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EFFECTS OF EXENDIN-4 TREATMENT ON DIABETIC MICE TRANSPLANTED WITH MARGINAL ISLET MASS

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BACKGROUND/AIMS: Recently, using the Edmonton Protocol, the success rate of human islet transplantation has markedly improved. However, it usually needs two or more pancreas to achieve normoglycemia. Exendin-4, an agonist of the glucagon-like peptide-1 receptor, has been shown to increase β-cell replication and islet neogenesis as well as reduce β-cell apoptosis. To overcome the shortage of donated organs, we tested whether exendin-4 treatment could improve the outcome of islet transplantation with marginal islet mass.

METHODS: Islets were isolated from C57BL/6 mice with collagenase digestion and purified by density gradient. We transplanted 150 isolated islets under the kidney capsule of inbred streptozotocin-induced diabetic C57BL/6 mice, after which the active treatment group received exendin-4 3 μg/kg bid sc for 4 weeks. After transplantation, blood glucose, body weight and intraperitoneal glucose tolerance test (IPGTT) were measured twice a week, once a day and once every 2 weeks, respectively.

RESULTS: At 4 weeks after transplantation, the exendin-4-treated group had lower blood glucose (149±8 mg/dL vs. 246±36 mg/dL; p=0.044) and IPGTT (area under the curve: 22734±2287 vs. 30623±1502 mg; p=0.015) than the control group. However, there was no significant difference in terms of increase in body weight (1.4±0.2 vs. 1.8±0.3 g; p=0.27).

DISCUSSION/CONCLUSIONS: Exendin-4 treatment could improve the outcome of islet transplantation with marginal islet mass.

Keywords: Exendin-4, Diabetes mellitus, Islet transplantation