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Antigenic relationships of the nucleo-proteins from the gram-positive cocci.

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Avery and Heidelberger^{1, 2, 3} have shown that the nucleo-proteins obtained from the various types of *Pneumococcus* are species specific rather than specific for type, while the so-called "soluble substance", carbohydrate in nature, is strictly type specific.

We have isolated, from several strains of non-hemolytic streptococci, similar substances which in their chemical and biological behavior show striking similarities to the "specific soluble" substance of pneumococci; they are probably similar to the "residue antigens" of Zinsser,⁴ and his co-workers; and to the soluble precipitating substances of Hitchcock.⁵ Precipitin reactions with the specific soluble substances from green streptococci are highly specific and show close agreement with agglutination reactions; further work on these substances is in progress.

Nucleo-proteins, on the other hand, seem to be serologically similar to each other. Anti-sera, prepared by immunizing four groups of rabbits with the nucleo-protein of four different strains of green streptococci, precipitated the nucleo-protein from five strains of green streptococci, from at least two strains of hemolytic streptococci and from the three type strains of pneumococci as well as from one strain of pneumococcus Group IV.* An immune serum usually precipitated its homologous nucleo-protein a little more strongly than one prepared from a heterologous strain. In the case of the green streptococci the identity of the nucleo-

¹ *J. Exp. Med.*, 1923, xxxviii, 73.

² *J. Exp. Med.*, 1923, xxxviii, 81.

³ *J. Exp. Med.*, 1924, xl, 301.

⁴ *J. Exp. Med.*, 1923, xxxvii, 275.

⁵ *J. Exp. Med.*, 1924, xl, 445, and 575.

* The pneumococcus nucleo-proteins were very kindly supplied by Dr. O. T. Avery.

protein has been confirmed by means of complement fixation reactions. It has been possible to adsorb all of the nucleo-protein precipitating antibodies from an anti nucleo-protein serum by means of nucleo proteins of both homologous and heterologous strains of green streptococci and also by means of one prepared from a hemolytic streptococcus. The results indicate, therefore, that hemolytic and non-hemolytic streptococci and pneumococci all contain a nucleo-protein with common antigenic properties.

Work is also in progress on staphylococcus nucleo-protein. The determination of its relationship to the other nucleo-proteins studied awaits the preparation of more potent sera.

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Local passive immunity against anthrax infection.

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Owing to the varying results obtained in our previous work in which we used guinea pigs as the test animal, the following experiment was carried out on rabbits. Anti-anthrax serum from Mulford & Co. was used with normal horse serum as control.

Ten control rabbits were prepared with normal horse serum: 2 intravenously, 4 subcutaneously, and 4 intradermally; each animal receiving 3 cc. Ten other animals were given anti-anthrax serum by the same routes and in the same dosage.

Thirty hours after the serum injection the resistance of each animal was tested by intradermal inoculation. The rabbits prepared by intravenous injection of the serum were inoculated intradermally over the abdomen. The rabbits prepared subcutaneously or intradermally were inoculated intradermally either at the same point or on the opposite side.

Two to four fatal doses of *Bacillus anthracis* were given. Previous titration of this culture showed that 1/5000 of a 24 hr. agar slant was consistently fatal for rabbits weighing from 1500