showed that the calf's pancreas during the trough of the PPS cycle did not secrete the same pattern of proteins as during the peak of the PPS cycle or during feeding. The present results clearly show that the overall composition of pancreatic juice proteins is not uniform under physiological conditions during the so-called 'basal' secretion.

Communication no. 2

The effect of the raw and extruded soybean products on the pancreatic digestive enzyme activities in young calves. M. Kapica, J.L. Valverde Piedra, T. Studzinski (Department of Animal Physiology, Veterinary Faculty, Agricultural University, Akademicka 12, 20-033 Lublin, Poland)

The aim of this study was to determine the influence of raw and extruded soybean meal on the enzyme activities of pancreatic juice in pre-ruminant calves. Twelve calves were fitted 3 weeks after birth with a catheter and a cannula in the pancreatic duct and duodenum, respectively. Experiments lasted for 3 weeks.

Calves were divided into one control group and two experimental groups. All animals were fed a milk diet. Calves from the control group additionally received wheat chaff. Calves from the experimental groups also additionally received, in their liquid fodder, 51.0 % barley, 30.0 % soybean meal and 14.0 % wheat chaff. Animals from the second group received raw soybean meal and animals from the third group received extruded soybean meal. All of the animals were fed liquid food only.

The pancreatic juice outflow increased during the first 15 min from the beginning of feeding and then decreased between 15 and 45 min of post-feeding time, remained low for 1 h and increased thereafter until the pre-feeding level which was reached about 3 h after the meal. Total protein content before feeding showed the lowest value 16.08 ± 3.02 $mg \cdot mL^{-1}$ in the control group, was higher (18.7 ± 1.8 $mg \cdot mL^{-1}$) in the third group and was the highest (26.3 ± 2.06 $mg \cdot mL^{-1}$) in calves of the second experimental group. Both of the experimental diets increased proteolytic activity of pancreatic juice to 38.83 $U \cdot mg^{-1}$ of protein and 36.8 $U \cdot mg^{-1}$ of protein in comparison with the control value in the pre-feeding time (22.46 ± 1.04 $U \cdot mg^{-1}$ of protein). The trypsin activity was significantly higher in experimental groups and amounted to 2.97 ± 0.28 $U \cdot mg^{-1}$ of protein for calves of the third group and 3.95 ± 1.86 $U \cdot mg^{-1}$ of protein for the second group in comparison to the control group (1.84 ± 0.23 $U \cdot mg^{-1}$ of protein).

These results demonstrated that the diet containing soybean meal modified the exocrine function of the pancreas mainly by increasing the enzymatic activity of the pancreatic juice.

Communication no. 3

Influence of histamine administration on pancreatic exocrine secretion in pre-ruminant calves. J.L. Valverde Piedra, M. Kapica, T. Studzinski (Department of Animal Physiology, Faculty of Veterinary Medicine, 20-033 Lublin Agricultural University)

The objective of the present study was to investigate the influence of histamine on pancreatic exocrine secretion in pre-ruminant calves. Experiments were carried out on six calves aged from 6 to 30 days old. The pancreatic juice was continuously collected over 15 min periods. Once the volume of pancreatic juice was measured, a sample was taken for further analyses. The remaining amount was reintroduced into the duodenum using a peristaltic pump. Observations lasted for 3 h after drug administration. Four different types of experiments were carried out. In the first trial 4 mL of saline were injected, while in the second trial 36.36 $\mu g \cdot kg^{-1}$ b.w. of histamine were injected, in the third trial 36.36 $\mu g \cdot kg^{-1}$ b.w. of histamine

