

### Effect of Type II Pneumococcus Soluble Specific Substance on Infectivity of Pneumococcus Type II.

RICHARD H. P. SIA AND S. H. ZIA.

*From the Department of Medicine, Peiping Union Medical College.*

One of us previously showed that the pneumococcus soluble specific substance exerted a specific antiphagocytic action on the blood *in vitro*.<sup>1</sup> This finding has since then been confirmed by others.<sup>2, 3, 4</sup> *In vivo* attempts, on the other hand, have not so far given similar striking results. By injecting Type II soluble substance together with an attenuated Type II pneumococcus in mice, Felton and Bailey<sup>5</sup> found that it exhibited an antagonistic effect on the defense of the animals or an actual increase in the virulence of the organism from 10-100 folds. We wish to record the results of a study along similar lines but with more striking effects.

The soluble specific substance employed in this work was prepared from a Type II pneumococcus according to the method of Heidelberger and Avery.<sup>6</sup> The chief organism used was a strain of a typical Type II pneumococcus, highly virulent for white mice, but relatively avirulent for rabbits.

Preliminary experiments with a modified method<sup>7</sup> for demonstrating growth-inhibitory and pneumococidal action of the blood before and after the intravenous injection of Type II pneumococcus soluble substance, showed that while rabbit blood normally was capable of destroying large numbers of Type II pneumococci, blood taken after the injection of the substance had entirely lost this property.

The effect of the intravenous injection of the soluble substance on the course of pneumococcus bacteremia in rabbits was next studied. It was found that when a sublethal dose of the Type II pneumococcus was injected intravenously into normal rabbits, the

<sup>1</sup> Sia, R. H. P., PROC. SOC. EXP. BIOL. AND MED., 1925, **22**, 262; *J. Exp. Med.*, 1926, **43**, 633.

<sup>2</sup> Wadsworth, A. B., and Sickles, G. M., *J. Immunol.*, 1927, **14**, 321.

<sup>3</sup> Ward, H. K., *J. Exp. Med.*, 1930, **51**, 675.

<sup>4</sup> Alston, J. M., Galbraith, G. R., and Stewart, D., *J. Path. and Bact.*, 1930, **33**, 845.

<sup>5</sup> Felton, L. D., and Bailey, G. H., *J. Inf. Dis.*, 1926, **38**, 131.

<sup>6</sup> Heidelberger, M., and Avery, O. T., *J. Exp. Med.*, 1923, **40**, 301.

<sup>7</sup> Wu, C. J., and Sia, R. H. P., PROC. SOC. EXP. BIOL. AND MED., 1932, **29**, 786.

organisms quickly disappeared from the blood stream; whereas in rabbits receiving soluble substance and similar amounts of pneumococcus culture, an increase in the bacteremia ensued and frequently terminated in the death of the animals. In the light of Tillett's<sup>8</sup> work, the course of bacteremia in these 2 series of animals may be interpreted to mean that the pneumococcus soluble specific substance causes an increased virulence of the organism. On the other hand, the injection of a culture of a "Rough" variant derived from Pneumococcus Type II after the animals had received similar amounts of the soluble substance failed to produce similar effects.

Experiments with the injection of Type II pneumococcus culture broth instead of the purified soluble substance gave practically identical results as the latter.

Further study on the effect of the injection of Type II pneumococcus soluble substance on the mortality rate of the rabbits which were subsequently infected with the homologous organism, suggested an increase in the susceptibility of the animals or an increased virulence of the organism by 10,000-100,000 times. Similar experiments in which the infecting organism was substituted by a "Rough" variant of a Type II pneumococcus again failed to produce such action. None of these latter animals even seemed to have suffered in any way by such injections.

## 6082

### Use of Antipneumococcus-Serum-Agar for the Identification of Pneumococcal Types.\*

RICHARD H. P. SIA AND S. F. CHUNG.

*From the Department of Medicine, Peiping Union Medical College.*

It is generally recognized that Type III pneumococci grow on blood agar plates in large mucoid transparent colonies. This peculiar growth characteristic of the organism has frequently rendered its isolation from plates quite simple. The identification of the other types of pneumococci by the appearance of their colonies, on the other hand, is beset with great difficulties, if not an impossibility. Such identification usually requires agglutination tests carried out with cultures obtained from the individual colonies.

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<sup>8</sup> Tillett, W. S., *J. Exp. Med.*, 1927, **45**, 1093.

\* We are indebted to Dr. A. B. Wadsworth for the antipneumococcus horse serum employed in this investigation.