

Serum Gastrin Levels in Pigs

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SUMMARY

Serum gastrin levels were measured in 11 young pigs during starvation and one and two hours after feeding. The mean basal value was 57 ± 16 pg/ml and was not affected by anaesthesia. Gastrin levels at one and two hours after feeding were significantly higher than the basal levels. However, the rise was much less than that noted in humans, suggesting a species difference.

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The pig has played a major role in the discovery and isolation of gastrin since Edkins¹ first described the existence of the hormone in 1906. Gregory and Tracey² isolated the hormone from pig gastric antral mucosa and the pig remains the major source of the natural hormone. Despite this, a review of the literature does not reveal any report of studies of the circulating levels of the hormone in this animal. Accordingly, we report here on basal serum gastrin and the gastrin response to feeding in pigs.

MATERIALS AND METHODS

Eleven young Landrace/Large White hybrid pigs of both sexes were used in the study. The animals weighed between 16 and 24 kg.

Under a brief general anaesthetic (pentothal/halothane), a catheter was inserted into the external jugular vein. Thereafter basal and postprandial venous samples were obtained daily for 3 consecutive days, as follows: blood samples were obtained from starved non-anaesthetised pigs under basal conditions and one and two hours after the ingestion of pig creep meal (a mixture of corn meal, bran, pollard, fish meal and ground nuts: 3 060 cal/kg; 18% protein). Samples were also obtained from anaesthetised animals 10 minutes after induction to study the effect of anaesthesia.

Blood samples were placed in heparinised plastic tubes, centrifuged within 2 hours, and the serum stored in plastic vials at -20°C until the assay was performed.

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Serum gastrin was measured by the radio-immunoassay previously described³ using synthetic human gastrin I as tracer and standards. Porcine plasma in serial dilutions gave a curve of displacement identical with the human gastrin I. All samples were assayed simultaneously.

Values are given as the mean and standard deviation, and significance of difference was determined by Student's unpaired *t*-test. Using two-tailed tables, probability (*P*) values of $<0,05$ were accepted as being statistically significant.

RESULTS AND DISCUSSION

Basal serum gastrin levels ranged from 31 pg/ml to 118 pg/ml with a mean of 57 ± 16 pg/ml. This is similar to the level of 48 pg/ml found in normal human subjects.³ Mean serum gastrin levels in anaesthetised and conscious animals were almost identical, the values being 56 ± 22 pg/ml, and 57 ± 16 pg/ml, respectively.

Postprandial serum gastrin was measured in 8 of the 11 animals at half-hourly intervals after ingestion of pig creep meal. Under the experimental conditions, it was not possible to determine exactly how much food had

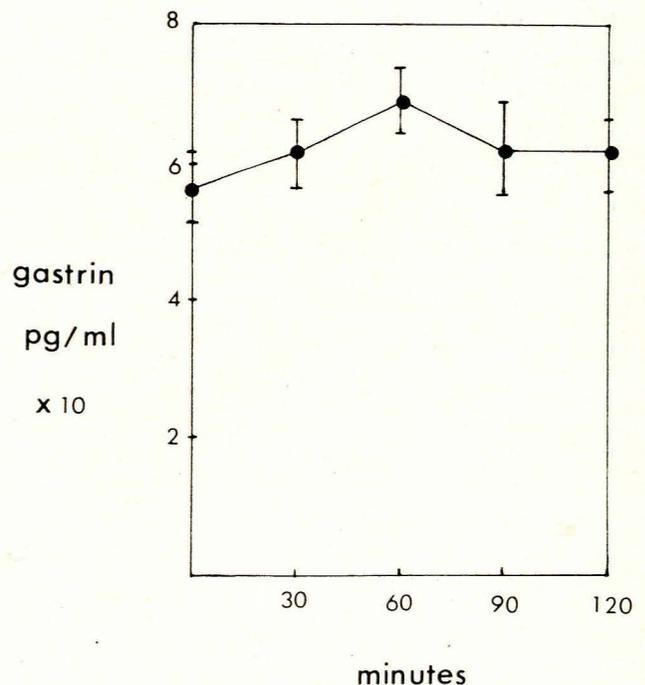


Fig. 1. Serum gastrin in pigs in response to eating creep meal.

been eaten, since the animals were in the same pen and were eating and drinking during the feeding period.

Serum gastrin increased from a basal level of 57 ± 13 pg/ml to 65 ± 18 pg/ml at 30 minutes, 72 ± 22 pg/ml at 60 minutes and thereafter remained constant. The 30-minute value did not differ significantly from the basal level, but the 60-minute and subsequent values were significantly increased ($P < 0,05$) (Fig. 1).

It appears, therefore, that the basal serum gastrin values are similar in pigs and humans, and that the anaesthetised pig is a useful model for the study of the regulation of gastrin secretion under basal conditions.

However, the relatively small rise in postprandial serum gastrin levels in pigs compared with humans⁴ does suggest a species difference.

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