

Genetic 'roadblock' hoped to inspire future type 2 diabetes research

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A team of Mount Sinai Hospital researchers has found that a “genetic roadblock” identified in a recent study could pave the way toward novel treatments for type 2 diabetes.

In the study, researchers from the Samuel Lunenfeld Research Institute of Mount Sinai Hospital found the first genetic evidence that the elimination of the gene for glycogen synthase kinase-3 (GSK-3) in mice sensitizes the animals to insulin.

Insulin is a hormone that helps control sugar (glucose) levels in the blood. In people with type 2 diabetes, the pancreas does not produce enough insulin, or it is not properly used. As a result, sugar accumulates in the blood rather than being absorbed, stored or burned for energy. The study found that by eliminating GSK-3 in mouse models, more sugar became stored in the liver in response to increased insulin sensitivity, indicating that insulin had become more effective.

The study from the laboratory of Dr. Jim Woodgett, Director of the Lunenfeld, and the first scientist to isolate the GSK-3 genes in 1990, made the cover of the October 3 edition of *Cell Metabolism*.

“We created a ‘genetic roadblock’ by knocking out this particular gene and this made the mice far more efficient in their ability to use insulin to regulate their blood-sugar levels,” said Dr. Woodgett. “Research creates the best medicine and while potential human treatments are likely still years down the road, this study provides strong evidence that chemical

inhibitors of this enzyme will be useful for increasing the effective potency of insulin.“

The study was co-authored by Drs. Katrina MacAulay and Bradley Doble. Dr. MacAulay was inspired to become a medical researcher specializing in diabetes because her sister, Ailsa MacAulay, suffers from this disease.

“I hope our findings will inspire other researchers around the world to develop treatments that will reduce symptoms of this epidemic disease as well as its associated complications, such as heart disease, liver disease or limb amputation,” said Dr. MacAulay.

Currently, more than two million people in Canada suffer from diabetes. It is one of the fastest growing diseases in the country with more than 60,000 new cases diagnosed each year.

Type 2 diabetes makes up about 90 per cent of all cases, with most evidence suggesting that it could be prevented or delayed by maintaining a healthy lifestyle.

“With this research, another piece in the puzzle has been put in place. It advances our understanding of how the complex mechanisms activated by insulin work. Understanding the details of this picture is central to developing new drugs that can help people with diabetes control their blood sugar,” says Dr. Diane T. Finegood, Scientific Director of the CIHR-Institute of Nutrition, Metabolism and Diabetes.

Source: Samuel Lunenfeld Research Institute

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