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Treatment of Type I Diabetes Mellitus by Using Pancreatic Adult Stem Cells

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DESCRIPTION

All stem cells, including adult stem cells, have at least two things in common. They first experience continuous self-renewal. Second, they have the capacity to develop into mature cell types with distinct morphologies and specialised roles. Before becoming completely differentiated, stem cells frequently produce one or more intermediate cell types. Precursor or progenitor cells are the names given to the intermediary cell. In foetal or adult tissues, precursor cells are partially differentiated cells that divide to produce fully differentiated/mature cells.

Pancreatic adult stem cells have drawn the most attention of all the adult stem cells currently under investigation because they may one day be employed to treat Type I Diabetes Mellitus.

Type I diabetes mellitus

The structure and operation of the cell clusters are impacted by the autoimmune response in those who are genetically prone to Type I Diabetes Mellitus (Type I DM). The cells eliminated by the body's immunological reaction are not replaced since cells have a limited capacity for regeneration. The pancreatic islets of such people exclusively contain non-cells. As a result, many individuals need ongoing insulin therapy to keep their blood sugar levels normal. Sole islet implants or ecto pancreatic transplants offer patients with Type I Diabetes Mellitus a cure, as insulin remains the only available treatment.

Unfortunately, there are very few donors available for pancreatic transplants or as sources of islets for implantation. Furthermore, the patient must receive lifelong immunosuppressive medication because the donated organ or islets are allogenic.

Pancreatic ductal adenocarcinoma

According to reports, the most common cancer in the United States and one of the deadliest, is pancreatic cancer. The treatment for pancreatic cancer is very ineffective. Recently, it has been determined that pancreatic cancer stem cells are the cause of the disease's resistance to treatment (CSC). Tumor initiation, proliferation, metastasis, and treatment resistance are all caused by the CSC. Finding these CSC's signalling mechanism and therapeutically deactivating it might provide a potential treatment for pancreatic cancer and increase the survival rate of those suffering from this fatal and life-threatening condition.

There are around 1 million instances of type I diabetes documented in India, where its prevalence is rising. An intrinsic disease like diabetes mellitus can have long-term systemic effects that are frequently incapacitating, irreversible, and can significantly lower quality of life. The current lifestyle concessions of people that lead to stress and weight also enhance the likelihood of the disease developing. Even more frustrating is the fact that many patients require ongoing insulin therapy to keep their blood sugar levels within normal range. Patients with Type-I diabetes mellitus and life-threatening illnesses such pancreatic cancer have reason for hope thanks to B-cells generated from adult pancreatic stem cells. The most difficult issue is maintaining the functionality of the islet cells *in vivo* and the requirement to take immunosuppressants for the rest of one's life to prevent immunological rejection, despite the ease with which islet cells can be isolated and cultured.

CONCLUSION

Although it is unclear what the future holds for the use of pancreatic adult stem cells, it is clear that there are still a lot of research problems that need to be resolved and that the solutions hold enormous promise. Expanding the study of adult pancreatic stem cells in people may lead to a game-changing therapeutic intervention for the treatment of Type I diabetes mellitus and provide those suffering from the condition hope for a normal life.

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