+ 3.64 $\mu g \cdot kg^{-1}$ b.w. of cimetidine were injected and in the fourth trial 36.36 $\mu g \cdot kg^{-1}$ b.w. of histamine + 0.90 $mg \cdot kg^{-1}$ b.w. of Diphergan (promethazinum hydrochloricum) were injected. All injections were administrated intramuscularly. Pancreatic juice was analysed for protein content according to the method of Bradford (Bradford, Anal. Biochem. 72 (1976) 248–254). Proteolytic activity was determined spectrophotometrically using casein as a substrate. The trypsin activity was measured using a micromodification of the original method of Erlanger et al. (Erlanger et al., Arch. Biochem. Biophys. 95 (1961) 271–278). Histamine administration evoked a significant increase in pancreatic juice volume from 17.45 ± 1.94 mL/15 min to 20.54 ± 3.31 mL/15 min, $P < 0.01$. Protein content decreased slightly from the initial value 4.84 ± 1.15 $mg \cdot kg^{-1}$ to 3.84 ± 1.19 $mg \cdot kg^{-1}$ 180 min after histamine administration. Proteolytic activity increased significantly from the basal values 58.48 ± 5.78 $U \cdot mg^{-1}$ of protein to 76.17 ± 8.43 ($P < 0.05$) $U \cdot mg^{-1}$ of protein after 90 min of histamine administration and remained at higher levels over the course of 1.5 h (70.88 ± 6.61; $P < 0.05$). Basal trypsin activity amounted to 5.25 ± 0.98 $U \cdot mg^{-1}$ of protein and slightly increased showing the highest value 6.68 ± 0.63 $U \cdot mg^{-1}$ of protein ($P < 0.05$) 180 min after histamine injection. These results indicate that histamine can modify the release of pancreatic enzymes in pre-ruminant calves.

Communication no. 4

Regulation of chymotrypsin and amylase expression by gastrin and its pancreatic CCKB/gastrin receptor type.

C. Desbois[a], I. Le Huërou-Luron[a], A. Estival[b], M. Dufresne[b], P. Clerc[b], V. Romé[a], F. Clemente[b], P. Guilloteau[a], D. Fourmy[a] ([a] Laboratoire du Jeune Ruminant, Inra, 65, rue de Saint-Brieuc, 35042 Rennes; [b] Institut Louis Bugnard, Inserm U 151, CHU de Rangueil, 31054 Tolouse, France)

The predominance of CCK_B/gastrin receptors in the pancreas of high mammals (human, calf, pig) is now accepted, but their physiological function has not yet been well characterized. Indeed, most studies regarding the biological function of the pancreas have been performed in mice and rats, both exclusively expressing CCK_A receptors. We recently demonstrated, in vivo, the involvement of CCK_B/gastrin receptors in exogenous CCK- and gastrin-stimulated exocrine pancreatic response in the calf (Le Dréan (1997) Ph.D. thesis, Université de Rennes-I, 193 pp.). In order to elucidate the role of CCK_B/gastrin receptors in the normal pancreas, we carried out in vitro studies on pancreatic acini from mice expressing transgenic CCK_B/gastrin receptors in the exocrine pancreas. Using this new tool, we investigated whether gastrin, via CCK_B/gastrin receptors, could regulate the secretion, transcription and synthesis of pancreatic enzymes in normal pancreatic cells.

All experiments were performed in isolated acini prepared by collagenase digestion with increasing doses of gastrin (sulphated [Nle^{11}]gastrin 13) in the presence of SR27897 (1.8 μM), a specific antagonist of CCK_A receptors. After 30 min of incubation with gastrin, secretion of chymotrypsin from pancreatic acini showed a typical dose–response curve and maximal secretion was obtained with 1 nM of gastrin. Analysis by northern-blotting, using ^{32}P-labelled probes of rat pancreatic chymotrypsin and amylase, revealed an increase in mRNAs after 3 and 20 h of incubation with 300 and 10 nM of gastrin, respectively. Gastrin-stimulated protein synthesis in isolated acini was evaluated by 20 min ^{35}S-methionine incorporation into total TCA-precipitable pancreatic protein. After 1 h of incubation with gastrin, total protein synthesis was increased to a maximum with 30 pM of gastrin and inhibited with higher doses (≥ 1 nM). The dose–response curves for gastrin-stimulated protein synthesis and enzyme secretion from transgenic mouse acini were similar to those obtained with