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Vitamin B Complex and Gastric Secretion.

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Webster and Armour¹ reported that artificially fed dogs with oesophagotomy, gastric fistula, obstructed pylorus and duodenal fistula, in which a condition of practically total avitaminosis had been induced, developed a complete achlorhydria without anorexia and inanition. Administration of powdered brewer's yeast restored the normal secretory activity of the stomach in 3 days. This indicated that for the normal activity of the gastric glands it is necessary that the vitamins contained in yeast, presumably vitamin B complex, be present in the body.

Two experiments on a similarly operated animal are here reported. The aim was to exclude as causative of achlorhydria other vitamins than vitamins B, and to determine if possible which of the latter is essential for the normal functioning of the gastric mucosa.

First Experiment. The dog, kept on Scott and Ivy's² food mixture, was in excellent condition 40 days after the pylorus had been obstructed. This diet was replaced by a diet of glucose, casein, sodium chloride and olive oil. As in the previous experiments the secretion of gastric juice in response to food introduced into the duodenum, subcutaneous administration of 1 mg. histamine and sham feeding gradually diminished. On the 17th day of experiment 50 cc. of olive oil in the diet were replaced by 50 cc. of cod liver oil in order to supply the body with vitamins A and D. In spite of this change in the diet, 2 days later 1 mg. of histamine provoked only 3.0 cc. of mucoïd secretion as compared with 40.5 cc. under normal conditions, and the next day only 2.6 cc. On the 21st day daily administration of 10 gm. of brewer's powdered yeast was begun and the special diet was replaced by Scott and Ivy's food mixture. Four days later 1 mg. of histamine provoked an enormous secretion (93.0 cc.) of regular gastric juice. Two days after this, 4 minutes' sham feeding gave 31.5 cc. in 40 minutes. During the whole experimental period the animal lost only 1.6 kg. This

¹ Webster, D. R., and Armour, J. C., *Proc. Soc. Exp. Biol. and Med.*, 1933, **30**, 1297.

² Scott, H. G., and Ivy, A. C., *Ann. Surg.*, 1931, **93**, 1197.

experiment shows that the presence of vitamin B complex in the body is absolutely essential for the activity of the gastric glands.

Second Experiment. Kept on the usual food mixture for 14 days, the dog regained its former weight (16 kg.) and was put on a diet of glucose, casein, sodium chloride and cod liver oil. At the beginning of the third week the total volume of gastric secretion in response to duodenal feeding markedly diminished. On the 19th day histamine (1 mg.) produced only 11.0 cc. of gastric secretion. On and after that day 10 to 30 gm. of yeast, autoclaved for $1\frac{1}{4}$ hours at 122°C . under 16 lb. pressure, were added to the daily diet, which otherwise was not changed. In spite of this the total secretion for the first few days was still very low (on the 6th day 1 mg. of histamine gave only 1.7 cc. of mucus). Weakness developed in the hind legs and the dog could hardly walk without assistance. However, on the 9th day of autoclaved yeast administration 1 mg. of histamine gave 19.9 cc. of regular gastric juice (free acidity from 197 to 380% HCl, total acidity from 339 to 485% HCl). On the 10th day the histamine gastric secretion was 30.5 cc., and on the 11th day 5 minutes' sham feeding gave in 40 minutes 25.0 cc. of gastric juice with a much higher concentration of pepsin than in the juice of the third phase or after histamine. At this time the general condition of the animal markedly improved and it could walk unaided. On the 17th day the histamine gastric secretion reached its normal volume, 38.0 cc. The weight of the animal at this time was 15.75 kg. Since our autoclaved yeast was not assayed on pigeons or rats for vitamins B_1 and B_2 , and we do not know how much of the former was destroyed in the process, the results reported are merely suggestive. At present we may only state that autoclaved yeast, which presumably contains more vitamin B_2 than B_1 , was effective in restoring the normal reaction of the gastric mucosa to nervous and chemical stimuli, although it took a much longer time than non-autoclaved yeast. Vitamins A, D and C do not seem to be essential for the proper functioning of the gastric glands.