

Diabetes: the path forward

Donors

Sound ethics and valuable research provide donors reasons to give

For the nine million Canadians living with diabetes or prediabetes today, research represents the hope for a cure, and the achievement of dramatically increased life expectancy and quality of life during our lifetime.

With the support of its donors, the Canadian Diabetes Association has funded more than \$95 million in research since 1975, most of that in the past 10 years. Last year alone, the Association provided more than \$7 million in funding to help kick-start more than 120 innovative new research programs. The

organization also funds a research chair at the University of Western Ontario and a centre for diabetes research in B.C.

Remarkably, the Association's work is funded by individual donors and through corporate partnerships and Clothesline®, a clothing recycling program.

"This funding allows us to support research programs and provide support and information programs in communities across the country," says Jay Hooper, executive director, Fund Development. "We rely absolutely on the charitable support of Canadians."

Recent research has resulted in new technologies and treatments that enable better management of the disease, including more effective forms of insulin and pumps that mimic normal insulin production.

"These breakthroughs have made an enormous difference in the lives of people with diabetes," says Mr. Hooper. In addition, he says, donations make it possible for the Association to create awareness about the importance of getting checked for diabetes, and ensuring doctors have the information they need. "With the help of volunteers, the

Association produces materials such as the Clinical Practice Guidelines for physicians and health-care practitioners, setting the standard for diabetes care."

According to Imagine Canada, a non-profit organization that "looks into and out for" Canadian charities and non-profits, 23 million Canadians donated a total of \$10 billion to charities in 2007.

With about 80,000 charities in Canada, it can be challenging for people to decide how to help. To make it easier, more than 200 organizations, including the Canadian Dia-

betes Association, demonstrate their commitment to the highest standards of accountability, governance and transparency by committing to Imagine Canada's Ethical Code Program.

"We try to create what we call an enabling environment," says Cathy Barr, vice president operations at Imagine Canada, "an environment that makes it easier for charities and non-profits to fulfill their mission."

The Ethical Code Program helps charities systematically assure donors of excellence in governance. "Most charities are good stewards of money –

well managed and very frugal. But there are bad apples in every environment, so donors need to do their research. The Ethical Code Program helps with that," says Ms. Barr.

Last year, the Canadian Diabetes Association's Clothesline® initiative diverted more than 41 million kilograms of clothing and household items from landfills, saving 766 million kWh of energy and reducing the carbon footprint of donors by 105 million kilograms of CO₂ emissions. Donations of mobile phones, PDAs, used printer cartridges and used vehicles are also welcome. For more information, visit diabetes.ca.



Chris Ford, donor and volunteer

"I continue to give to the Canadian Diabetes Association – both in time and money – because my donations make a difference. In return, the Association

provides hope, encouragement and support to the millions of Canadians affected by diabetes, including my daughter, who has type 1 diabetes. I

give because I trust the Association to provide my daughter and the millions like her with the best possible opportunities for a long and healthy life."

Research

Researchers advance front line of diabetes battle

Each year, Canadian Diabetes Association funding helps kick start innovative research projects across Canada. Here are some of the results of those efforts and the progress being made.

Biology

Scientists have been hunting for the reason why high levels of fat (obesity in humans) kill beta-cells in people with type 2 diabetes for many years. Dr. James Johnson (Vancouver) is the very first scientist to show that high levels of fat in the blood destroy insulin-producing



beta-cells in the pancreas by reducing a protein (called CPE) – a process that leads to type 2 diabetes. He is the first to link the most important diabetes risk factor (obesity) to this important protein (CPE) that controls beta-cell function and survival. Understanding the pathway of beta-cell death in people with type 2 diabetes, how it is initiated and how it progresses, will lead to the design of new therapies for type 2 diabetes.

Problems with Insulin

Dr. Peter Light (Edmonton) has discovered a potential link between diet and genetics in people with diabetes. He has found that people who eat a high-fat diet or who are overweight may be at increased risk for developing type 2 diabetes if they carry a variation (called



a 'polymorphism') in a gene that encodes for a specific potassium channel in the pancreas. When activated, this channel reduces insulin secretion, which results in increased blood sugar. This effect is amplified in the 'polymorphic' potassium channel. As it turns out, saturated and trans fats – the so-called 'bad' fats – activate this 'polymorphic' potassium channel much more than polyunsaturated fats (the 'good' fats). This information could lead to the development of a screening tool to identify people at risk and then advise them about their diet. There are also anti-diabetes drugs that target this particular potassium channel, so they could be prescribed selectively to people with this polymorphism.

