Diabetes

CIHR IRSC

The Canadian Institutes of Health Research (CIHR) is the Government of Canada's agency for health research. Through CIHR, the Government of Canada invested approximately $32.8 million in 2006-07 across Canada in research on diabetes.

The Facts

- More than two million Canadians have diabetes. By 2010, this number is expected to rise to three million.
- Type 1 diabetes is usually diagnosed in childhood and involves an abnormal autoimmune response that destroys insulin-producing cells in the pancreas, resulting in little or no insulin production.
- Type 2 diabetes typically begins in adulthood, although more and more children are developing the disease. Type 2 diabetes develops because the body's cells become resistant to the effects of insulin and the insulin-producing cells of the pancreas are unable to compensate.
- People who have a family member with diabetes, are physically inactive or are overweight are at higher risk of developing type 2 diabetes.
- Currently, about 90% of people with diabetes have type 2 and 10% have type 1. However, the number of people with type 2 diabetes is on the rise as our population ages and our lifestyles change.
- Complications of diabetes include nerve damage, cardiovascular disease, blindness, kidney disease and impotence.
- According to one study, diabetes and its associated illnesses cost the Canadian health-care system an estimated $13.2 billion a year.

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About CIHR

The Canadian Institutes of Health Research (CIHR) is the Government of Canada's agency for health research. CIHR's mission is to create new scientific knowledge and to catalyze its translation into improved health, more effective health services and products, and a strengthened Canadian health-care system. Composed of 13 Institutes, CIHR provides leadership and support to more than 11,000 health researchers and trainees across Canada.

Finding Solutions

Easing diabetes pain with insulin

Insulin may boost nerve growth and help stop pain. Dr. Douglas Zochodne, a CIHR-funded scientist at the University of Calgary, has been investigating a new use for insulin in the treatment of diabetes. People with diabetes often develop a condition known as diabetic neuropathy, in which nerve cells in their skin begin to die off. In addition to helping maintain blood sugar levels, insulin promotes the growth of some types of cells. Dr. Zochodne and his colleagues have found that injecting low doses of insulin into a diabetic rat's spinal column can prevent nerve cell death. This research could lead to improved quality of life for diabetics and advances in the science of nerve regeneration.

Building stronger bones

Dr. Marc Grynpas and his team of researchers at the University of Toronto have been investigating the benefits of a potential new anti-diabetic drug, known as BEOV. In addition to helping control blood sugar levels, BEOV may protect against diabetes related-bone loss. In a CIHR-funded study, Dr. Grynpas found that the new drug increases bone development in both diabetic and non-diabetic rats. While more research must be done to establish the safety and effectiveness of BEOV, it appears to be a promising advance in the treatment of diabetes and its related conditions.

What causes type 1 diabetes?

Malfunctioning nerves may play a role in the development of type 1 diabetes. Drs. Michael Salter and Hans-Michael Dosch, researchers at the Hospital for Sick Children in Toronto, have discovered that malfunctioning nerve cells produce chemicals that trigger the immune system to destroy the insulin-producing islet cells of the pancreas. By killing the nerves with a chemical derived from chili peppers, the researchers were able to cure diabetes in mice. Drs. Salter and Dosch hope to begin testing this procedure in humans by 2008.

Extracting modern treatments from traditional medicine

Researchers at the University of Montreal have identified several plants used in traditional Cree medicine that may help treat diabetes. CIHR-funded researcher. Danielle Spoor and her colleagues worked with aboriginal healers in northern Quebec to harvest the medicinal plants. The researchers extracted and tested chemicals from the plants and found that many of them possess anti-diabetic properties. These findings may be particularly important to members of the aboriginal community, who suffer from a high incidence of type 2 diabetes and are often not comfortable with modern medical treatments.

The Researchers

Dr. Ray Rajotte – Committed to developing better treatments for type 1 diabetes patients

CIHR-supported researcher Dr. Ray Rajotte of the University of Alberta is well known for his pioneering work in islet transplantation. He helped create the Edmonton Protocol, a revolutionary procedure for transplanting normal, insulin-producing islet cells into the pancreas of a person suffering from type 1 diabetes. Many transplant recipients have been able to stop or reduce their use of insulin – at least for a while.

Transplant patients must take immune-suppressing drugs to prevent their bodies from rejecting the foreign cells. But, over time, the drugs damage these cells and reduce their ability to produce insulin.

Dr. Rajotte's new challenge is preventing rejection of islet cells. He and his team hope to eliminate the need for anti-rejection drugs by using gene therapy to create islet cells that will produce their own anti-rejection chemicals.

He's also working to increase the supply of islet cells for transplantation.

"In Canada, there are only about 400 donor pancreases, and there are 6,000 new type 1 diabetics every year," says Dr. Rajotte. "So even if we got every pancreas, we'd only be able to transplant 1-2% of the patients."

Dr. Rajotte is studying a process known as xenotransplantation, the transplantation of animal cells into humans, as a possible solution to the shortage of islet cells. This past year, Dr. Rajotte and Dr. Greg Korbutt in collaboration with Dr. Christian Larsen of Emory University in Atlanta, Georgia, showed that pig islet cells could be used to cure diabetic monkeys. If xenotransplantation proves to be safe and effective in humans, it could lead to a virtually unlimited supply of healthy islet cells to treat type 1 diabetes.