

## 3404

## Bactericidal Function of the Liver.

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During the course of our studies on the effects of intestinal stasis on blood destruction and regeneration, some experiments were undertaken to determine the rôle of the liver and bile in the elimination of bacteria in normal fasting dogs. Several investigators<sup>1</sup> have found organisms in the tissues of apparently normal animals. Wolbach and Tadasu<sup>2</sup> found an anaerobic spore-bearing bacterium in the livers of 21 out of 23 healthy dogs. These authors obtained their material from dogs which were killed by chloroform. The interval between the last feeding and the death of the animal was not stated. They were unable to grow the organisms obtained from the liver in sterile bile, or bile containing media.

The material for our studies was obtained under strict aseptic conditions from 11 normal dogs which had been kept without food for 18 hours. Ether anesthesia was used. The specimens consisted of blood from the portal vein (obtained in 5 dogs), bile from the gall-bladder, and a wedge-shaped piece of liver measuring approximately 3 cm. x 2 cm. In addition, the organisms which were obtained from the liver tissue were incubated in undiluted and diluted bile (1:10 to 1:1,000,000). The organisms and bile were obtained from the same animal in each instance. Cooked meat dextrose broth was used as the culture medium. Strict anaerobiosis was maintained. Aerobes as well as anaerobes of intestinal origin develop satisfactorily under these conditions.<sup>3</sup> The liver tissue was also cultured aerobically.

In every dog the bile was sterile. The liver tissue from all the animals yielded a pure culture of an anaerobic spore-bearing bacterium which was similar to the one described by Wolbach. In 3 dogs the organism was identified as *B. welchii*; in the others the organism was not identified. It resembled the gram positive anaerobic bacillus commonly found in the intestine of normal dogs.

Cultures of the organisms in bile yielded the following results: in pure bile a sparse growth was obtained from 3 out of 11 dogs; in diluted bile, growth was obtained from all the dogs and in all dilutions (1:10 to 1:1,000,000).

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In the 5 dogs from which the portal blood was cultured, no growth occurred.

The presence of living anaerobic bacilli in the livers of all our dogs, and their absence from the bile and portal blood, raises some interesting questions. The belief has been expressed that at times intestinal bacteria and their toxins get into the portal circulation, but if this is true, why should the above organisms survive in pure culture in the liver? Are we to assume that in the dog they alone can pass the intestinal barrier, or that the liver destroys all the others?

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<sup>1</sup> Reith, A. F., *J. Bact.*, 1926, xii, 367, with review of the literature.

<sup>2</sup> Wolbach, S. B., and Tadasu, S., *J. Med. Res.*, 1909, xxi, 267.

<sup>3</sup> Berg, B. N., Meleney, F. L., and Jobling, J. W., *Arch. Surgery* (in press).

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#### The Effect of Division and Transplantation of the Common Duct Upon Gall-Bladder Function.

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Recent studies<sup>1, 2</sup> tend to minimize the importance of the sphincter of Oddi in the regulation of gall-bladder activity. However, the methods which have been employed to eliminate the action of the sphincter are open to a number of criticisms. We have attempted to avoid them by completely dividing the common duct proximal to the sphincter and implanting the stump into another part of the duodenum. The effect of this procedure upon the action of the gall-bladder was determined by means of cholecystograms which were made according to the method described by Graham and his co-workers.<sup>3</sup>

Under ether anesthesia, the common duct in 2 dogs was isolated and doubly ligated just above its entrance into the duodenum. A linear incision 2 cm. long was made in the anterior surface of the duodenum about 8 cm. from the pyloric sphincter. The duct was divided  $\frac{1}{2}$  cm. proximal to the ligature, and fixed at the lower angle of the opening in the duodenum, which was then closed by two sutures.

Six weeks and 8 weeks respectively, after the operation, cholecys-

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