

virus of foot-and-mouth disease may also be infective in high dilution through intranasal inhalation.

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ACTIVE IMMUNIZATION TO ANTHRAX BY MEANS OF HETEROPHILE ANTIGEN

SINCE the work of Forssman¹ showing the existence and action of heterophile antigens and antibodies, subsequent investigations have shown these to be widely distributed in animals and bacteria. Recently, Combiesco, Satamtesco, Nestoresco and Adam have demonstrated this antigen in anthrax bacilli.²

The work of Bailey and Shorb,³ and that of Powell, Jamieson, Bailey and Hyde,⁴ indicates that the heterophile antibodies play an important rôle in the protection, treatment and recovery in pneumococcus infections.

Thus the following experiment was done to determine whether or not heterophile antibodies play any rôle in anthrax infections.

Two rabbits were inoculated with boiled sheep cor-

puseles. After a period of two weeks had elapsed from the last injection, a small amount of blood was removed from the ear vein and a titration made to determine their heterophile antibody content. Then these two rabbits, along with two controls, were given subcutaneous inoculations of a virulent anthrax bacilli. The results are shown in Table 1.

From the above experiment it is evident that immunity developed by stimulation with the heterophile antigen in sheep's corpuscles protects rabbits from anthrax infection.

Since heterophile antibodies can be produced by oral administration of the antigen,⁵ this method of anthrax immunization might be adaptable to the protection of individuals whose occupation exposes them to anthrax infection. Such individuals as wool sorters and tannery workers might be protected from anthrax infection by oral administration of the heterophile antigen in sheep corpuscles.

The use of heterophile antiserum in the treatment of anthrax infection is being studied, and will be reported later.

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TABLE 1

Previous treatment of rabbits	Heterophile Titer*	Amount of turbid suspension of virulent Anthrax bacilli inoculated	Results
None	none	0.2 cc subcutaneous	Died in 3 days
None	none	0.2 cc subcutaneous	Died in 4 days
5 intraperitoneal injections of 5 cc of 20 per cent. solution of boiled sheep corpuscles.	800 units per cc	0.2 cc subcutaneous	No ill effect. Observed for a month
5 intraperitoneal injections of 5 cc of 20 per cent. solution of boiled sheep corpuscles.	3200 units per cc	0.4 cc subcutaneous	No ill effect. Observed for a month

* Heterophile unit is defined as sufficient antibodies to hemolyze in the presence of complement 0.1 cc of washed erythrocytes diluted 1 plus 3 in terms of whole blood concentration.

¹ J. Forssman, *Biochem. Zeitschr.*, 37: 78, 1911.

² D. Combiesco, S. Stamatesco, N. Nestoresco, and C. Adam, *Compt. rend. Soc. de Biol.*, 104: 712-717, 1930.

³ G. H. Bailey and M. S. Shorb, *Amer. Jour. Hyg.*, 13: 831-856, 1931; *ibid.*, 17: 329-411, 1933.

⁴ H. M. Powell, W. A. Jamieson, H. Bailey and R. R. Hyde, *Amer. Jour. Hyg.*, 17: 102-121, 1933.

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⁵ H. M. Powell, *Amer. Jour. Hyg.*, 5: 228-229, 1925; *Proc. Ind. Acad. Sci.*, 34: 261-263, 1926.