EFFECT OF TAURINE AND β-ALANINE ON MORPHOLOGICAL CHANGES OF PANCREAS IN STREPTOZOTOCIN-INDUCED RATS

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Abstract: In order to determine the effects of taurine supplementation or depletion on the morphological changes of pancreatic β-cells in streptozotocin-induced diabetic rats, Sprague-Dawley male rats were fed the purified diets supplemented with 1, 2 or 3% taurine or 5% (3-alanine in their drinking water for 7 weeks. After 3 weeks, diabetes was induced by streptozotocin injection (50mg/kg body-weight). Pancreatic morphology was observed by transmission electron microscopy. The pancreatic β-cell of the non-diabetic (CO) group had the many secretory granules, rough endoplasmic reticulum and rod shaped mitochondria. However, the (3-cells of non taurine-supplemented diabetic (EO) group were severely damaged, showing depleted secretory granules. In the 1% taurine-supplemented diabetic group, the (3-cells were less damaged compared to the EO group and had some apparently normal secretory granules, but most of rough endoplasmic reticulum and mitochondria was destroyed. The (3-cell of 2% taurine-supplemented diabetic group had swollen rough endoplasmic reticulum, round-shaped mitochondria and some apparently normal secretory granules. The β-cell of 3% taurine-supplemented diabetic group was little different from that of non-diabetic group. The pancreatic β-cell of taurine-depleted diabetic group was not destroyed but had many small secretory granules which appeared immature. This was reflected in the blood glucose concentrations of this group. Therefore, taurine may prevent insulin-dependent diabetes by protection of the pancreatic β-cell and may also preserve normal secretory granules. From these results, taurine supplementation may be recommended for prevention and treatment of diabetes.
Fig. 1 A (Upper), B (Lower). Pancreatic β-cells of rats X 10,000. A: Control group (CO), B: Diabetic group (EO).