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Vildagliptin enhances differentiation of insulin producing cells from adipose-derived mesenchymal stem cells

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Objective: Type 1 diabetes is caused by destruction of beta cells. Vildagliptin (VG), a dipeptidyl peptidase 4 inhibitor, is an anti-diabetic drug which increases beta cell mass. In present work, VG effect on generation insulin-producing cells (IPCs) from adipose-derived mesenchymal stem cells (ASCs) was investigated.

Materials & Methods: In this experimental study, ASCs were isolated and after characterization were exposed to differentiation media without or with VG. The presence of IPCs was confirmed by morphology analysis and gene expression (Pdx-1, Glut-2 and Insulin). Newport Green staining was used to determine insulin positive cells. Insulin secretion under different concentration of glucose was measured by using radioimmunoassay method.

Results: In presence of VG the morphology of differentiated cells was similar to the pancreatic islet cells. Expression of Pdx-1, Glut-2 and insulin genes in VG-treated cells was significantly higher than the cells exposed to the only induction media. Insulin release from VG-treated ASCs showed a nearly 3.6 fold ($P<0.05$) increase when exposed to a high glucose medium in comparison to the VG-untreated ASCs. The percentage of insulin positive cells in the VG-treated cells was approximately 2.9-fold higher than the VG untreated ASCs.

Conclusion: The present study has demonstrated that VG elevates the differentiation of ASCs into IPCs. Improvement of this protocol may use to cell therapy in diabetic patients.

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