Prevention and Management

Dr. Ron Sigal (Calgary) has found that aerobic exercise and resistance exercise (i.e. weight training) were each effective in improving blood sugar control, but the combination of both types of exercise was at least twice as effective as either type of exercise alone. The DARE (Diabetes Aerobic and Resistance Exercise)



trial has provided the strongest evidence available for the value of both aerobic and resistance exercise for most people with diabetes. The DARE trial and other smaller trials have led to changes in clinical practice guidelines regarding physical activity/exercise from both the Canadian and the American Diabetes Associations. The guidelines now recommend both aerobic and resistance exercise for most people with diabetes, and provide specific recommendations regarding type, intensity and quantity of exercise.

Obesity

Over 63 per cent of children and youth in Canada and the

United States are insufficiently active to obtain health benefits. One of the main reasons why teens do not consistently follow exercise programs is lack of enjoyment of physical activity and the increasing



availability of enjoyable sedentary behaviours such as TV and video games, both of which compete with physical activity. Dr. Gary Goldfield (Ottawa, pictured) and Dr. Kristi Adamo demonstrated that stationary cycling while playing video games is just as effective as stationary cycling to music at improving fitness, body composition and cholesterol profiles in obese teens. While capitalizing on youth's attraction to video games could eventually help increase physical activity and fitness levels in youth, further investigation and research is needed to evaluate the health benefits of this medium.

Special Populations

Dr. Donna Koller's (Toronto) research highlighted the importance of sharing information



with children about their diabetes in order to facilitate greater self-care. One emerging theme from Dr. Koller's research is how knowledge of diabetes provides the basis upon which self-care can evolve over time.

Although children and adolescents showed varying degrees of knowledge, the majority of participants had a marginal understanding of diabetes and wanted to learn

more. The implications of this research show the need for more effective educational strategies and the significance of child participation in discussions regarding diabetes and plans for self-care.

Complications

Dr. Brian Rodrigues (Vancouver) has developed and tested a novel heart-specific drug delivery system that could



help protect people with diabetes from heart disease. Dr. Rodrigues demonstrated that when a drug is attached to very small magnetic beads, the drug will localize specifically to the heart when a magnet is placed directly above it. These results show great promise for the development of a new way to deliver drugs to specific places in the body where the drug is most needed (such as the heart or kidney).

Search for New Treatments

Dr. Paul Fernyhough (Winnipeg) has demonstrated that treatment with an anti-inflammatory medication helps repair damaged nerve endings in the skin of rats. Nerve disease severely affects the quality of life of many people with type 1 and type 2 diabetes. In diabetes-related nerve disease, nerve endings die, leading to loss of the sensation, causing

pain, poor wound healing, ulceration and in many cases lower limb amputation. Currently, there is no effective treatment. It is believed that high levels of blood glucose



and/or low levels of insulin cause inflammation that ultimately leads to the destruction of the nerve endings. Dr. Fernyhough's research may lead to the use of anti-inflammatory medications for nerve disease in humans in the near future.

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Education

Demand for diabetes educators rising to meet public needs

According to the North American Diabetes Health Network, every 10 minutes another Canadian adds to the more than two million people already diagnosed with diabetes. Along with the rising incidence of diabetes, the need for diabetes educators is also growing exponentially.

When it comes to increasing life expectancy and quality of life for people with diabetes, education is critical.

Qualified health professionals are rising to the occasion, taking advantage of a program provided by the Canadian Diabetes Educator Certification Board aimed at providing educators with the tools they need. But for many doctors, nurs-

es, pharmacists and other health professionals, certification is the best way to ensure they are up to date with the latest developments in treatment and care says Arlene Kuntz, past-chair of the Canadian Diabetes Association Diabetes Educator Section.

"It helps health care providers build patients' skill and abilities in managing their own diabetes. Patients live with diabetes every hour of every day – they need information, and to learn techniques and skills so that they can manage their diabetes in concert with the rest of their diabetes health-care team," says Ms. Kuntz. "We're really trying to encourage people with diabetes to be

much more engaged and involved with the management of their condition in order to live a long life and enjoy quality of life with diabetes."

For health-care employers, she says, the certification can provide assurance that all employees have the latest information and tools to help educate patients.

"It is critical for health-care professionals to be educated in diabetes management as well, so everyone can provide appropriate, current and specific knowledge to empower people with diabetes to live the best life that they can. It's an absolutely critical component of a patient's care and self-management."