

Diabetes: how could stem cells help?

What do we know?

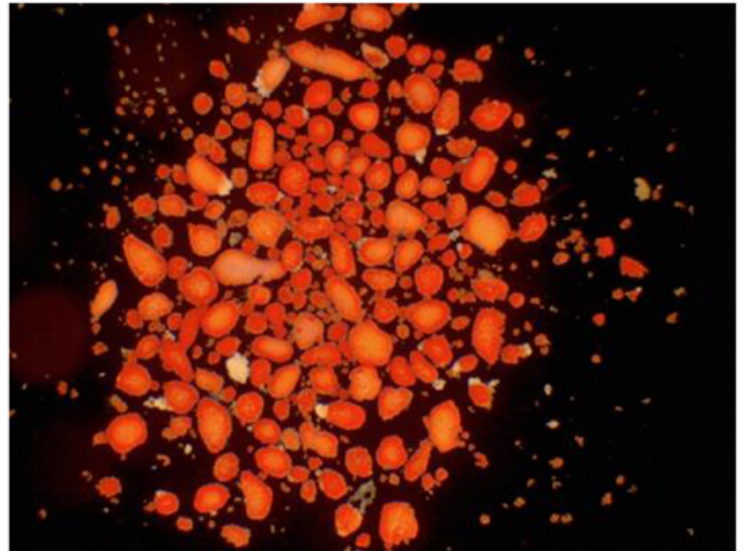
When blood glucose (sugar) levels rise, beta cells in the pancreas release insulin. Insulin tells cells throughout the body to take up glucose from the blood.

In Type 1 diabetes, the immune system destroys beta cells. In Type 2 diabetes, cells do not take up enough glucose, either because they are insensitive to insulin or too little insulin is produced.

Type 1 diabetes patients require daily blood testing and insulin shots.

Scientists have successfully used pluripotent stem cells to produce glucose-responding cells that release insulin, like beta cells.

Clinical trials of these cells are underway.



Isolated islets of Langerhans used for transplantation. Image: Andrew Friberg (CC BY 3.0)

What are researchers investigating?

Diabetes is quite well understood, but the causes of diabetes are not. Research is still being conducted on what triggers the immune system to destroy beta cells in Type 1 diabetes.

Current research is examining the use of stem cells as a way to create beta cells that can be transplanted into patients with Type 1 diabetes. Clinical trials are presently taking place with devices/capsules that protect transplanted stem cell-derived precursor cells of beta cells from the patient's immune system.

Researchers are also interested in the possibility of using drugs to promote cells in a patient's pancreas to naturally make more beta cells.

What are the challenges?

Autoimmunity is a big challenge for Type 1 diabetes.

Even if new beta cells are created or transplanted into a patient, the immune system will eventually target and destroy these cells.

Thus, treatments must consider how to prevent new beta cells from being targeted.

Typically this has involved immune suppressants, which have an unfortunate side effect of increasing the risk of infection.