Effect of All-Trans Retinoic Acid on the Pancreas of Streptozotocin-Induced Diabetic Rat

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Abstract:

All-trans Retinoic acid (atRA) is instructive for the development of endocrine pancreas and is an integral component of b-cell induction protocols. We showed that atRA induces glucose-responsive endocrine transdifferentiation of pleomorphic pancreatic ductal adenocarcinoma cells in vitro. This study aimed to detect the role of atRA in improving the histological changes of the pancreas in diabetic rats. Forty young male Wistar rats were used and divided into three groups. Group I: normal vehicle control (N55). Group II: streptozotocin-induced diabetic rats (N520) were followed up at 0.0, 1, 2, and 4 weeks. Group III: streptozotocin-induced diabetic rats (N515) treated with atRA (2.5 mg/kg/day), were followed up at 1, 2, and 4 weeks. Specimens from the pancreas were processed for light, electron microscopy and pancreatic insulin mRNA expression. Blood samples were assayed for the levels of glucose, insulin, and total peroxides. In the atRA-treated group, the number of the islets and the islet area significantly increased. Strong insulin-immunoreactive endocrine-like cells were observed nearby the pancreatic acini and the interlobular ducts. Interestingly, insulin-positive cells seemed to arise from pancreatic acinar and ductal epithelium. Ultrastructurally, β-cells, acinar, and ductal cells restored their normal appearance. Pancreatic insulin mRNA and blood indices were almost normalized. AtRA improved the histological changes of the pancreas and the blood indices in diabetic rats.

Keywords:

diabetic rat; retinoic acid; pancreatic β-cells regeneration

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