

β -cell replenishment: Possible curative approaches for diabetes mellitus

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Abstract

Aims

Diabetes mellitus (DM) is a disorder of heterogeneous etiology marked by persistent hyperglycemia. Exogenous insulin is the only treatment for type 1 diabetes (T1D). Islet transplantation is a potential long cure for T1D but is disapproved due to the possibility of immune rejection in the later stage. The approaches used for treating type 2 diabetes (T2D) include diet restrictions, weight management and pharmacological interventions. These procedures have not been able to boost the quality of life for diabetic patients owing to the complexity of the disorder.

Data synthesis

Hence, research has embarked on permanent ways of managing, or even curing the disease. One of the possible approaches to restore the pancreas with new glucose-responsive β -cells is by their regeneration. Regeneration of β -cells include islet neogenesis, dedifferentiation, and trans-differentiation of the already differentiated cells.

Conclusions

This review briefly describes the islet development, functions of β -cells, mechanism and factors involved in β -cell death. It further elaborates on the potential of the existing and possible therapeutic modalities involved in the *in-vivo* replenishment of β -cells with a focus on exercise, diet, hormones, small molecules, and phytochemicals.

Keywords: Pancreas; β -cell apoptosis; β -cell regeneration; Islet neogenesis; α -to- β trans-differentiation; Regenerative medicine