Electrical stimulation. Vagal stimulation caused relatively reproducible responses in gastric secretion in both animals (Figure 2 and Table). In chicken, a transient but precipitous pH fall, which returned to baseline 6 to 12 min after stimulation, was observed. In rat the stimulation produced a loose pH fall which returned to baseline 40 to 60 min after the stimulation.

Electrical stimulation and PM administration. The gastric secretory response to vagal stimulation was inhibited more than 80% by the 5 min premedication with PM 250 mg/kg in rat. In chicken, however, the pH fall was not inhibited by the premedication of PM 50 mg/kg at all (Figure 2 and Table).

Discussion. There is a negative view about the existence of gastrin in chicken[1]. BLAIR et al.[6], however, extracted gastrin from the chicken upper intestine, and tested it by bioassay in cat. Using radioimmunoassay, KETTERER et al.[7] investigated the distribution of gastrin and found it in the duodenum alone. POLAK et al.[8] demonstrated gastrin in chicken and quail in the gizzard, duodenum and intestine by means of immunohistochemical and ultrastructural technics.

In mammals, vagal stimulation has been used for many years to release gastrin from the mucosa of the pyloric gland area of stomach. According to the concept presented by UVNAS[9], the hormone release into the circulation is neurally mediated and controlled by the vagus nerves. Further supporting evidence for vagal control of gastrin was presented by FYRO[10]. He demonstrated a depletion in gastrin stores after prolonged electrical vagal stimulation. Further, LANCIAULT et al.[11] determined the electrical vagal stimulation elevated portal serum gastrin in dog.

In the present study, the enhancement of the gastric secretion caused by vagal stimulation was inhibited in more than 80% by PM 250 mg/kg which also inhibited the effect of TG 1.0 μg/kg completely. On the other hand, in chicken the gastric secretory enhancement caused by the vagal stimulation was never inhibited by PM 50 mg/kg, although the effect of TG 0.5 μg/kg in chickens was inhibited by this dose. It must be admitted that PM, known as an antiulcerous drug, has an inhibitory effect on the stimulated gastric secretion in dog and rat by the several stimulants, especially TG[3,4,12,13].

Results obtained from the present experiments indicate that the enhancement of chicken gastric secretion resulting from electrical stimulation of the vagi is not due to the endogenous release of gastrin.

Zusammenfassung. Nachweis, dass i.v. Tetragastrin (TG) und elektrische Vagusreizung eine stark erhöhte Magensekretion bei narkotisierten Hühnern und Ratten verursachte. Proglumid, ein Antigastrinikum, unterdrückte die Wirkung von TG bei beiden Tierarten, während die vermehrte Sekretion durch Vagusreizung nur bei Ratten, nicht aber bei Hühnern, von Proglumid unterdrückt wurde.

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Sex and Calcium Transport Through the Duodenal Wall of Rats

It has long been observed[1] and repeatedly confirmed[2–5] for animals of both sexes that calcium absorption from the intestinal tract diminishes with age. The same effect of age was found for calcium transport through the duodenal wall[6]. WALLING and ROTHMAN[7] have also pointed to the pronounced age-sensitivity of the active calcium transport.

The purpose of our experiment was to find out to what extent calcium transport through the wall of the duodenum in rats of different age is influenced by sex.

Material and method. Calcium transport was determined on a duodenal segment from male and female 4-week- to 16-month-old rats, by the in vitro method of the 'everted intestinal sac'[8]. There were altogether 150 animals (71 males and 79 females) in groups of 8 to 20 rats. Until the day before the experiment, the animals were on a standard diet with 1.2% calcium and 0.8% phosphorus. The experimental procedure was identical to that described before[9], except that the intestinal segments were incubated in 2.5 ml instead of 15 ml of modified Krebs-Ringer solution. The composition of the medium/l was as follows: 135 m*M* NaCl, 11 m*M* KCl, 0.05 m*M* $CaCl_2$ and 10 m*M* sodium phosphate buffer pH 7.4.

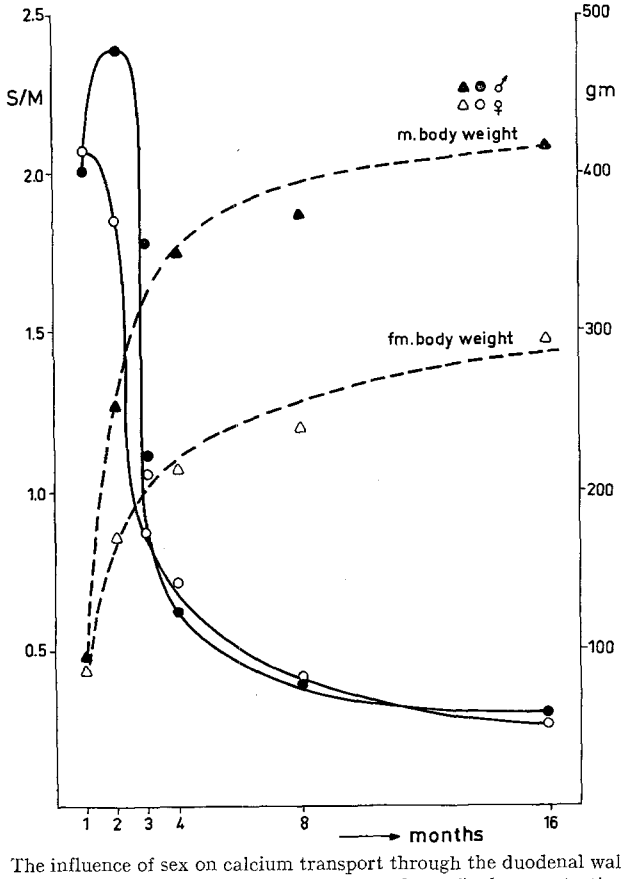
Calcium-45 (Radiochemical Centre, Amersham, England) was added to the mucosal solution in the form of chloride and the activity of the solution was about 10 μCi in 100 ml. After a 45-min incubation of the samples, the solution activity was measured on the serosal (S) and

