Is Secretin Enterogastrone?

JOHNSON and GROSSMAN[1] have maintained that the inhibition of gastric acid secretion from Heidenhain pouches by an acid duodenum can be explained entirely by the resulting liberation of secretin from the duodenum. We have maintained[2] that secretin alone is an insufficient explanation since an acid duodenum augments cholinergically stimulated pouch secretion. Currently available pancreozymin preparations (CCK-PZ) from Jorpes and Mutt also augment cholinergically stimulated pouch gastric acid secretion[3]. Secretin by contrasts antagonizes secretion per 10 min fell slightly and the pepsin rose. From pH 3 to pH 1 both acid and pepsin fell precipitously. It is concluded that as the pH falls from 7 to 3 the pattern of acid inhibition and pepsin augmentation is consistent with the action of secretin liberated from the duodenum by virtue of the falling pH. The pattern below pH 3 is not consistent with the action of secretin since pepsin and acid both fall. We suggest that some other inhibitory hormone, perhaps CCK/PZ, is responsible for the acid and pepsin inhibition at duodenal pH values below 3.

Effect of duodenal pouch pH on gastrin pentapeptide stimulated acid and pepsin secretion from a Heidenhain pouch

pH	7	5	3	1
Acid m-equiv/10 m	0.566 ± 0.013	0.508 ± 0.015	0.505 ± 0.016	0.380 ± 0.013
Pepsin/mg tyrosine liberated from Hb/10 min	26.0 ± 4.0	37.5 ± 7.5	43.0 ± 8.0	22.0 ± 2.5

it. We have recently gathered additional evidence which supports our previous contention.

Intravenous secretin stimulates pepsin production independently of gastric acid[4]. Therefore, if secretin is the enterogastrone liberated by low duodenal pH as the gastric acid falls, pepsin should rise.

Four dogs were prepared with pouches of the first part of the duodenum and Heidenhain pouches. The duodenal pouches extended to the opening of the main pancreatic duct. The common bile duct was tied and cut and a cholecystenterostomy performed. Continuity was established by way of a gastroenterostomy 10–15 cm distal to the ligament of Treitz.

Gastric secretion was stimulated throughout using 2 µg/min of gastrin pentapeptide i.v. To change the pH within the duodenal pouch it was bathed at the rate of 115 ml/h with isotonic citrate buffer. The pH used were 7, 5, 3 and 1 in random order. The duodenal pouches were exposed to a given pH for at least 50 min. Changes in pH during infusion were compensated for. Heidenhain pouch collections were taken at 10 min intervals. 25 ml of isotonic saline was introduced into the pouch, removed after 10 min and then amalgamated for titration with a further 25 ml saline rinse. Samples were titrated to pH 7 and pepsin was estimated using NORTHRUP's method[5,6]. As the pH in the duodenal pouch fell from 7 to 3 the acid

Résumé. On a prétendu que la sécrétine est l'«entérogastrone» libérée quand le pH du duodénum est 3 ou moins. Nous croyons que ce n'est pas possible parce que la sécrétine fait augmenter la pepsine tandis que si le pH d'une poche de duodénum est plus bas que 3, la sécrétion de l'acide et de la pepsine gastriques diminuent.

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The Part Played by Temperature in the Rhythm of Formation of Markings on the Shell of Cuttlefish (*Sepia officinalis* L.) (Cephalopoda, Mollusca)

The rings on the shells of Mollusca are considered by many authors[1] as biological indications of growth and of age. As far as cephalopods are concerned, CHOE[2] recently summarized previous research in this field, particularly drawing attention to the important part played by external factors on the stripe pattern of *Sepia esculenta* Hoyle, *Sepia subaculeata* Sasaki and *Sepiella maindroni* de Rochebrune, reared in tanks[3]. One of these external factors was modified independently of others[4–6], while rearing *Sepia officinalis* L. in the aquarium, and a study of the effects of temperature has been carried out.

The shells used came from cuttlefish kept from the moment of hatching in thermostatically controlled rearing conditions: the first batch at 25 °C, the second at 20 °C, the third at 15 °C and the fourth at 13 °C. For the cuttlefish of these different batches (Figure and Table) the relationship between the number of stripes and the age, allowing for the temperature of experimental rearing has been established.

