CASE STUDY

EXPLORING NOVEL SOLUTIONS FOR TREATING DIABETES

Type 1 diabetes mellitus (also known as juvenile onset diabetes or insulin dependent diabetes) is a major health problem worldwide.

This disease damages tissues and organs, leading to a number of debilitating and potentially life-threatening complications, including premature heart disease, kidney failure (nephropathy), blindness (retinopathy) and poor circulation leading to strokes, gangrene and sometimes limb amputation. Diabetes mellitus is now the major cause of end stage renal failure in the world. Currently type 1 diabetes is treated by use of insulin injection, but this treatment is not a cure and requires lifelong therapy. Recently, new developments involving Dr Toby Coates and his research team have made transplantation of the insulin producing pancreatic islet cells a viable treatment option.

Treatment of Type 1 Diabetes with Islet Transplantation

Pancreatic islets make up only one to two per cent of the pancreas and are scattered throughout this organ. It is estimated there are approximately 1 million islets in a pancreas. In type 1 diabetes, the body‘s immune system mistakenly attacks and destroys the beta cells, and the body can no longer produce insulin. Recently, transplantation of islets that have been extracted from the pancreas has become possible. Put simply, the islets are removed from the donor pancreas via a complex laboratory procedure and subsequently transplanted into the recipient by injecting them into the liver via the portal vein.

Islet transplantation is just emerging from being experimental to becoming state of the art. It offers a number of advantages over whole organ (pancreas) transplantation in that no major surgery is required, and thus there is less risk to the patient and a much shorter recovery time. Patients typically leave the hospital in just a few days. In addition, the process can be repeated if necessary.

The goal of islet transplantation is to give back to type 1 diabetics the ability to produce insulin that is needed to regulate blood glucose levels by transplanting islets that actually produce insulin. Islet separation technologies allow these cells to be collected from a deceased donor‘s pancreas and transplanted into a recipient with diabetes at minimal risk to the patient, so he or she can produce sufficient insulin once again. With functioning islets, the release of insulin is continuous throughout the day in amounts that meet the body‘s requirements under the influence of glucose intake, as occurs in normal healthy individuals.

Returning blood glucose levels to normal will assist in preventing any further damage to a patient‘s cardiovascular, nerve or ophthalmic systems. There is also a possibility that any damage already present may improve over several years. In addition the non-diabetic state of the patients will stop any further damage to their kidneys that occurred while in their diabetic state.