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## Genome-Environment Interactions in Type 1 Diabetes

<b>Status</b>	Current
<b>Competition</b>	III
<b>Sector</b>	Health
<b>Genome Centre</b>	Ontario Genomics Institute
<b>Project Leaders</b>	Jayne Danska & Andrew Macpherson

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### Project Description

Type 1 Diabetes (T1D) is a complex disease often arising in childhood in which the immune system destroys the insulin producing cells of the pancreas. Insulin is a crucial hormone in sugar and fat metabolism. Despite insulin therapy, T1D greatly increases the probability of heart attack, stroke, blindness and limb amputation, as well as shortened life expectancy. T1D afflicts some 200,000 Canadians and is caused by multiple genetic risk factors and currently unknown environmental factors. Now an innovative research project is investigating the interactions of genetic risks and environmental factors underlying T1D.

Dr. Jayne Danska, Senior Scientist at Toronto's Hospital for Sick Children and Professor in the Faculty of Medicine at the University of Toronto, and Dr. Andrew Macpherson, Canada Research Chair in mucosal immunology at McMaster University, are project leaders of Genome-Environment Interactions in Type 1 Diabetes.

This project aims to understand the genetic control of T1D in humans and rodent models, and to study the role of exposure to common intestinal bacteria in regulating immune system development and how such exposures affect the probability that persons at genetic risk of T1D will develop the disease.

By identifying genetic variants and bacterial exposure associated with T1D, this project is expected to discover new genetic markers, and to identify environmental exposures to intestinal bacteria that modify inherited T1D risk.

Canada has the third highest rate of T1D in the world and the incidence is rising. T1D accounts for 10% of cases of all diabetes cases, and costs the Canadian healthcare system \$1.32 billion in 2002 and is projected to rise to \$1.6 billion by 2010.

This project aims to decrease the disease burden and increase the quality of life and life expectancy of persons with T1D and their families.

Moreover, discoveries from this research project are expected to have implications for a number of other autoimmune disease states, such as multiple sclerosis, inflammatory bowel disease and rheumatoid arthritis.