such flow-sensitive receptors. The present work aims to demonstrate a vagal control of pyloric resistance which could be considered as the corresponding efferent pathway.

Experiments were performed on 17 Large White female pigs (36.5 ± 3.2 kg). Gastropyloroduodenal motility (miniature strain gauges, sleeve manometry, and electronically regulated pneumatic barostat) and transpyloric flow (endoluminal flow probe) were simultaneously recorded under continuous saline gastric loading. The vagus nerves were cut at the cervical level and bipolar stimulatory electrodes were placed on the distal stumps of the cervical vagus and on the dorsal and ventral vagus distal to the cardiac branches.

Bilateral cervical truncular vagotomy did not significantly modify the pyloric resistance (15.1 ± 0.83 *vs* 11.6 ± 1.25 ml•s^{-1}•mmHg, $p > 0.05$), and the characteristics (stroke volume, peak flow and duration) of the flow pulses. Electrical stimulation (frequency range 0.62–10 Hz) of the cervical or thoracic (similar effects) vagus nerves significantly decreased the pyloric resistance by about 67% (7.5 ± 1.57 ml•s^{-1}•mmHg) and triggered flow pulses of large stroke volume (4.5 ± 0.78 ml *vs* 0.3 ± 0.01 ml). The larger flow rate was associated with increased fundic tone and pressurisation of the antrum (fig 1). Endovenous phentolamine (α-adrenergic antagonist, 1.5 mg•kg^{-1}) but not propranolol (β-adrenergic antagonist, 1 mg•kg^{-1}) reduced the transpyloric flow and pyloric resistance responses to vagal stimulation.

To assess the relative importance of the fundic tone *versus* pyloric resistance on the vagally induced increase of flow, fundic distension and fundic exclusion manœuvres were performed. Distension of the fundus was performed using a pneumatic barostat and exclusion of the fundus was achieved according to the method of Lind *et al* [(1961) *Am J Physiol* 201, G197-G202]. Pressurisation of the antro-pyloric area and flow pulses of large stroke volume were recorded during fundic distension, but pyloric resistance was unchanged. After surgical exclusion of the fundus, the basal pyloric resistance was significantly lower (5.3 ± 0.33 ml•s^{-1}•mmHg, $p < 0.01$) than in intact pigs (11.6 ± 1.25 ml•s^{-1}•mmHg). Under surgical exclusion of the fundus, the vagal stimulation resulted in a reduced pyloric resistance (2.5 ± 0.37 ml•s^{-1}•mmHg *vs* 9.6 ± 0.43 ml•s^{-1}•mmHg) and a 3-fold increase in stroke volume of flow pulses.

In conclusion, we were unable to demonstrate a tonic vagal influence on the pyloric resistance in the pig. But the activation of an efferent vagal pathway, involving α-adrenergic receptors, stimulates transpyloric flow as a primary consequence of reduced pyloric resistance.

Control of the rate of passage in the rabbit in response to the dietary fibre level.

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Incorporation of fibre into rabbit feed reduces the mean retention time (MRT) of the diet in the whole digestive tract, but we do not know how fibre acts in the different parts of the tract.

Table I. Mean retention time (MRT) in the rabbit digestive tract according to the fibre (NDF) level (T Gidenne).

Dietary NDF (%DM)	*MRT*				
	Whole tract		*Ileo-rectal*	*Stomach*	*Caecum-colon*
	Reference	*Model*	*Reference*	*Model*	*Model*
21.7	28.6^{a}	28.1^{a}	23.8^{a}	1.1^{a}	21.5^{a}
30.4	21.7^{ab}	20.9^{ab}	16.6^{b}	1.6^{ab}	14.1^{ab}
39.6	16.6^{b}	16.3^{b}	12.8^{b}	2.8^{b}	9.7^{b}
Pooled SEM	1.8	1.9	1.6	0.3	1.9
P level <	0.010	0.011	0.007	0.03	0.012

^{a,b} Means with a common superscript are not different at the level $P < 0.05$.

