AIM & OBJECTIVES

In T1D, insulin therapy is the only feasible approach as on date. But insulin therapy, passive in nature and does not directly address the cause of the disease. An alternative for this is pancreas/islet/stem cell transplantation. But unfortunately transplantation is associated with surgical morbidity and chronic immunosuppression. Immune tolerance is the process by which the body naturally does not launch an immune system attack on its own tissues. Immune tolerance therapies seek to reset the immune system so that the body stops mistakenly attacking its own organs or cells in autoimmune disease or accepts foreign tissue in organ transplantation. The particular array of major histocompatibility complexes varies slightly between individuals, and this variation is the basis of the immune response when a transplanted organ is rejected.

Monoclonal antibodies for targeting therapeutic agents to autoimmune disorders are currently a major area of interest in immunology. Monoclonal antibodies can induce the immune tolerance to the body, thereby stop the beta cell apoptosis and deliver the drug at pancreatic islets for regeneration/restoration of beta cells. Possible way to conquer this difficulty by employing a monoclonal antibody-drug conjugated delivery system, thereby targeting to the cytotoxic effector (CD4+) T cells and delivers the drug at pancreatic islets site to restore the beta cell mass and produce better efficacy of the treatment. Drug-antibody conjugates in nano forms have the ability to target receptor sites in a much more effective way.

Anti-CD4 monoclonal antibodies are well established in induction of immune tolerance and the correlation between sitagliptin and β-cell neogenesis is well established.

Our aim is to produce anti-CD4 monoclonal antibody coupled sitagliptin loaded nanoparticles (anti-CD4 mAb-SP-NPs) for the better treatment approach for T1D.

The objective of the work is as follows:

- Preparation of SP-NPs and coupling of SP-NPs with anti-CD4 mAbs
- Characterization of the anti-CD4 mAb-SP-NPs
- Development of T cell induced autoimmune diabetes into BALB/c mice
- In vivo efficiency of the anti-CD4 mAb-SP-NPs in diabetic BALB/c mice.