Table I. The number of animals and the mean ratio of ^{45}Ca in the serosal (S) to that in the mucosal fluid (M) with the standard error of each mean

Age (months)	^{45}Ca (S/M ± SE)			
	No of rats			
	♀	♂	♀	♂
1	18	20	2.07 ± 0.14	2.02 ± 0.14
2	18	20	1.85 ± 0.16	2.39 ± 0.18
3	9	10	0.87 ± 0.13	1.11 ± 0.18
4	8	10	0.71 ± 0.09	0.61 ± 0.03
8	10	10	0.41 ± 0.07	0.39 ± 0.03
16	8	9	0.26 ± 0.03	0.30 ± 0.03

Table II. Mean body weight (± SE) of male and female rats of different age

Age (months)	♀	♂
1	86.00 ± 0.67	93.00 ± 1.33
2	170.50 ± 1.90	226.00 ± 1.94
3	210.00 ± 2.89	356.50 ± 4.22
4	214.00 ± 2.48	348.25 ± 3.56
8	239.25 ± 1.79	374.75 ± 4.78
16	295.75 ± 6.46	418.50 ± 8.15



The influence of sex on calcium transport through the duodenal wal of rats in relation to age. Data are expressed as a final concentration ratio of tracer inside the sac (serosal medium) over that outside the sac (mucosal medium), S/M. Values represent mean standard error. —, S/M ratios; ---, body weight (g).

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the mucosal (M) side of the intestinal segment with a scintillation counter (spectrometer model 3375, Packard Instrument).

Result and discussion. The results (the mean ratio of the serosal to the mucosal content of ^{45}Ca) are presented graphically in the Figure. In the 4-week-old males and females, calcium transport does not differ, but already after 8 weeks of age it is significantly ($p < 0.02$) more intense in the males. The differences in the transport of calcium between the two sexes after the 3rd month are not significant ($p > 0.05$).

The above difference between the 2 curves for S/M ratio vs. age presented in the Figure is believed to be real for the following reasons. Although the S/M data for 4-week- and 2-month-old males are not significantly different, the similarity between the male and female data for the 4-week experiment is corroborated by the body weight which is the same for both sexes at 4 weeks, too (see Figure). While the S/M data for animals older than 3 months do not differ significantly between the sexes, those obtained in the experiments with 2-month-old animals differ quite substantially for the two sexes.

Several causes of this difference between the S/M ratios for the two sexes could be envisaged. There may be some hormonal action upon the wall membrane, or a sex-dependent aging of the intestinum. However, the elucidation of the relative importance of these findings would require additional experiments.

It seems well established that a very efficient age-sensitive control of calcium transport is correlated with the rapid initial growth-phase (see the body-weight curves in the Figure), with a remarkable difference between the sexes. The latter effect seems to be timed very sharply within the life-period from 8 to 10 weeks.

From the practical point of view, regarding the methodology in experiments involving calcium transport in animals 8- to 10-week-old, it seems to be of prime importance 1. to separate the animals by sex and 2. to have the age under strict control.

Zusammenfassung. Nachweis, dass bei umgestülpten Duodenalabschnitten junger Ratten (1–16 Monate) nur bei den ca. 8wöchigen männlichen Tieren der ^{45}Ca-Transport wesentlich gesteigert war; die übrigen Altersgruppen zeigten keinen Geschlechtsdimorphismus.

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The Effect of Sulfhydryl Reagents on Cation Binding by Membrane Fragments

The concept that sulfhydryl (-SH) reactive agents may affect membrane permeability by displacement of bound divalent cations suggests an important role for membrane -SH groups in cation binding and transport. This possible role is supported by the results of Tolberg et al.[1,2] who reported a close correlation between displacement of tightly bound erythrocyte membrane calcium by the -SH reagent, *p*-chloromercuribenzoate (pCMB), and the resultant increased loss of cellular potassium. Forstner and Manery[3], however, suggested that the observed loss of calcium is explainable in terms of the solubilization of membrane protein by pCMB.

Sulfhydryl reagents have also been reported to affect cation binding by mitochondria[4] and sacroplasmic