clinical care through the continuum of care from primary prevention to reintegration in the community after stroke. A defining feature of the program is that research and clinical care are integrated. For example, knowledge translation projects have resulted in faster access to carotid endarterectomy and thrombolysis for patients at the centre. The program also plays a key role in training future neurologists specializing in stroke in Canada and abroad.

Reference

1. CIHR-CMAJ — *Top achievements in health research (2011)*. Ottawa (ON): Canadian Institutes of Health Research; 2011. Available: www.researchnet-recherchenet.ca/rnr16/vwOpprtntyDtIs.do?prog=1306&&view=currentOpps&org=CIHR&type=AND&resultCount=25&sort=program&all=1&masterList=true (accessed 2011 Jan. 6).

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2012 Competition for the CIHR/CMAJ Top Achievements in Health Research

The 2012 competition for the CIHR/CMAJ Top Achievements in Health Research will be launched in the summer of 2012, with a deadline for submissions in the fall of 2012. Details of the competition will be available on the CIHR website (www.cihr-irsc.gc.ca) in June.

Information on the previous winners is available at www.cmaj.ca under "Special reports."



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