

# Stem Cell-Derived Islet Cells: A Novel Approach to Treating Type 1 Diabetes

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**Abstract:** *Insulin insufficiency results from the death of pancreatic  $\beta$ -cells in type 1 diabetes (T1D), a chronic autoimmune disease. Exogenous insulin therapy is still the gold standard, however it has the potential to cause hypoglycemia and does not restore physiological glucose homeostasis. The in vitro production of functional islet cells from pluripotent stem cells (PSCs) has been made possible by recent advances in stem cell biology. This could potentially treat the condition by replacing missing  $\beta$ -cells. Current developments in the production, characterization, and preclinical/clinical applications of stem cell-derived islets (SC-islets) are summarized in this review. We point out important issues, such as safety, immunogenicity, and scalability, and suggest future paths to quicken translational advancement.*

**Keywords:** Type 1 diabetes, stem cells, islet transplantation, regenerative medicine, insulin secretion

