Delivery of recombinant plasmid containing human insulin gene-GLP1 promoter into L cells in the rats with a type-1 diabetes

ABSTRACT

The purpose of this study was to determine whether the treatment with recombinant plasmid consisted of human GLP1 promoter and insulin gene can treat diabetic rats. Rats were induced type-1 diabetes mellitus (T1DM) by a single dose of intraperitoneal injection of streptozotocin (STZ) at dose of 55mg/kg. The induction of diabetes was confirmed in rats by checking the blood glucose level for seven days. The recombinant plasmid, GLP1/Ins/pBud plasmid, was wrapped with chitosan and then transferred to diabetic rats by force feeding. The blood glucose level was checked from the tips of the tails by needle puncture using a glucometer and test strips. The blood levels of human and rat insulin were assessed by enzyme-linked immunosorbent assay (ELISA). The results showed no significant effects of orally treatment with recombinant plasmid DNA at both doses of 100 and 600 μg/mL of the human insulin level in diabetic rats ($p>0.05$). The human insulin level was significantly increased by orally treatment at dose of 300 μg/mL ($p=0.04$). The findings indicated that the intraperitoneal injection of 300 μg/mL of this nanoparticle complex prominently increased the human insulin level in diabetic rats in contrast to both doses of 100 and 600 μg/mL. Despite above results, both methods was not effective enough to decrease the blood glucose levels in diabetic rats. It was concluded that the treatment of diabetic rats with recombinant plasmid consisted of human GLP1 promoter and insulin gene was not effective to reduce the blood glucose levels in diabetic rats.

Keyword: Diabetes mellitus; T1DM; Plasmid; Chitosan; L cells