

In Vitro Human Bone Marrow Stem Cells Transdifferentiation into Insulin-Producing Cells for the Treatment of Type 1 Diabetes

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Type 1 diabetes mellitus is caused by an autoimmune destruction of pancreatic islet beta cells. Cell therapy using pancreatic islets would be a promising therapy to treat diabetes. However, it is severely limited by a shortage of human donor islets. So other cellular sources have to be considered. In vitro differentiation of human adult stem cells into insulin producing cells provide abundant source for transplantation and it also could overcome allograft rejection. We explored whether human bone marrow stem cells could be induced to differentiate into insulin producing cells when cultured with LY294002, inhibitor of phosphatidylinositol 3-kinase, and nicotinamide. This differentiated cells can form islet-cell like morphology that express pancreatic β cell differentiation-related transcription factors by RT-PCR (PDX-1, PDX-4, Nkx2.2 and Nkx6.1, insulin, glucose transporter 2) and islet specific hormones detectable by immunocytochemistry (insulin, somatostatin). These results indicate that human bone marrow stem cells capable of in vitro transdifferentiating into insulin-producing cells and offer novel source of cells for transplantation into patients with type 1 diabetes.

References

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