Pancreatic Peptides in Young and Elderly Zucker Type 2 Diabetic Fatty Rats

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ABSTRACT

Context The global prevalence of diabetes mellitus, and in particular type 2 diabetes mellitus is increasing at an alarming rate. Risk factors for development of diabetes include obesity and advancing age. Objectives The distribution of insulin, glucagon, somatostatin and pancreatic polypeptide in the pancreatic islets has been investigated in young and elderly type 2 Zucker diabetic fatty rats (FA/FA). Methods Experiments were performed in male animals aged either 9-13 weeks or 30-34 weeks. Immunohistochemistry was used to label insulin, glucagon, somatostatin and pancreatic polypeptide in islet cells. Results The percentage of insulin-positive cells was unaltered in young but decreased in elderly Zucker diabetic fatty (35.5±2.5%) rats compared to Zucker lean (+/FA) controls (57.9±1.8%). The percentage of glucagon-positive cells was increased in young ZDF (58.7±3.4%) compared to Zucker lean controls (23.4±2.1%). However, in elderly rats the percentage of glucagon-positive cells declined in Zucker diabetic fatty rats and was no longer different from Zucker lean controls. The percentage of somatostatin-positive cells was unaltered in young and elderly Zucker diabetic fatty rats compared to Zucker lean controls. The percentage of pancreatic polypeptide-positive cells was unaltered in young but increased in elderly Zucker diabetic fatty (22.0±2.5%) rats compared to ZL controls (13.8±1.8%). Conclusions The distribution of pancreatic hormones is altered to varying extents in the Zucker diabetic fatty rat and during the normal aging process.