

Making Islet Cell Transplants Safer

People with type 1 diabetes don't make insulin, but Melena Bellin, MD, hopes to change that

By Barbara Brody

March 2019



Melena Bellin, MD

OCCUPATION:

Associate professor of pediatric endocrinology and surgery and director of research for the islet autotransplant program at the University of Minnesota Medical Center and Masonic Children's Hospital

FOCUS:

Islet transplantation

As a pediatric endocrinologist, Melena Bellin, MD, regularly treats children with diabetes. Yet for a while, her research didn't directly focus on the disease—though it had the potential to have a major impact on it.

People with **type 1 diabetes** don't make insulin. To change that, scientists have been exploring islet cell transplants for decades. Normally, the procedure involves taking groups of islet cells (which include the beta cells that make insulin) from a healthy deceased donor and transplanting them into a recipient with type 1 diabetes. But people with diabetes aren't the only ones who can benefit from islet cell transplants. People with severe pancreatitis (inflammation of the pancreas) that necessitates the removal of the pancreas also lose the ability to produce insulin and therefore need another source of insulin to survive.

In an effort to help these patients, experts at the University of Minnesota Medical Center have been performing what's known as autologous pancreatic islet cell transplants, meaning the islet cells are obtained from the transplant recipient's own pancreas. Doctors remove the pancreas, isolate the insulin-producing islet cells, and then infuse them into the patient's liver.

By performing this procedure on numerous people with pancreatitis and following them to see how they respond, Bellin and her colleagues have gained insight into what it takes to do successful islet transplants—including in people with diabetes.

There are some important distinctions between the groups, though. "These [pancreatitis] patients don't have an autoimmune disease, and they're getting their own cells back," says Bellin. People with type 1 diabetes, on the other hand, receive beta cells from a donor. Without the help of immune-suppressing drugs, which have side effects, their immune systems will attack these foreign cells.

Given those challenges, "the main reason we'd do an islet cell transplant for someone with type 1 is because they're really struggling with **hypoglycemia** and hypoglycemia unawareness," says Bellin. "Insulin therapy becomes dangerous if you [regularly] have rapid falls in blood sugar, seizures, and are passing out." Transplantation needs to be a careful choice between doctor and patient to be sure the benefits outweigh the risks.

In the past few years, Bellin has played an integral role in research aimed at making islet transplants safer for people with type 1. Currently, she's working on a trial funded by the National Institutes of Health (NIH) that focuses on transplant-related inflammation. Infusing islets into the liver triggers an inflammatory response—the sort of reaction the body might have if you cut your finger. As a result, many of the transplanted islets are lost early in the transplant period, which increases the likelihood that a patient may have diabetes post transplantation. Her study is looking at whether two anti-inflammatory drugs currently on the market for other conditions could block that inflammation, helping more of the islets survive transplantation and making diabetes less likely.

While this work has clear implications for anyone with type 1, "islet cell therapy could be beneficial for type 2 diabetes as well, since people with that condition don't make enough insulin to meet their needs," says Bellin.