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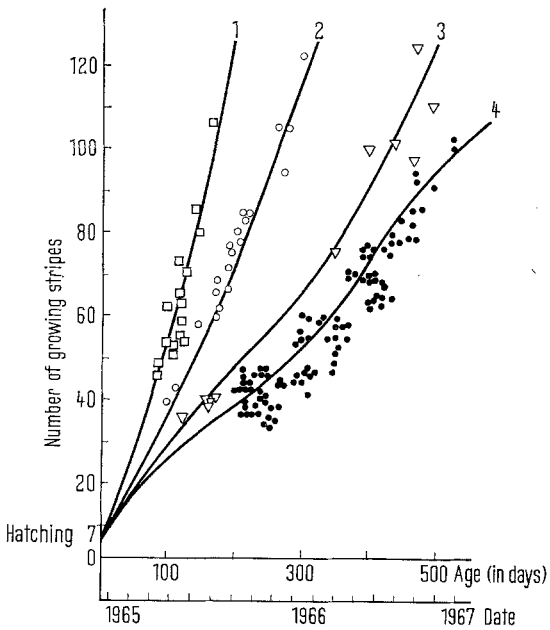
The graph lines corresponding to batches 1 and 2 are regular whereas those which stand for batches 3 and 4 reveal a variation in the rhythm of formation of shell stripe pattern which reflects the summer rise of temperature in the waters of the English Channel. The thermostatic system used was without cooling and the minimum experimental temperatures could not be maintained during the summer.

These observations may be further pursued if one estimates the rhythm of daily age markings. Allowing for thermic variations undergone by the cuttlefishes of batches 3 and 4, the true rhythm for these 15 and 13 °C temperatures has been worked out by measuring the curve on the graph for the winter period, when the thermostatic controls are effective (Table).

Influence of temperature on the rhythm of appearance of striped markings

Experimental batch	1	2	3	4	Estimate	
Temperature (°C) (minimum control)	25	20	15	13		
Temperature in fact (achieved)	25	20	varies between 19.5–15	varies between 19.5–13	15	13
Rhythm of appearance of striped markings (No. of days necessary for formation of each single stripe)	*1.6*	*2.6*	4.3	5.4	*6*	*8*



Variation in the number of striped line according to the temperature in which the cuttlefish were reared. (1) Batch of cuttlefish reared at a temperature of 25 °C; (2) 20 °C temperature; (3) 15 °C temperature; (4) 13 °C temperature (this being the minimum control temperature).

As a result, recordings obtained by these different experimental rearings allow us to state that the rhythm of stripe formation depends on temperature; the number of markings on a shell are merely an approximate indication of age, scarcely more reliable than the length of the shell itself. The biological comparisons which one might be tempted to draw between living cephalopods of different oceans can only be true during those periods in which thermal conditions are similar.

By extrapolation of results it can, however, be estimated that the daily age markings observed by CHOE[2] would indeed be attained by *Sepia officinalis* L. in water the temperature of which was maintained at 30 °C, this being the maximum rearing temperature in Japan.

It may thus be supposed that the mineral metabolism, a function of the siphuncular epithelium responsible for age markings, is governed by a biological rhythm occasioned by external factors in the case of the different cuttlefish species.

Résumé. Le rythme de formation des stries d'accroissement de la coquille de seiche est fonction de la température. Il semble donc nécessaire d'en tenir compte avant de comparer divers Sepiidés (Age, Sous-espèces, etc.).

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Proteinuria in the Rat: A Comparison of Tissue Components in the Voided and Renal Pelvic Urine

It is generally accepted that the proteinuria in the rat is the result of a discrepancy between glomerular filtration of blood serum proteins and tubular reabsorptive capacity[1]. BELL'S[2] assumption that the protein in the urine partly originates from the accessory genital glands has been recently reconsidered by PERRY[3] and ROSENMANN et al.[4] in the male rat and by BARNES et al.[5] in the human. The purpose of this communication is to present evidence that the urine of the male rat does contain tissue components derived solely from the accessory genital glands.

Antisera to organ-specific antigens of the accessory genital glands of the male rat were prepared in rabbits by an immunization schedule employing Freund's complete adjuvant as described previously[4]. 4 organ-specific antigens were detected by the double diffusion technique in agar gel using antisera directed against the sediment, soluble and lipid fractions of the glands. None of these antigens were found in the urine of female rats, whereas 1 or 2 antigens were demonstrated in the urine of male animals when reacted with anti-sediment and anti-lipid fraction sera; no precipitation bands developed with the anti-soluble fraction serum.

In order to prove that the antigens demonstrable in the urine of the male rat are not excreted or secreted by the kidneys, spontaneously voided and renal pelvic urine samples were compared. The left ureter of 8 adult male rats was exposed during laparotomy and ligated approximately 1 cm from the uretero-pelvic junction. 10–12 days after the operation, the animals were placed in individual metabolism cages over urine-faeces separators and urine was collected under a layer of liquid paraffin. The rats were killed 1 day later and the urine was aspirated from the hydronephrotic sac. The spontaneously