12 (155)

The influence of water on gastric secretion and the chemical affinity of mucus for HCl in the stomach.

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Pawlow called attention to water as a stimulant of gastric secretion but the degrees and limitations of stimulation produced by water in food Pawlow has not recorded. Using dogs with Pawlow fistulas, it was observed that with definite amounts of cracker meal as food, the amount and rate of gastric secretion depend to some extent on the amount of water given the dog with his meal, *i. e.*, when small amounts of water are given, the secretion is slow and scanty. If larger quantities of water are mixed in the food the secretion is more abundant.

The degree of acidity of gastric juice depends upon the *amount* of secretion. When this is considerable it is much more acid than when the secretion is scanty. Pawlow is of the opinion that the degree of acidity of the gastric juice is constant; this can hardly be correct, however, for the total acidity changes from hour to hour. The proportion of *free* acid depends upon the amount of mucus secreted, since mucus protein like other proteins combines with HCl. Mucus in the presence of pepsin combines with HCl to a considerable extent and undergoes digestion, with formation of proteoses.

13 (156)

The action of the electric current on toxin and antitoxin.

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In the early days of antitoxin it was thought that it might be possible to obtain antitoxin by passing an electric current through toxin. It was soon realized, however, that the fluid around the anode neutralized toxin by virtue of the acid formed about this

pole, and not because true antitoxin had been formed. It was not until 1904 that any attempt was made to determine the nature of the electric charge carried by particles of toxin or antitoxin; this research, done in Von Behring's laboratory by Romer, gave only negative results. Again in 1905, Biltz, Much, and Siebert, working in the same laboratory were unable to decide this question.

The failure of these workers was due, we believe, to the disturbing influence of the products of electrolysis. To eliminate this factor we substituted for the U-shaped tube used in the above experiments three beakers connected by agar-filled tubes, semicircular in shape and about 20 cm. long and 1 cm. in diameter. The middle beaker, into which both agar tubes dipped, contained the toxin or antitoxin to be tested; the end beakers held the platinum electrodes surrounded by distilled water, which was changed every half hour during the passage of the current. At the end of four hours, the agar was removed from the tubes, chopped into fine pieces and allowed to stand for one hour in distilled water. The agar was then removed by filtering through gauze and the toxic or antitoxic value of the fluid determined by tests on guinea pigs.

The results of our experiments were decisive. Both toxin and antitoxin particles were found to travel toward the cathode and must therefore carry positive charges. This holds true when the fluid tested is made either acid or alkaline in reaction.

Since a true chemical reaction can take place only between ions carrying charges of opposite sign, the fact that toxin and antitoxin are both electropositive would indicate that the combination of these two substances represents not a chemical union, but rather the adsorption of one colloid by another.

14 (157)

Nuclein metabolism in a dog with an Eck fistula.

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A dog with an Eck fistula was maintained in nitrogenous equilibrium on a diet consisting of cracker meal, plasmon and lard, and the following chemical observations were made:

1. The output of uric acid was compared with that of a normal dog. An increase in the output was noted.