Islet transplantation: the quest for an ideal source.

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Abstract

The progress of islet transplantation as a new therapy for patients with diabetes mellitus depends directly upon the development of efficient and practical immunoisolation methods for the supply of sufficient quantities of islet cells. Without these methods, large scale clinical application of this therapy would be impossible. Two eras of advances can be identified in the development of islet transplantation. The first was an era of experimental animal and human research that centered on islet isolation procedures and transplantation in different species as evidence that transplanted islets have the capability to reverse diabetes. The second was the era of the Edmonton protocol, when the focus became the standardization of isolation procedures and introduction of new immunosuppressive drugs to maintain human allograft transplantation. The quest for an alternative source for islets (xenographs, stem cells and cell cultures) to overcome the shortage of human islets was an important issue during these eras. This paper reviews the history of islet transplantation and the current procedures in human allotransplantation, as well as different types of immunoisolation methods. It explores novel approaches to enhancing transplantation site vascularity and islet cell function, whereby future immunoisolation technology could offer additional therapeutic advantages to human islet allotransplantation.