

Impaired pancreatic endocrine and exocrine responses in growth-retarded piglets.

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The alteration of pancreatic endocrine and exocrine secretory responses induced by secretagogues and neural input was investigated in post-weaning growth-retarded (GR) piglets. Blood and pancreatic juice were collected from these animals (6-8-weeks old). Plasma insulin and pancreatic digestive enzymes induced by nutrients, drugs and vagal stimulation were measured biochemically. The pancreas was inspected by immunohistochemical analysis. In GR piglets, the plasma glucose and insulin concentrations at the resting state were very low, and the secretory response was also markedly reduced, with maximum inhibition of 90% by glucose administration and 83% by arginine administration. The insulin secretion was not increased by 2-deoxy-D-glucose administration in GR piglets. The pancreatic juice secretions induced by vagal stimulation and secretagogues in GR piglets were not different from those induced in the control piglets. However, amylase activity in the pancreatic juice and in the pancreas was significantly decreased in GR piglets, although trypsin and chymotrypsin activities were not different. In the immunohistochemical analysis, the numbers of islets and the staining degree for insulin antibody also declined in the pancreases of GR piglets. These results indicated the reduction of insulin and amylase secretions from the pancreas in GR piglets, suggesting that a dysfunction of pancreatic endocrine and exocrine secretion during growth after weaning may be an important factor in the induction of growth retardation in piglets.