



## TYPE 1 DIABETES

Type 1 diabetes (Juvenile/Insulin dependent diabetes) is becoming one of the most common illnesses in younger individuals. Although this type constitutes only 5-10% of the total diabetic population worldwide, it has serious short and long term consequences. The condition results due to pancreatic beta cell destruction which causes absolute insulin deficiency. T-cell-mediated immune system activation leading to insulinitis and humoral B-cell response producing immunoglobulins are implicated in the pathogenesis of T1DM. Genetic and environmental factors are also thought to be the cause of type 1 diabetes. Low/absent C-peptide levels indicate disease progression. Evidence suggests that along with sustained C-peptide level, even modest beta-cell function is associated with lower incidence of hypoglycemia and occurrence of micro- and macro-vascular complications.

Life-long insulin therapy is the only available treatment modality to maintain blood glucose levels, but does little in terms of curing the patient of diabetes. Islet cell transplantation was proposed in treatment of T1DM. However, lack of donors as well as inability of transplanted islet cells to address the issue of auto-reactivity of T cells hampers the clinical use of this treatment modality.

Stem cells have tremendous regenerative capacity and the flexibility to grow into different types of cells. Mesenchymal stem cells are capable of differentiating into glucose-responsive insulin-producing cells. Bone marrow MSCs seem to have more potency than adipose derived MSCs to differentiate into insulin producing cells. Immuno-modulatory and pro-angiogenic properties can help to arrest  $\beta$ -cell destruction, preserve residual  $\beta$ -cell mass, facilitate endogenous  $\beta$ -cell regeneration and prevent disease recurrence. Furthermore, allogeneic MSCs can be employed to re-educate lymphocytes and reset the autoimmunity, thereby leading to metabolic control (increased c-peptide level and reduce insulin dosage).

Cell-based approach to insulin replacement aims to ultimately improve glucose control in patients with type 1 diabetes. As the therapy addresses the root cause of diabetes, results achieved, although gradual are permanent. Lifestyle and diet are two other factors that play a major role in prognosis of diabetes. Leaky gut syndrome leading to altered intestinal permeability has been reported as a cause of T1DM as well as other autoimmune conditions. It is therefore imperative to identify such cases and plan diet and lifestyle modifications. The goal is to teach patients to incorporate moderate intensity exercise in their daily lives, in addition to diet management as a means to improve/maintain insulin sensitivity post treatment.

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