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Histopathological changes in the pancreas of high-fat diet fed streptozotocin induced Wistar rats

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Histopathological changes in the pancreatic tissue of diabetic animal models are important to elucidate pancreatic mechanisms of novel antidiabetic agents. This study aimed to describe histopathological changes of haematoxylin and eosin (H&E) stained sections of the pancreatic tissues of high-fat diet (HFD) fed streptozotocin (STZ) induced Wistar rats. Wistar rats fed with HFD for four weeks were injected with STZ (30, 40, and 50 mg/kg, IP). Rats with fasting serum glucose concentration >11.1 mmol/L were considered as 'diabetic' and grouped (n=10 per group) as HFD+STZ (30 mg/kg), HFD+STZ (40 mg/kg) and HFD+STZ (50 mg/kg) rats. At the end of the study, pancreatic tissues were excised and stained with H&E. The pancreatic islets of healthy rats were normal in size and spherical with well-demarcated borders. HFD feeding resulted in hyperplasia of islets and irregular borders. The density of islets was reduced by 16.7% ($p>0.05$), 36.7% ($p>0.05$), and 50.0% ($p=0.028$) upon STZ 30, 40, and 50 mg/kg injections, respectively. Hypertrophy of islet cells was noted while some islet cells showed evidence of cell death. Furthermore, marked fatty change in the exocrine pancreas was observed in STZ-induced rats. The degree of observed changes increased in a dose-dependent manner in which HFD+STZ (50 mg/kg) rats showed the most prominent reduction of pancreatic islets with prominent fatty change in the exocrine pancreas. In conclusion, STZ (30−50 mg/kg) produces partial destruction of the pancreatic islets in a dose-dependent manner in HFD-fed rats. Prominent alterations in the pancreatic tissue of the Wistar rats fed with HFD, followed by STZ (50 mg/kg) could be useful in elucidating pancreatic mechanisms of novel antidiabetic agents.

Keywords: High-fat diet, streptozotocin, diabetes mellitus, histopathology

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