8571 P

Hemolytic Streptococci from Tonsils of Cow, Hog, and Sheep.

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Investigations in our laboratories have demonstrated the constant occurrence of hemolytic streptococci of the *beta* type in the human throat and tonsillar crypts. In excised tonsils of children and adults these streptococci can be isolated from the depths of the crypts in 97%,[1] often in predominant numbers and occasionally in pure culture. These organisms conform to the virulent human type in their cultural and biological reactions. In 13.8% the streptococci from these tonsils resemble the *Streptococci epidemicus,* the mucoid encapsulated streptococcus identified with the bovine mastitis responsible for epidemic septic sore throat.[2] The *Streptococcus epidemicus* recovered from milk and throat alike correspond to the human type of streptococci. Other streptococci responsible for bovine mastitis appear to be of the bovine type and apparently are harmless to human beings.

The present investigation was to determine the presence of hemolytic streptococci in the tonsils of cattle and to study their biologic properties. The tonsils were obtained from the Chicago stockyards, during the months of October, November, and December, 1935. The pharyngeal structures containing both tonsils were brought to the laboratory and cultures were made within 2 to 3 hours after slaughter.

A transverse section through the substance of the tonsil beneath the mucous membrane was made with a sterile knife and the cultures made from the depths of the exposed crypts. Usually a small amount of debris or secretion was obtained with a loop and a dilution made in sterile salt-solution. Dilution-pour-plates were examined after 24 and 48 hours at 37.5°C. The medium was infusion-agar and 5% defibrinated human blood, with ascitic fluid (20%) to render mucoid organisms prominent.[3]

The tonsil of the cow is of the tubular variety with a flat mucous surface studded with pits which lead into crypts 1 to 2 cm. deep.

1 Pilot, I., and Davis, D. J., *J. Infect. Dis.,* 1919, **24**, 386.

2 Pilot, I., and Davis, D. J., *J. Infect. Dis.,* 1931, **48**, 501.

3 Pilot, I., Hallman, B., Davis, D. J., *J. A. M. A.,* 1930, **95**, 264.

Cultures from 133 pairs revealed hemolytic streptococci of the *beta* type in 112 (84%). The hemolytic zones were clear and complete, measuring 2 to 4 cm. across. Upon further study they differed from the human streptococci. In tests for fibrinolysis, of oxalated human blood, 92 of 100 were negative. Seventy-eight of 96 strains tested hydrolysed sodium hippurate. Fermentation of trehalose and sorbitol was irregular. Forty-nine fermented trehalose, 44 did not; 52 fermented sorbitol, 46 were negative. Acid-production was consistently high, varying from pH. 4.3 to 5.0. Nine of 22 strains killed mice injected intraäbdominally in doses of 0.5 cc. of broth-culture. Of three strains examined by Dr. Lancefield, one fell in group G, one in group H, and one was not identified; none belonged in group A, the human type. These streptococci thus conform with the animal streptococci and might be designated as the bovine tonsillar type.

The hog's tonsil is considerably smaller, flat on surface with pits leading into shallow crypts. Of 106 pairs 102 (96%) were positive for *beta* hemolytic streptococci which often occurred in large numbers. In their cultural characteristics and their reactions they resembled the streptococci of the tonsils of the cow. Thirty-nine of 43 strains were not fibrinolytic for oxalated human blood. Fourteen fermented sorbitol, 26 did not; 31 fermented trehalose, 12 did not. Six of 20 strains killed mice in 24 hours in doses of 0.5 cc. Three strains sent to Lancefield fell into group C which consists chiefly of animal strains.

The tonsils of sheep were the smallest in comparison and were examined by the same technic. One hundred of 135 (74%) pairs yielded *beta* hemolytic streptococci. The colonies appeared to be smaller than those derived from the cow or hog and required 48 hours' incubation for their full growth. The hemolytic zones were wide and distinct. Study of these strains is now in progress.

In all cultures made of the tonsils of cow, sheep and hog on ascitic blood-agar, no encapsulated mucoid forms resembling *S. epidemicus* were found. The tonsils were free from gross pathological changes. The high incidence of hemolytic streptococci in such normal tonsils lends support to the conception that, as in the human tonsil, hemolytic streptococci are an essential part of the normal bacterial flora of the tonsillar crypts of a variety of animals. These apparently harmless streptococci in the throat may be responsible for disease in cattle under certain conditions. The similarity of these strains to certain hemolytic streptococci of the bovine type present in bovine

mastitis[4] suggests that the oral secretions of cattle are the important source of this common infection.

Associated with the hemolytic streptococci in tonsils of cow, hog and sheep were frequently *B. coli,* staphylococci, and occasionally non-hemolytic streptococci.

Conclusions. (1) Hemolytic streptococci are frequently found in the crypts of the tonsils of cow (84%), hog (96%), and sheep (74%). They constitute part of the normal flora of the lymphoid tissue of the oropharynx of these animals. (2) The streptococci conform to the animal type and differ from the human type and the *Streptococcus epidemicus* of bovine mastitis and epidemic septic sore throat.

8572 P

Restoration of Blood Pressure and Peripheral Resistance in Sympathectomized Dogs.

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The recent treatment of hypertension by types of sympathetic surgery has created a new interest in the extent and duration of the vascular relaxation following sympathetic ganglionectomy. There has been little experimental study of the blood pressure of completely sympathectomized animals over a long period of time. Bradford Cannon[1] reported by cuff sphygmomanometer a moderate temporary fall in blood pressure immediately after complete sympathetic ganglionectomy with a final return to normal, but the time interval is not stated.

Further investigation of this problem has been made upon 15 dogs, 5 of them controls. The right thoracic chain was removed first, the left next, and the abdominal chains last at intervals of 10 days to a month. Dummy operations were done in the same order for controls. Blood pressures were measured every few days following each operation and at longer intervals later by the arterial puncture method.

The 5 control animals, 2 of which were submitted to dummy

[4] Gibson, H. J., and Muir, R. O., *J. Hygiene,* 1935, **35**, 238.

[1] Cannon, B., *Am. J. Phys.,* 1931, **97**, 592.