Effects of Secretin on Serum IRI, Pancreatic Exocrine Function and Pancreatic Blood Flow in Dogs

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The present study was undertaken to determine the effects of exogenous secretin on serum IRI, pancreatic exocrine function and pancreatic blood flow in the normal and 60% pancreatectomized dogs. In the latter, the study was performed three weeks after operation. Serum IRI was measured by the immunoassay method using ^{125}I insulin. Pancreatic exocrine secretion was collected continuously by the catheter inserted in the main pancreatic duct at three minutes intervals after infusion of secretin. Pancreatic blood flow was measured by ^{133}Xe clearance method. Secretin (0.5 and 3.0 units per killogram of body weight) was diluted with 10 ml of saline solution, which was infused into the femoral vein for 60 seconds.

Serum IRI levels reached a peak between 2 and 3 minutes after infusion of secretin. In control animals, insulin peak after stimulation showed more than tenfold of basal secretion, while in pancreatectomized animal only three fold. Thus, insulin response to secretin decreased three weeks after pancreatectomy. The volume of exocrine secretion per gram of the pancreatic tissue reached the maximum during 3–6 minutes after secretin stimulation. Its volume ratio of control to pancreatectomized animals was 1.6, suggestive of elevated exocrine function of the remnant pancreas after partial pancreatectomy. The pancreatic blood flow (per 100 grams tissue per minute) showed significant increase after secretin stimulation, which was more remarkable in the pancreatectomized group rather than in the control. These increased ratio in the blood flow was well according with that in the exocrine function, suggesting close correlation of the pancreatic exocrine secretion with its circulatory dynamics.

Whole Body Autoradiography of ^{125}I Labelled Gastrin in Rats

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A freezing whole body autoradiography of ^{125}I labelled gastrin in rats was studied.

Method: ^{125}I labelled synthetic human gastrin 1 (^{125}I-SHG) was prepared by the method of

Hunter & Greenwood. Its specific activity was 560 μCi/μg.

Forty-four μCi or 5 μCi of ^{125}I-SHG was administered intravenously to Wister male rats weighing 210–300 g. The rats were frozen in a mixture of dry-ice and acetone 15 minutes; 1, 3, 6, and 12 hours after the injection respectively and were applied to the preparation of the whole body sagittal section of about 40 μ thickness on a Leitz 1300 type microtome. The sections thus obtained were dried below—20°C for 5–7 days. Their autoradiograms were prepared using Sakura N-type X-ray films after 7 days exposure—44 μCi group—or 28 days exposure—5 μCi group. The films were developed with Konidol X.

Result: The dose of 44 μCi gave satisfactory autoradiograms, while the dose of 5 μCi was insufficient. In the renal cortex the highest amount of radioactivity was detected already in 15 minutes after the injection and then radioactivity decreased gradually. A considerable amount of radioactivity was also detected along the inner layer of the glandular stomach and in the stomach cavity. As time elapsed the amount of the radioactivity in the stomach increased gradually. In other organs no specific accumulation of radioactivity was observed.

Discussion: A freezing whole body autoradiography of ^{125}I-SHG in rats was studied. Gastrin was considered to have a specific affinity to the renal cortex. A considerable amount of radioactivity was observed along the inner layer of the glandular stomach and was observed to secrete into the stomach cavity, but its significance was not determined.

Radioimmunoassay of Gastrin

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We have reported some results to evaluate gastrin kit of CIS. Purity of labeled gastrin was examined by gel filtration method (Sephadex). Though its activity was low because of the lapse of time before obtaining kit, labeled gastrin appeared to be highly purified without any radioactive inorganic iodine, decomposed or denaturated hormone and other radioactive impurities, from the fact that no band other than main one could be detected. Within assay variation was 8.2±6.5%. Recovery was high at 20 pg or less and was low at 200 pg or more. In dilution tests, there seems to be some problems for multiple dilutions. The kit is quite useful, judging from the fact that the average blood gastrin concentration of 19 samples which were collected from normal males before breakfast was 105±28.7 pg/ml. Fundamental studies on incubation time, step to add animal serum and the amount of charcoal, etc. suggested that the test should be performed as described in brochure.