Concerning Possible Contractile Mechanisms in the Pancreas – Myoepithelial Cells

It is well established that myoepithelial cells are associated with the acini in many types of exocrine glands, but the literature contains no mention of them with respect to the exocrine pancreas. Recent electron microscopic studies of the cat pancreas[1,2] do not mention myoepithelial cells either positively or negatively.

Myoepithelial cell activity causes pressure changes against a head of pressure in the ducts of salivary glands[3,4]. In the present investigation a similar system has been used to ascertain whether or not such activity exists in the pancreas of the cat, and pancreatic tissue has also been studied morphologically for the presence of myoepithelial cells.

For the physiological studies 3 cats were used. After induction with ether, anaesthesia was maintained using chloralose (80 mg/kg). The abdomen was opened and the main pancreatic duct was carefully dissected and cannulated with a metal cannula of widest possible bore which was connected to a pressure transducer by polyethylene tubing. A closed pressure recording system was arranged as described previously[3]. The pressure in the duct could be set at any desired level through a connection to a pressure bottle. Pressure changes in the duct were registered on a polygraph. The system could also be opened to study secretion. In order to avoid a continuous secretion from the gland, the cats were fasted for 12 h and the pylorus was ligated.

The parasympathetic and sympathetic nerves of salivary glands have been found to contain motor fibres for the myoepithelial cells[3,4] and their effects can be imitated pharmacologically[4]. To study this on the pancreas of the cat vagal stimulation, methacholine and adrenaline were tried; secretin[5] was also used in 2 experiments. The drugs were injected i.v. through a femoral vein and vagal stimulation was achieved by stimulation of the posterior vagal trunk at the lower end of the oesophagus after intrathoracic exposure of the nerve.

Vagal stimulation caused a slow, continuous increase in pressure in the pancreatic duct, but this only became evident at a fairly high frequency of stimulation, about 10/sec, and in the open system this initiated a slow pancreatic secretion. Secretin caused a similar effect on the pressure when given in doses large enough to induce secretion; secretin in lower doses had no perceptible effect on the duct pressure. Methacholine, e.g. 1 µg/kg, was similarly found to give a pressure rise which was slow in onset but of short duration, while adrenaline in doses up to 10 µg/kg did not affect the duct pressure. In the open system, methacholine, in doses affecting the duct pressure, sometimes but not always caused a small secretory response which was not seen after adrenaline. Thus, the effect of the stimuli on the pressure in the pancreatic duct seems to be closely related to secretion.

For the morphological studies separate small pieces from the head, tail and uncinate process from 4 cats were rapidly frozen by liquid nitrogen and cryostat sections were used for studying alkaline phosphatase activity by the method of HUGON and BORGERS[6]. Adjacent pieces of tissue were fixed with a paraform-glutaraldehyde mixture, post fixed with osmium tetroxide, embedded in araldite and ultrathin sections were examined, after lead staining, by electron microscopy.

Salivary myoepithelial cells in the cat show a strong alkaline phosphatase activity[7]. In the pancreas no alkaline phosphatase was found in association with acinar structures (as shown previously by PETKOV[8], using different techniques). Furthermore no myoepithelial cells were found by electron microscopy.

In salivary glands both parasympathetic and sympathetic stimulation cause 2 types of pressure response in the ducts: one type related to myoepithelial activity and another to secretory activity[3,4]. In the pancreas of the cat, the present experiments show only one type of pressure response – that related to secretory activity – thus indicating that myoepithelial cells might not exist in the pancreas; this possibility was confirmed by electron microscopy.

The exact function of myoepithelial cells is not understood. They are found in most salivary glands but do not seem to be indispensible, for they have not been found in the parotid gland of the rat[9]. The present study shows that myoepithelial cells are also absent in the pancreas of the cat.

Zusammenfassung. Aktivität myoepithelialer Zellen in Speicheldrüsen verursacht Druckerhöhungen in den Ausführgängen der Speicheldrüsen[3]. Die Pancreasdrüse der Katze zeigt nichts dergleichen, da keine myoepitheliale Zellen vorhanden sind. Druckerhöhungen erhält man nur, wenn durch vagale Reizung oder bei Verabreichung von Methakolin und Sekretin die Sekretion angeregt wird.

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Effect of Antilymphocyte Serum on Experimental Myocardial Infarction

Arrhythmia and conduction disturbances have frequently been observed[1–3] to follow myocardial infarction. It has been shown in earlier experiments[4] that the stasis dermatitis due to temporary ischemia can be prevented by induced lymphopenia and immunosuppression (ALS, Imuran treatment).

In the present work, the effect of antilymphocyte serum (ALS) on the frequency of arrhythmia and con-