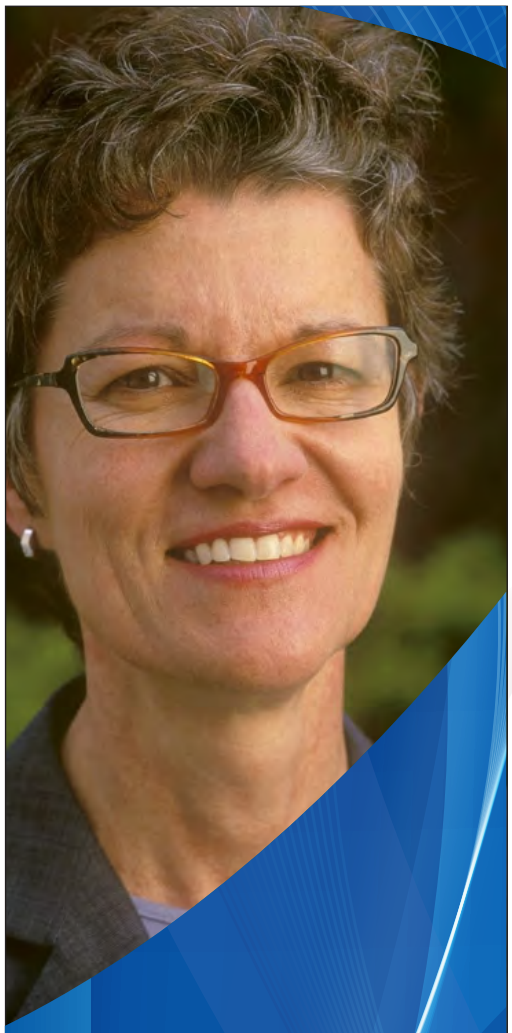

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Health Research Caucus
Diabetes Research and Innovation in Canada

PRESENTER SUMMARY

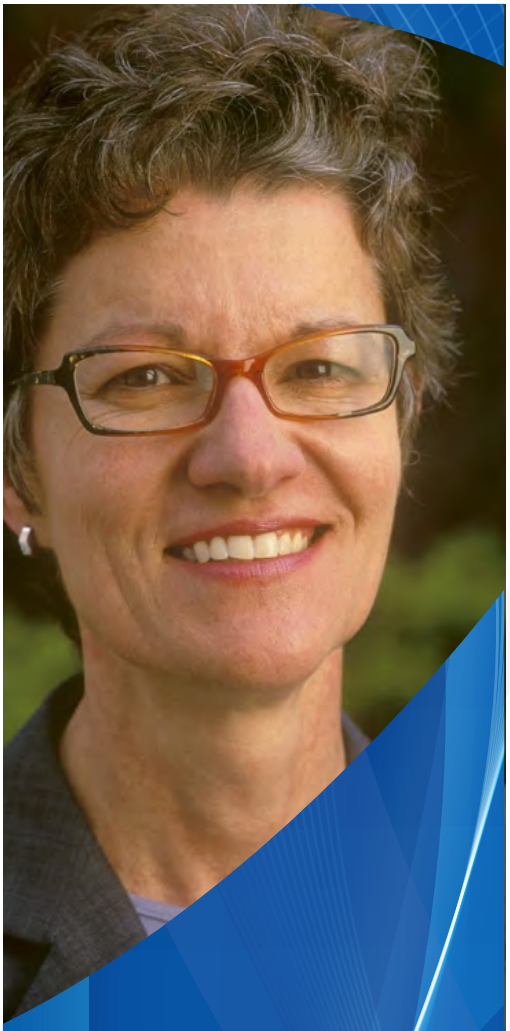
RESEARCH CANADA | RECHERCHE CANADA
An Alliance for Health Discovery | Une alliance pour les découvertes en santé

Artificial pancreas program in type 1 diabetes mellitus

Type 1 diabetes mellitus occurs in 10% of Canadians who have diabetes, about 1% of the population (350,000 Canadians). The rate of Type 1 is increasing in young children from 0.1% (3,800 cases) in 1998/1999 to 0.2% (5,200 cases) in 2008/2009.

Type 1 diabetes can lead to blindness, kidney dialysis and leg amputations as examples of serious complications of small blood vessels. It also affects large blood vessels causing heart disease, stroke and a shortened life span. Along their journey, patients have more visits to doctors/hospitals. The impact/burden is on the individual, their family, their school and their work place.

In London, the pump shut-off studies are funded by the JDRF Canadian Clinical Trial Network (CCTN). Coordinating with 2 major centers in the US, these studies are assessing ways to prevent low blood sugars overnight, a very dangerous condition that can lead to coma, seizures or death. The artificial pancreas is a combination of an insulin pump to deliver insulin, a continuous glucose monitoring system to measure blood sugars in the patient every five minutes, and a computer algorithm that predicts for each individual when they are at risk for hypoglycemia (low blood sugar). When operating, the system predicts a low blood sugar while the patient is sleeping, turning off the insulin pump when blood sugars are dropping into a low range and then turning back on when blood sugars allow. We have tested the system in adults and now are testing in a group of children as young as 3 years of age. This system could potentially prevent overnight hypoglycemia in patients and is a first step to developing a system that functions like a native pancreas.



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Removal in Type 1 diabetes mellitus

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In London, we participate in a clinical trial (DCCT/EDIC) that has gone on for 33 years proving the benefits of good blood sugar control to the patient. Using frequent injections (4-6 daily) of insulin or an insulin pump, frequent blood sugar testing (4-6 daily) or continuous glucose monitoring, we have shown a dramatic 50% reduction in complications is possible.

The REMOVAL trial is funded by JDRF Canadian Clinical Trial Network (CCTN) and looks at older type 1 diabetes subjects who are at risk for heart attacks, stroke and death. This study uses Metformin, a medication proven to prevent heart disease in Type 2 diabetic patients. 500 patients from Europe, Australia and Canada (105 patients) will be followed using carotid imaging for 3 years. Carotid imaging changes have been shown to predict increasing atherosclerosis and heart disease. We lack evidence for additional treatments that we can use in Type 1 diabetic subjects to prevent heart disease which is the number one cause of death in this population.