Islet dysfunction induced by oxidative stress under high glucose condition

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View from specialist: It is creative, and of certain scientific and educational value.

[ABSTRACT] Objective: To determine the dose-dependent effect of glucose on the secretory activity of INS-1 cells, and to explore the role of oxidative stress in glucose-mediated functional damage of INS-1 cells. Methods: INS-1 cells were treated with glucose at concentrations of 11.1, 16.7, 22.2, 33.3 mmol/L, then the morphological changes were observed under a light microscope. Malondialdehyde (MDA) content in the culture media was determined by spectrophotometry and the glucose-stimulated insulin secretion (GSIS) was assessed by ELISA. Results: As the glucose dose increased, the INS-1 cell apoptosis increased, MDA concentration gradually elevated while the GSIS gradually decreased showing significant differences among groups treated with different concentration of glucose. Conclusions: Under high glucose conditions, the reactive oxygen species (ROS) metabolite MDA increases, leading to apoptosis and thereby impaired insulin secretion in isle.

[KEY WORDS] Oxidative stress; Islet β-cells; Islet function