MedicalXpress

# Islet cell transplantation restores type 1 diabetics' blood sugar defense mechanisms

December 18 2014

Type 1 diabetes (T1D) patients who have developed low blood sugar (hypoglycemia) as a complication of insulin treatments over time are able to regain normal internal recognition of the condition after receiving pancreatic islet cell transplantation, according to a new study led by researchers at the Perelman School of Medicine at the University of Pennsylvania, published online in *Diabetes*. Severe hypoglycemia—a life-threatening complication of insulin treatment for T1D—can occur when the body's defense mechanisms against low blood sugar are broken down over a long period of time, causing shakiness, irritability, confusion, lightheadedness, shortness of breath, and even seizures or loss of consciousness.

In this study, led by Michael R. Rickels, MD, MS, associate professor of Medicine and medical director of the Pancreatic Islet Cell Transplant Program at Penn Medicine, T1D patients who were suffering from "hypoglycemia unawareness"—when a patient has low blood sugar, but feels no symptoms—were able to internally recognize the condition and automatically increase their own blood sugar to normal levels six months after undergoing islet cell transplantation. Pancreatic islets are tiny clusters of cells within the pancreas that contain several types of cells, including cells that produce insulin to help the body process sugar.

"The results of this study suggest that islet cell transplantation may be an effective treatment for patients with type 1 diabetes who are experiencing significant hypoglycemic events because their body isn't able to recognize their low blood sugar levels," said Rickels. "Currently,

islet cell transplantation is considered investigational for type 1 diabetes patients, but this study shows that it has the potential to dramatically improve a patient's ability to defend against and recognize symptoms of hypoglycemia and eliminate severe hypoglycemic episodes."

Patients who undergo pancreatic islet cell transplantation receive islets from deceased donors, sometimes through two separate infusions. In this study, 12 patients with hypoglycemia unawareness and frequent severe hypoglycemia events underwent either one or two infusions of islets in order to achieve insulin-independence. The subjects all had approximately 30 years of disease history before the infusion, and their bodies' ability to recognize hypoglycemia was measured prior to the infusion and at six to seven months afterwards. The results were then compared to a control group. Following the islet cell transplantation, the subjects' time spent hypoglycemic was nearly abolished. In addition, their bodies were able to appropriately respond to experimental insulin-induced hypoglycemia following transplantation.

"Now that we've seen improvement in the protection against hypoglycemia as a result of islet cell transplantation, we're evaluating the longer term durability of these restored defense mechanisms," said Rickels. Additional work in the laboratory of Ali Naji, MD, PhD, the J. William White professor of Surgery and co-director of the Type 1 Diabetes Unit for Penn's Institute for Diabetes, Obesity and Metabolism, is aimed at the development of new immunosuppression medication approaches to reduce the risk for adverse side effects.

Provided by University of Pennsylvania School of Medicine