

# Pancreatic stem cell discovery opens door to regenerative treatments for diabetes

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Endogenous stem cells in the pancreas could offer a method for regenerating insulin-producing cells in patients with diabetes. (Steve Buissinne)

The transplantation of insulin-producing islets has helped some patients live without the need for insulin injections, but there are not enough cells to treat the millions of people who have Type 1 diabetes. A regenerative solution could bridge this gap.

A team at the University of Miami Miller School of Medicine's Diabetes Research Institute has [found the source](#) of pancreatic stem cells that can turn into insulin-releasing beta cells. The discovery could pave the way for regenerative cell therapies for Type 1 diabetes.

The idea that the pancreas contains progenitor cells—a specialized type of stem cell that can become beta cells—is not new, but it had not been confirmed until now. In their paper, [published](#) in Cell Reports, the DRI researchers pinpointed the location of these stem cells in the pancreas and proved that they have the ability to develop into beta cells.

These stem cells can be identified by their expression of the protein PDX1 and the cell receptor ALK3, and are found in the pancreatic ductal and glandular network. The researchers selectively extracted these cells, cultured them, and then used a growth factor called bone morphogenetic protein 7 (BMP-7) to prompt them to become beta cells.

The discovery builds on the DRI's previous work, in which the team used BMP-7, which is FDA-approved for clinical use, to stimulate progenitor-like cells in non-insulin-producing parts of the pancreas.

“Our in-depth study of these pancreatic stem cells may help us tap into an endogenous cell supply ‘bank’ for beta cell regeneration purposes and, in the future, lead to therapeutic

applications for people living with type 1 diabetes,” said Juan Dominguez-Bendala, Ph.D., DRI director of pancreatic stem cell development for translational research and co-principal investigator of the study, in a press release. “Together with our previous findings using BMP-7 to stimulate their growth, we believe that we may be able to induce these stem cells to become functional islets.”

Several research groups and companies are pursuing cell-based therapies for type 1 diabetes. Last fall, Semma Therapeutics [raised \\$114 million](#) to take its Type 1 diabetes cell therapy through clinical proof of concept. The Cambridge, Massachusetts-based biotech will now test whether its beta cells, produced from undifferentiated pluripotent stem cells, can control blood sugar levels in diabetics.

One major challenge of these therapies is figuring out how to prevent the immune system from rejecting implanted cells. The University of Miami researchers hope their approach will prove a viable way to address that risk.

“The ability to offer regenerative medicine strategies to restore insulin production in the native pancreas could one day replace the need for transplantation of the pancreas or insulin-producing cells,” said Camillo Ricordi, M.D., University of Miami professor and director of the Diabetes Research Institute, in the statement. “In type 1 diabetes, this would require abrogation of autoimmunity to avoid immune destruction of the newly formed insulin-producing cells. For this reason, our current efforts are converging on immune tolerance induction without the need for lifelong anti-rejection drugs.”