Diabetes-suppressive Microsphere Vaccine

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Technology description

Background
Diabetes is a chronic disease with elevated and fluctuating levels of glucose in the blood. Approximately 23.6 million Americans have diabetes which conventionally is diagnosed as type 1 or type 2 diabetes. Type 1 diabetes is caused by an autoimmune attack on the patient own insulin producing beta cells. About 5 to 10 percent of the diabetic population has type 1 diabetes. Type 2 diabetes is characterized by decreased insulin sensitivity, and approximately 10 percent of all type 2 diabetes patients suffer from an autoimmune attack towards their beta cells and are characterized as having Latent Autoimmune Diabetes in Adults (LADA). The autoimmune destruction of the insulin producing cells in type 1 diabetic and LADA patients results in an insulin deficiency which needs to be treated with insulin therapy for life.
Technology Description
Investigators at the University of Pittsburgh have developed a vaccine to reverse or prevent the destruction of insulin producing pancreatic cells. This vaccine stops T cells from attacking the pancreatic islet cells by reprogramming dendritic cells that trigger the T cell assault. Dendritic cells activate the T cell attack through surface molecules called CD40, CD80, and CD86. The vaccine utilizes microspheres that deliver antisense oligonucleotides to dendritic cells in the pancreas which keep the CD40, CD80 and CD86 molecules from being expressed. Vaccine studies have been completed in both mouse and primate models. Phase I clinical trials are underway for a cell therapy version of this vaccine.

Application area

Targeted treatment for Type 1 diabetes
May also work for Type II diabetes
Treatment of autoimmune diseases related with CD40, CD80, CD86 and their combination

Advantages

May be a true cure for diabetes, Type I diabetics may no longer need to use insulin injections

Less invasive and much easier than transplantation based treatments
Prevents Type I diabetes before the onset of symptoms

Institution

University of Pittsburgh

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