

Device protects transplanted pancreatic cells from the immune system

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Scientists at Burnham Institute for Medical Research (Burnham) and the University of California San Diego (UC San Diego) School of Medicine have demonstrated in mice that transplanted pancreatic precursor cells are protected from the immune system when encapsulated in polytetrafluorethylene (PTFE). The study, which suggests a new approach to treating Type 1 diabetes, was published online on April 8 in the journal *Transplantation*.

The team of scientists showed that after transplantation, the precursor cells mature into functional [beta cells](#) that are glucose-responsive and control blood sugar levels. Additionally, the study demonstrated that using precursor cells, instead of more committed beta cells, enhanced the cell transplant's chances of success.

"The results exceeded our expectations," said Pamela Itkin-Ansari, Ph.D., assistant adjunct professor at the UC San Diego School of Medicine and Burnham. "We thought that [T-cells](#), although unable to penetrate the device, would cluster around it. But we found no evidence of an active immune response, suggesting that the cells in the device were invisible to the immune system."

The investigators used two different mouse models in the study. The team transplanted mouse islet cells into other mice to demonstrate that the cells were protected from the immune system when encapsulated in PTFE. [Human cells](#) encased in PTFE were then transplanted into immunodeficient mice to study the viability and function of both mature

beta cells and precursor cells inside the device. Itkin-Ansari's team found that by using precursor cells that had not completely differentiated, the transplanted cells could regenerate into fully functional beta cells. This has important implications for how stem cell-derived tissue should be transplanted in the future.

Type 1 diabetes results from an autoimmune response wherein the body attacks and kills insulin producing beta cells in the pancreas. One of the challenges of cell transplantation therapy to treat diabetes is the need for long term immunosuppression, which carries health risks. Transplanting beta cells in a protective device could alleviate the need to use immunosuppressive drugs.

Source: Burnham Institute

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