109 (1856)

Serological studies of the diphtheria group.

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A systematic qualitative and quantitative study has been made on the immunity developed in a group of young adults immunized against diphtheria with toxin-antitoxin.

As a preliminary, a successful attempt was made to corroborate Havens' contention that there are two serological groups of diphtheria bacilli with specific agglutinogenic properties and no evidence of cross agglutination. For our minor group antigen we used two cultures recovered from cases of diphtheria developed in persons immunized with toxin-antitoxin and yielding negative Schick tests.

This specificity has been further substantiated by antibody absorption, which confirms the other findings completely.

Incidentally, we used rabbit blood agar plates exclusively for isolation and study of the organisms, and noted that hemolysis, a sometime mooted point, is not characteristically allied with virulence, nor does it only occur in freshly isolated cultures, but may crop up as late as the 56th generation.

We have also found, as we believe Park stated, that certain true diphtheria bacilli possess a factor of virulence not neutralized by antitoxin, concerning whose identity we are making a further study. Likewise we have confirmed Park and Havens in finding that there is some group antitoxin present in the antitoxin commonly in use for the toxin of the minor group.

Using a modified Römer method, we titrated the antitoxin content of a group of young adults immunized against diphtheria with toxin-antitoxin. We found 20 out of 26 had developed antitoxin in quantities varying from 1/30 unit up to 1/5, while three developed only 1/50, and three failed to develop any immunity.

We then ran Schick tests with regular and minor group toxins.

Without exception, all gave a strongly positive reaction to the minor group toxin, though 20 were protected completely against the regular toxin, and three more partially so.

To further verify this stage of the work, we tried titrating any possible group antitoxin against the minor group by using a ripened minor group toxin, whose standardization, for obvious reasons, could not be attempted with standard antitoxin. Although we worked at the limit of sensitivity, approximately 1/500 M.L.D., we were unable to demonstrate the presence of any protective power in the blood of any of this group against the minor toxin. Seemingly, then, immunization with monovalent diphtheria toxin-antitoxin does not protect against infections of the minor group, as, of course, is manifest in the two cases of that type originally quoted and with whose cultures we started our work.

Two of the most important laboratories in the country have recently told us that they were likewise studying the toxins of certain diphtheria organisms which are not neutralized by the antitoxin in current use, so we hope after their publication that steps will be taken to include the minor group in the preparation of antitoxin, toxin-antitoxin, and Schick test toxin.

110 (1857)

An intramuscular method of digitalis assay.

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Many observers have criticized the one-hour method of standardization on account of the failure of complete absorption.

During the course of work on the elimination of digitalis substances, one of us demonstrated the feasibility of making intravenous injections in the frog by the insertion of a fine hypodermic needle into the abdominal vein. It was suggested by Dr. Hatcher that an intravenous method of assay might be evolved upon the frog. Efforts to do so have not been successful but in testing the possibility the idea occurred to us to experiment with an intramuscular method.