RTH Foundation Knowledge Base Article

Pancreas Regeneration and Beta Tissue Replacement as a Solution to Type I Diabetes

Much of this introduction and analysis is from a where are we Article: “Pancreas Regeneration.” Source: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6168194/

Diabetes has been estimated to afflict well over 300 million people worldwide and is a major and growing health problem in the modern world. Complications resulting from long-term diabetes include kidney failure, peripheral vascular disease, stroke, and coronary artery disease; together, these complications create enormous medical and social burdens as well as causing premature deaths.

Type I Diabetes (T1D), which makes up about 5–10% of all diabetes cases, is an autoimmune disease in which β-cells are selectively destroyed, leading to a severe insulin deficiency that must be treated with daily insulin injections for survival. Together, these diseases account for a large and growing patient population with pancreatic β-cell deficiency.

Type I Diabetes is caused by the loss of so-called Pancreatic Beta cells, the cells that produce the hormone insulin, which is essential for regulating the use of sugar in the body. Since Beta cells do not regenerate, scientists have traditionally assumed that the loss of these cells is irreversible; indeed, diabetic patients require insulin injections for life.

To many it remains unclear whether the adult human pancreas can spontaneously regenerate β-cells in any physiologically meaningful way. Substantial β-cell loss therefore results in permanent endocrine deficiency and irreversible diabetes. There is an increasing consensus that a regenerative medicine approach will be helpful, even essential, in treating certain forms of diabetes including T1D and possibly the subset of T2D in which there is substantial β-cell loss.

The need for β-cell regeneration therapy is enormous. Approximately 2.5 million people in the USA (and more than 20 million worldwide) suffer from T1D and many millions more patients with T2D have pancreatic β-cell deficiency. Both patient populations could benefit from therapies that restore functional β-cell mass, freeing them from daily insulin injections and avoiding the serious complications that develop from imprecise dosing. The need for β-cell regeneration in patients with T1D is particularly pressing as this

disease preferentially affects children and the severe lack of β-cells in T1D can cause life-threatening fluctuations in blood glucose

Using the results of the below referenced study and many other studies plus knowledge from many years of Diabetes research and the core BCM technologies and procedures, the BCM Team foresees an ability to address the removal of Type I Diabetes in humans is possible. It is the mission of the BCM Team to deliver a healing solution.

Source: https://www.sciencedaily.com/releases/2018/05/180508111745.htm

Title: Tissue-engineered Human Pancreatic Cells Successfully Treat Diabetic Mice

Researchers tissue-engineered human pancreatic islets in a laboratory that develop a circulatory system, secrete hormones like insulin and successfully treat sudden-onset Type 1 Diabetes in transplanted mice. The scientists use a new bioengineering process they developed called a self-condensation cell culture. The technology helps nudge medical science closer to one day growing human organ tissues from a person's own cells for regenerative therapy.