Abstract:

Diabetes mellitus (DM) is a group of endocrine disorders characterized by insufficient or complete lack of insulin production, secretion, or sensitivity, resulting in persistent hyperglycemia. Type 1 DM is the result of autoimmune destruction of one’s own insulin-producing islet β-cells. Type 2 DM is characterized as poor insulin secretion or sensitivity. Type 3c DM, or pancreatogenic DM, results from congenital or acquired, partial or complete absence of islets secondary to diseases of the exocrine pancreas such as chronic pancreatitis. The destructive natures of Type 1 and Type 3c DM ultimately leads to exogenous insulin dependency. The “brittle” condition of these diabetics makes it difficult to manage acute metabolic complications such as hypo/hyperglycemia and diabetic ketoacidosis, even with intensive insulin therapy.

Islet transplantation has emerged as a viable treatment option for those suffering from brittle diabetes and as an adjuvant procedure for those undergoing pancreatectomy to treat chronic pancreatitis. Islets are procured from a deceased donor (Type 1 DM) or from the same patient (Type 3c) and are traditionally transplanted into the hepatic portal vein. However, long-term success of islet transplantation is hindered by a significant loss of transplanted islets during the peritransplant period due to an innate immune response called the Instant Blood-Mediated Inflammatory Reaction (IBMIR). Additionally, transplants for Type 1 DM patients require immunosuppression that is toxic to islets in order to prevent graft rejection. This seminar presentation will introduce the field of clinical islet transplantation, current research, and additional challenges that need to be overcome.

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Clinical Islet Transplantation:
Current Applications, Research and Challenges

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