Silicon Nanopore Membrane encapsulated enriched-Beta Clusters for Type 1 Diabetes treatment

Grant Award Details

Silicon Nanopore Membrane encapsulated enriched-Beta Clusters for Type 1 Diabetes treatment

Grant Type: Quest - Discovery Stage Research Projects

Grant Number: DISC2-10751

Project Objective: To develop a macro encapsulation technology based on the silicon nanopore membrane to support the long term viability and function of human stem cell derived insulin producing cells.

Investigator:

Name:	Shuvo Roy
Institution:	University of California, San Francisco
Type:	PI

Disease Focus: Diabetes, Metabolic Disorders, Type 1 diabetes

Human Stem Cell Use: Embryonic Stem Cell

Award Value: $1,113,000

Status: Active

Grant Application Details

Application Title: Silicon Nanopore Membrane encapsulated enriched-Beta Clusters for Type 1 Diabetes treatment

Public Abstract:

Research Objective

We propose to develop a cell encapsulation technology to support the long term viability and function of human stem cell derived insulin producing cells.

Impact

A device that provides adequate mass transfer of oxygen, glucose, and insulin for encapsulated stem cell derived beta cells can address the challenges of current cell therapy for Type 1 Diabetics.

Major Proposed Activities

- Generate and model various Cell Scaffold designs to house stem cell derived beta cells.
- Fabricate and characterize the Cell Scaffold in vitro to determine stem cell derived beta cell functionality.
- Evaluate various iBAP prototypes for proper fit within the tissue pocket
- Prototype and evaluate iBAP vascular connections after implantation
- Determine the dose of beta cells for glucose autoregulation in the diabetic model
- Demonstrate chronic glucose autoregulation in vivo in the diabetic model.

Statement of Benefit to California:

Type 1 Diabetes affects over 250,000 Californians. A device encapsulating stem cell derived beta cells represents a functional cure for Type 1 Diabetes patients. However the poor transport of oxygen, glucose, and insulin of previously developed devices severely limits these device's clinical potential. We will develop an encapsulation technology that solves these mass transfer problems, provides physiologic glucose control, and achieves the first functional cure for Type 1 Diabetes.