The MRT in several digestive compartments of the rabbit was studied in 4 adult female cannulated at the ileum, receiving *ad libitum* 3 diets, differing mainly in the fibre level (22–40% NDF). Whole tract and ileo-rectal MRT were simultaneously measured by following the fecal kinetics of ^{169}ytterbium and ^{141}cerium adsorbed onto fibre particles and given orally (Yb) or through the ileal cannula (Ce). The results are shown in table I.

Whatever the diet, the whole tract MRT provided by modelling [Grovum and Williams (1973) *Br J Nutr* 30, 313-329] was similar to that obtained algebraically (reference method [Faichney (1975) *In: Digestion and metabolism in the ruminant.* 227-241]). The increase in the dietary fibre level slightly affected the feed intake (112 to 119 g/d). On the other hand, the 40% increase in fibre intake (26–44 g NDF/d) led to a 40% decrease in the whole-tract MRT (–12 h), originating mainly from a 2-fold reduction of the ileo-rectal MRT. Oro-ileal MRT (mean 5 h) was not affected by the dietary fibre incorporation, but MRT in the stomach was significantly longer, therefore involving a shorter MRT in the small intestine.

Thus, dietary fibre mainly affected the rate of passage through the posterior part of the rabbit tract, whereas it remained steady in the anterior part due to a compensation between stomach and small intestine.

Effect of caseinomacropeptide (CMP) on gastric secretion and plasma gut regulatory peptides in preruminant calves.

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Caseinomacropeptide (CMP) is a 64-amino-acid peptide secreted in the stomach as a result of proteolytic enzyme activity on κ casein. It is found in 8 or 9 different forms which differ according to their glycosylation at 5 potential sites. When injected by parenteral infusion, it reduces gastric secretion in dogs [Vasilevskaya *et al* (1977) *Vopr Pitan* 4, 21-24], and gastrin levels in rats [Aleinik *et al* (1984) *Vopr Pitan* 2, 47-50], but causes no such reduction in calves [Guilloteau *et al* (1987) *Reprod Nutr Dev* 27, 287-288]. Following milk ingestion in calves, CMP enters the duodenum intact, especially during the first postprandial 30 min [Yvon *et al* (1986) *Reprod Nutr Dev* 26, 705-715]. The purpose of the present study was to check whether the effects of infusion, which had been observed in several species, were similar after ingestion of CMP.

All animals received a milk substitute (T), in which the proteins (25% of dry matter) were exclusively provided by a CMP-free 'whey protein concentrate from hydrochloric acid casein preparation'. The CMP (a preparation containing a mixture of glycosylated and non-glycosylated CMP, slightly contaminated by the 1–23 fragment of α1 casein) was introduced into the T diet as a partial lactose substitute, at 2 different concentrations, *ie* equal to and 5 times higher than cows' milk CMP (diets CMP 1 and CMP 5). The calves were fed 2 meals per day at 7-h intervals, on the basis of 45–55 g DM/kg $LW^{0.75}$.

Total quantities of gastric juices secreted in 24 h and measured in 10 calves did not vary in the presence of CMP (491–525 g per day per 100 kg LW); pepsine quantities seemed lower with diets CMP 1 and CMP 5 than with diet T; and chymosine quantities seemed lower with diet CMP 1 (NS). During the first and/or the second postprandial hour, the quantities of gastric juice, enzymes and H^+ secreted were higher with diet T. No such increase occurred during the first 2 h in the case of diet CMP 1, but only during the first hour in the case of diet CMP 5 (fig 1). At the same time, in the case of diet T, meal ingestion induced an increase in plasma levels of digestive regulatory peptides, which were measured in 26 calves by radioimmunoassay using the double antibody technique [Guilloteau *et al* (1992) *In: Nutrition-related endocrine changes in cattle* (M Stangassinger, JW Blum, eds), University of Berne, 44-53]. The CCK increase was partially inhibited in the case of diet CMP 1. On the other hand, the somatostatin increase was more pronounced (fig 1). In the case of diet CMP5, these differences were reduced to a large extent, or were non-existent.

In conclusion, when CMP is ingested at a similar rate to that contained in cows' milk, it seems to induce transient postprandial inhibition of gastric secretion, whereas it seems to have little or no effect when ingested at a rate 5 times higher. Digestive regulatory peptides appear to be involved in the regulatory processes.