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Reversibility of Quellung Phenomenon on Addition of Type-Specific Polysaccharide.*

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Although pneumococci can be typed directly from sputum, it has been recognized that the results are sometimes unsatisfactory. Taplin, Meneely and Hettig[1] have outlined an improved method using fresh sputum to obtain the Quellung phenomenon. Essentially, this method consists of breaking up and suspending the sample in saline, centrifuging, and using the sediment for typing. The authors suggested that the water-soluble capsular polysaccharide might well be the interfering substance, which was removed by their technic.

In work published elsewhere,[2] it has been determined that in undiluted samples of ground lung from pneumonic rats, pneumococci present did not give the Quellung reaction with specific antiserum. The reaction did occur if the material were sufficiently diluted with PSS. Heidelberger[3] has shown that excess of antigen prevents visible evidence of antigen-antibody reaction, and has ably discussed the reversibility of the precipitin and agglutinin reactions. Since the above findings indicated that excess antigen prevented the occurrence of the Quellung reaction, it seemed that reversibility of this phenomenon might likewise take place. Hence, the following experiments were performed.

In each of 4 serological tubes were placed 0.1 cc of a broth culture of Type I pneumococcus and 0.1 cc of undiluted type-specific rabbit antiserum; after a short interval, the pneumococci were examined for the presence of swollen capsules. These were uniformly present. Then 0.1 cc of dilutions of Type I polysaccharides were added to each tube to give final amounts of 1.0 mg, 0.1 mg, 0.01 mg, and 0.001 mg in 0.3 cc of fluid, respectively. Five minutes later, the preparations were reëxamined. In the first 2 tubes, the swollen capsules had disappeared. In the last 2 tubes, no change was observed.

A similar reaction was seen employing Type III pneumococcus. However, the Type III specific polysaccharide was partially effective

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1 Taplin, G. V., Meneely, G. R., and Hettig, R. A., *J. A. M. A.*, 1938, **111**, 410.

2 Kempf, A. H., and Nungester, W. J., *J. Infect. Dis.*, 1939, **65**, 1.

3 Heidelberger, M., *Bact. Rev.*, 1939, **3**, 49.

in causing this reversibility, when 0.01 or even 0.001 mg of the substance was added to the tubes containing previously swollen capsules. The specificity of this reversibility was indicated by the fact that addition of Type I polysaccharide failed to reverse the reaction.

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Effect of Sulfapyridine, Sulfathiazole and Sulfamethylthiazole upon Severe Staphylococcal Infection in Mice.*

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In previous reports[1, 2] it was shown that while sulfanilamide therapy had a slight effect upon the course of staphylococcal infections in mice, the use of sulfapyridine markedly prolonged the lives of the infected animals. In a few instances the mice treated with sulfapyridine survived 2 and 3 months.[3] Eventually, however, they succumbed, showing at postmortem, abscess formation in the kidneys and liver.

Preliminary studies[4, 5] in which the *in vitro* effect of sulfathiazole was tested, indicated that this compound inhibited the growth of a number of microörganisms, including staphylococci, to a greater degree than did sulfanilamide and sulfapyridine. It was then considered worthwhile to compare the activity of this compound and of sulfapyridine in the treatment of severe staphylococcal infections in mice. Later the activities of sulfathiazole and sulfamethylthiazole were similarly compared.

Methods. The mice were infected by the intravenous injection of heavy broth suspensions of a strain of *Staphylococcus aureus* which had been isolated a year previously from a patient, ill with a lung abscess. The method is given in detail elsewhere.[1]

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2 Bliss, E. A., and Long, P. H., PROC. SOC. EXP. BIOL. AND MED., 1939, **40**, 32.

3 Unpublished observations.

4 Lawrence, C. A., PROC. SOC. EXP. BIOL. AND MED., 1940, **43**, 92.

5 Long, P. H., and Bliss, E. A., PROC. SOC. EXP. BIOL. AND MED., 1940, **43**, 324.