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Influence of Oral Administration of Bile Upon Fasting Gastric Acidity and Intestinal Bactericidal Action.

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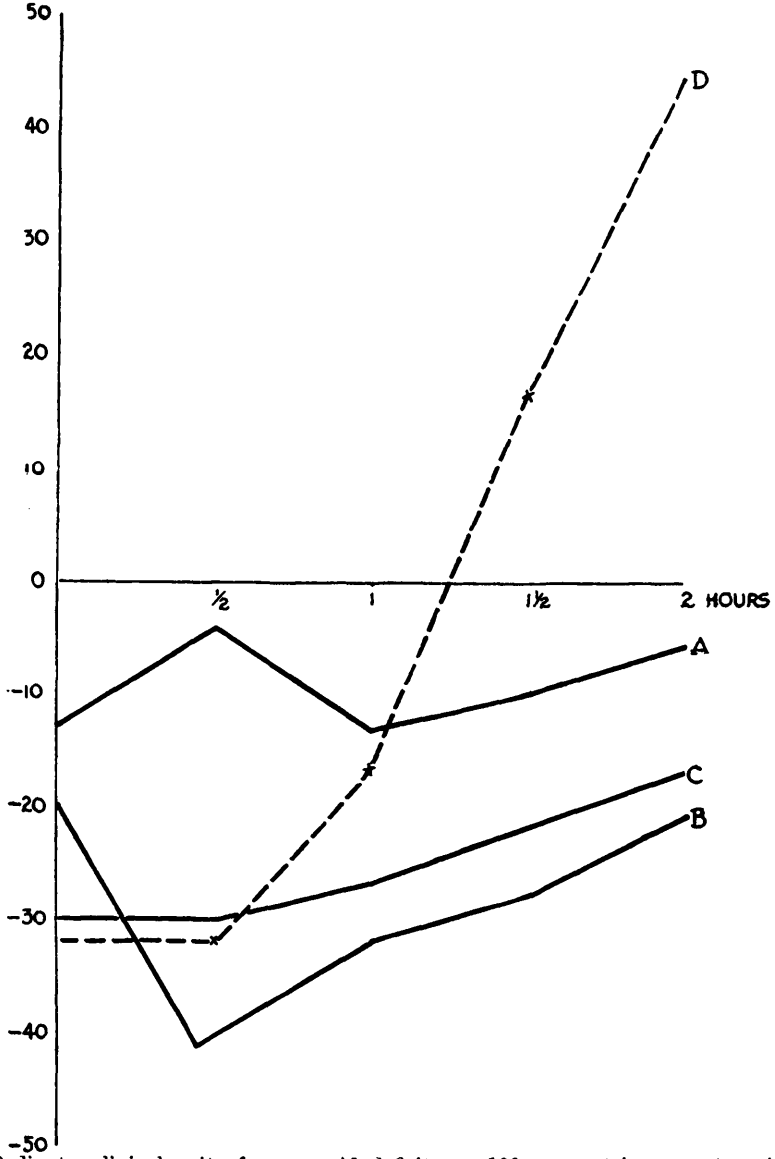
Living non-pathogenic bacteria appear in the thoracic duct lymph when these microorganisms are placed in the lumen of the duodenum in an alkalinized bile solution in the post-digestive dog.[1, 2] Various concentrations of bile have been placed in the stomach of dogs through a fistulous opening and the gastric contents removed and titrated at intervals 2 to 3 hours after the bile was administered. Dehydrated bile (Difco) has been used, 100 cc. volume of fluid, concentration of bile varying from 0.5 to 10.0%. It was found that 5.0% and higher concentrations caused vomiting within a short period of time, followed by diarrhea. There was usually a period of active HCl secretion following the emptying of the stomach in this manner. One half of the required amount of acid was added to neutralize the alkali in 100 cc. of a 5.0% bile solution to see if this mixture would leave the stomach rapidly and not stimulate acid secretion. (Line "D" in graph.) One per cent bile was found to be the optimum concentration to rapidly leave the stomach and be followed by a certain period of acid deficit. (Line "B" in graph.) Three dogs were used for these experiments. Each

[1] Arnold and Brody, PROC. SOC. EXP. BIOL. AND MED., 1928, xxv, 247.

[2] Arnold, *Am. J. Hygiene*, 1928, in press.

curve on the graph is an average of 5 experiments using 3 dogs, a total of 15 separate experiments. Experiments were conducted during the forenoon. Animals were fed in the afternoon and used on alternating dogs 18 hours after feeding.



Ordinate, clinical units free or acid deficit per 100 cc. gastric contents. Abscissa, time in half hour periods. A. Curve, 100 cc. distilled water + 1 agar petri dish of *B. prodigiosus*. B. Curve, 100 cc. 1% bile + same bacteria. C. Curve, 100 cc. 2% bile + same bacteria. D. Curve, 100 cc. 5% bile plus sufficient acid to neutralize half of the alkaline content + same bacteria. The acid-deficit of the mixture placed in the stomach is indicated at the beginning of the curve.

These animals had, in addition to the gastric fistula, a caecal fistula.[2] *B. prodigiosus* was suspended in water and the various bile solutions and the relative concentration in the caecum was determined. This method has been used to determine the relative bacterial killing power of the intestinal tract.[2] These test microorganisms appeared only in 15 to 20% of their original concentration in the caecum for about 2 hours (1½ to 3½ hours after feeding) when given in distilled water. In 1% bile they appear in the caecum within 30 minutes and last for 6 hours and are in the same concentration as was placed in the stomach. There is no evidence of a bacterial killing action in the passage from the stomach to the caecum. This concentration of bile is below the diarrhea dose. The test bacteria can be cultured from the gastric contents so long as there is an acid-deficit in the stomach. Higher concentrations of bile that produce vomiting and diarrhea are associated with an interference with the bactericidal power of the intestinal tract, but the period is shorter in duration. This is probably due to the gastric acid secretion that follows these stimulating doses of larger quantities of bile. One gram of dried bile in 100 cc. of water leaves the post-digestive dog's stomach rapidly and is followed by a period of achlorhydria. This causes a change in the normal reaction of the small intestine by allowing alkaline buffered solution to pass into the duodenum and is associated with an interference with the normal bacterial killing power of the small intestine. This is a preliminary report upon the problem of immunization by oral administration of the vaccine.

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Further Observations on Mammillo-infundibular Region of Diencephalon: Relation to Epilepsy, Dementia and the Psychoses.

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In a recent report by Morgan and Johnson[1] it was shown that a lesion in the mammillo-infundibular region of the brain in dogs was followed by symptoms which were in all essential respects identical with epilepsy in the human. The author[2] has reported on a study of

[1] Morgan, Lawrence O., and Johnson, Clarence A., PROC. SOC. EXP. BIOL. AND MED., 1928, xxv, 442.

[2] Morgan, Lawrence O., PROC. SOC. EXP. BIOL. AND MED., 1928, xxv, 444.