

able to confer protection or bring about cure in rickets, both in infants and in rats. Further experiments have shown that as little as one drop (0.05 gm.) a day (fed by pipette) is sufficient to protect rats which are on a ration markedly deficient in phosphorus. It is of much less protective value when the rats are given a rickets-producing dietary very low in calcium. Boiling the egg for twenty minutes does not appreciably diminish the potency of the yolk in relation to rickets. Drying the yolk and keeping it in a dried state markedly reduces its antirachitic value. When 0.05 gm. was given subcutaneously, the yolk did not confer protection, but this was accomplished by injections of 0.15 gm.

Various fractions of egg yolk were tested in protective experiments on rats receiving the low phosphorus diet. It was found that the non-saponifiable fraction was protective and a preparation was obtained about 90 times as concentrated as the original yolk. It is, however, possible that its potency is not restricted entirely to this fraction.

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A study of hypersensitiveness to derivatives of hemolytic and non-hemolytic streptococci. (Preliminary report).

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Hemolytic and non-hemolytic streptococci obtained from the interior of tonsils immediately after tonsillectomy have been used for the preparation of filtrates and extracts of intact organisms. A large number of patients with a variety of conditions has been tested by the intracutaneous method with these preparations.

The present report deals chiefly with certain reactions obtained with filtrates of young broth cultures. The intracutaneous injection of 0.01-0.04 cc. has produced in nearly all adults positive re-

actions which develop after a latent period of 8 to 12 hours. The intensity of the reaction has shown wide variation. The weaker reactions consist of a central, red, slightly tender elevation surrounded by slight swelling and erythema 1.5 to 2.5 cm. in diameter. Stronger reactions consist of a central pustule which upon culture has without exception proved to be sterile. Surrounding the pustule there is a red, hot, indurated zone, and outside of this a halo of erythema. The most intense reactions have measured 10 or 12 cm. in diameter and have been extremely tender. The full intensity of the reaction is attained after 24 to 48 hours. The reaction fades out in the course of two to ten days showing in the later stages a pigmented spot upon which, in some cases, a fine desquamation occurs. In a few instances there has been conspicuous lymphangitis extending up the arm from the site of the reaction with tender epitrochlear and axillary lymph nodes. The phenomena of a local infection with cellulitis, lymphangitis, lymphadenitis, have in the most intense reactions, been reproduced in a striking way. That these reactions are due to an acquired hypersensitiveness is shown by the fact that of 12 children under six months of age none has shown even a weakly positive reaction. Only one of 30 adults, tested with the same preparations, has failed to give a positive reaction.

An observation which may prove to be of significance was noted with a non-hemolytic streptococcus obtained from the excised tonsil of a rheumatic fever patient. A 24-hour filtrate prepared immediately after isolation of this organism has been found to be highly active. After cultivation for three weeks on blood agar repeated efforts to produce active filtrates from it have failed. The mechanism for the production of the active substance ceased to function after cultivation on laboratory media. A 48 hour filtrate from this organism prepared at the time that the active 24 hour filtrate was obtained, has proved to be entirely inactive. Forty-eight hour filtrates of the hemolytic streptococci studied have shown no less activity than the 24 hour filtrates; nor have we failed with the hemolytic strains to obtain active filtrates after cultivation on laboratory media for a period of three months. The active substance in the filtrates from both hemolytic and non-hemolytic streptococci is heat stable, withstanding boiling for ten minutes with little or no loss of activity.

Preparations kept in the icebox for three months have not deteriorated. Preliminary attempts to produce a neutralizing serum have yielded only equivocal results. Further work is in progress along this line. When a test is done on a skin area where a reaction has occurred, two or three weeks previously, it has been found that compared to a test done at the same time on a fresh site, the reinjection causes an accelerated reaction. The erythema and swelling appear in 3 to 5 hours, and reach their most intense development within 24 hours, and subside earlier than the reactions at a fresh site. There appears to be a certain lack of specificity in this accelerated response since the same phenomenon occurs if the reinjection is made with a filtrate of hemolytic streptococci at a site upon which the primary reaction was obtained with a non-hemolytic streptococcus filtrate. Four strains of non-hemolytic streptococci from human sources which have been grown on artificial media for several years, have produced 24 hour filtrates totally inactive on all except one of seven patients. So far the filtrates of non-hemolytic streptococci obtained from routine throat cultures have shown little or no capacity to produce skin reactions. Studies of the reactions with whole killed broth cultures and weak alkali extracts of whole organisms ground with powdered glass are in progress. It is already apparent, however, that some individuals react more strongly to these preparations than to filtrates, and in a few individuals the alkaline extracts free from constituents of the broth, have produced, not only the delayed reaction already described, but also the immediate wheal and erythema reaction which appears within thirty minutes and subsides after one to three hours.

We believe that the results thus far obtained justify the following conclusions: (1) hypersensitiveness to derivatives of hemolytic and non-hemolytic streptococci obtained from the throats or from the substance of tonsils, is demonstrable in a high percentage of adults. Very young children apparently do not react to this substance. (2) The non-hemolytic streptococci obtained from routine throat cultures in the absence of acute infection, have been found to be much less capable of producing active filtrates than non-hemolytic streptococci obtained from excised tonsils. (3) Certain non-hemolytic streptococci quickly lose the capacity to produce the active substance when

cultivated outside the body. (4) The active substance present in 24 hour filtrates withstands boiling and does not rapidly deteriorate when kept at icebox temperature. (5) Reinjection at a site previously used for a reaction frequently reveals an alteration of the tissue response characterized by shorter latent period and earlier disappearance of the reaction. This alteration in the response is in some cases at least non-specific. (6) Some individuals react more strongly to filtrates, others to constituents of the bacterial cell.

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Observations of the nutritional effect of subcutaneous oil injections.

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Experiments with subcutaneous oil injections have been frequently tried. The first clinical observations were published in 1869. Extensive animal experiments were carried out by Leube in 1895 and by Mills in Lusk's laboratory in 1911. Both considered oil injections were of practical value. Others have repeated this work using fat and oil for injections with varying degree of success. Winternitz was, for instance, unable to obtain good results.

We resorted to this method of treatment in a very serious case of Hirschsprung's disease (child 11 years of age). Following the total extirpation of the colon and sigmoid the child either refused or vomited most of his food. He also had loose stools. His condition was desperate, his weight having fallen from 63 to 47 pounds, a loss of 16 pounds.

The first two days we injected 50 cc. of sterile cotton seed oil. The child gained in weight, but after stopping the injections the weight remained stationary. For the following seven days we increased the amount of oil to 100 cc. per day. The general condition and appetite improved to such an extent that he took food by mouth better than before. His weight likewise increased.