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Effect of pentagastrin on IL-1β induced inhibition of insulin secretion in neonatal rat islets of Langerhans

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Abstract

AIM: To observe the effect of pentagastrin (G-5) on IL-1β induced inhibition of insulin secretion in newborn rat islet of Langerhans.

METHODS: Islets of Langerhans of 3 to 5 day old rats were isolated by collagenase digestion. The islets were maintained free floating in culture medium RPMI-1640, containing 10% (V/V) calf serum, and distributed randomly in 96-well plastic plates (6 wells in each group). There are 15 is lets per well in 0.2 mL culture medium. The islets were kept at 37 ℃ in mixed gases of 5% CO_2 and 95% humidified air for the time required by the experimental design. Three experiments were performed in this study. (1) IL-1β induced inhibition of insulin secretion in isolated islets of Langerhans. (2) Effect of G-5 on IL-1β induced inhibition of insulin secretion. And (3) Effect of G-5 on the functional repair of islet B-cells inhibited by IL-1β. Accumulated and glucose stimulated insulin secretion was measured by radioimmunoassay in all studies. Data are presented as $\bar{x} \pm s$. Differences between groups were analyzed using the Student's t test. $P < 0.05$ was considered significant.

RESULTS: The function of islet B cells, which has been received IL-1β treated for 24 h, was dose-dependently inhibited. The accumulated and glucose stimulated insulin secretion was significantly lower than that of the control group ($P < 0.05$). The inhibitory effect of IL-1β on islet B cells can be partially reversed by G 5. Accumulated and stimulated insulin secretion of G-5 0.6 ng/mL and 0.8 ng/mL groups was significantly higher than that of IL-1β treated alone group ($P < 0.05$). The function of islet B-cells, which received IL-1β treatment for 24 h, could partially recover after G-5 treatment for another 24 h. But accumulated and glucose stimulated insulin secretion in groups with G-5 treatment for 10 h groups had no significant difference as compared with IL-1β treated alone group ($P > 0.05$).

CONCLUSION: The present results indicate that G-5 may have a protective effect against the toxicity of IL-1β on islet B-cells.

Key words: Pentagastrin; Interleukin-1; Islet, Langerhans; Insulin; Diabetes mellitus, insulin-dependent

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