A Benedict spirometer was employed in determining the oxygen consumption. Arterial blood was obtained from the femoral artery and mixed venous blood from the right side of the heart. The oxygen content of the blood was determined with the Van Slyke-Neill manometric apparatus.

Ten experiments were performed. In all, the striking of the abdomen was followed by a decline in the blood pressure. The drop in the mean arterial blood pressure in the different experiments varied from 38 to 75 mm. Hg. The decline in blood pressure was usually of short duration. Associated with the drop in blood pressure, the output of the heart increased slightly in 7 experiments and decreased in 3. The consumption of oxygen increased during and immediately following the traumatization in 9 of the 10 experiments. The arterio-venous oxygen difference increased in some instances and decreased in others. These alterations are quite different from those that are found in secondary shock.

6984 P

Specific Carbohydrate of Type I Pneumococcus.

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(Introduced by Hans Zinsser.)

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When a Type I pneumococcus antiserum is absorbed with the homologous soluble specific carbohydrate until no further precipitin reaction occurs with the latter, the absorbed serum still reacts type-specifically with a substance in pneumococcus autolysates in high dilution, as shown by Enders[1] and confirmed by Wadsworth and Brown[2, 3] and by Sabin.[4] We have now succeeded in isolating this substance, called the "A substance" by Enders, from Type I pneumococcus broth cultures.

The initial steps in the preparation of the A substance are essentially those given by Heidelberger and Kendall[5] in their preparation

[1] Enders, J. F., *J. Exp. Med.*, 1930, **52**, 235.

[2] Wadsworth, A., and Brown, R., *J. Immunol.*, 1931, **21**, 245.

[3] Wadsworth, A., and Brown, R., *J. Immunol.*, 1933, **24**, 349.

[4] Sabin, A. B., *J. Exp. Med.*, 1931, **53**, 93.

[5] Heidelberger, N., and Kendall, M., *J. Exp. Med.*, 1930, **52**, 477.

of the soluble specific substance, SSS1, except that care is taken to maintain an acid reaction throughout. When, as in their procedure, the specific carbohydrate is precipitated with acetic acid at pH 3.4, the A substance remains in solution. We have found, contrary to Heidelberger and Kendall, that it is frequently not possible to obtain an appreciable precipitation of SSS1 at this point. This matter will be discussed below. At any rate, whether or not a precipitate is obtained, the A substance is present in the acid supernatant from which it is now precipitated by alcohol and purified by precipitation with copper chloride at pH 3.4 as noted. The excess copper is removed by repeated solution in 10% acetic acid and precipitation with alcohol. The yield varies from about 100 mg. to 600 mg, from 20 L of broth culture, depending on how much SSS1 is removed by precipitation with acetic acid.

The A substance prepared as outlined above is an extremely hygroscopic, white amorphous powder, soluble in the range pH 1-9. It contains no sulfur or phosphorus. As recorded in Table I, its elementary analysis, amino-nitrogen content (van Slyke) and specific rotation are practically identical with the SSS1 as prepared by Heidelberger, Goebel and Avery.[6]

TABLE I *

Substance	C	H	N**	amino-N (van Slyke)	ash	α_D
A	42.4	6.5	5.2	2.8	3.4	290
S	43.3	5.7	5.0	2.7	—	299

* analyses calculated to ash-free basis.
** Pregl Dumas method.

Enders,[1] whose observations have been confirmed by Wadsworth and Brown,[2, 3] found that the immunological activity of the A substance is rapidly destroyed by heating on the alkaline side of neutrality. We have observed that on boiling in N/100 NaOH, the activity of the A substance is completely destroyed in 10 minutes. The resulting solution can be precipitated at pH 3.4 with acetic acid, reacts to titre with Type I antisera, but no longer with SSS1 absorbed antiserum. This destruction of A takes place slowly, even in the cold, if solutions are kept at pH 7 or above and allowed to stand for any length of time. For this reason care must be taken during the preparation to maintain an acid reaction. The precipitin titres of A and SSS1 with a Type I rabbit anti-pneumococcus serum, unabsorbed and absorbed with SSS1 and with A, are given in Table II.

[6] Heidelberger, N., Goebel and Avery, O. T., *J. Exp. Med.*, 1925, **42**, 727.

TABLE II

Substance	Unabsorbed Serum	SSS1 Absorbed Serum	A Absorbed Serum
A	1:4,000,000	1:4,000,000	no reaction
SSSI	1:4,000,000	no reaction	" "

It is clear that the A substance of Enders and the SSS1 are closely related. It would seem possible that the A substance more closely approximates the Type I pneumococcus haptene as present in the living cell, and that the SSS1 carbohydrate precipitated at its iso-electric point, pH 3.4, is an hydrolytic product of the A carbohydrate. In the procedure of Heidelberger, Goebel and Avery[6] for the preparation of SSS1, there can be little doubt that the A substance is destroyed at the stage where it is precipitated with $Ba(OH)_2$. In the short method for preparing SSS1, (Heidelberger and Kendall), much A is always present, carried down by the SSS1 when the latter is precipitated with acetic acid.

The question as to the true nature of the pneumococcus carbohydrates is an important one, if they are to be used in evaluating the strength of antisera. Since in many cases unabsorbed rabbit Type I antisera contain no precipitins for SSS1 whatsoever, yet precipitate heavily with A, the SSS1 is obviously of no value in estimating the strength of rabbit antisera.

The theoretical and practical implications of these observations are evident, but cannot be properly discussed until studies now in progress have been completed.

6985 C

Action of Digitalis on the Kidney.*

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It has never been clearly established whether or not digitalis has a diuretic action on the kidney aside from the secondary diuresis that occurs as a result of improvement in the circulation in congestive heart failure. A number of workers failed to obtain any direct diuretic action. Schwartz[1] was unable to produce diuresis in normal individuals with digitalis; Cushny[2] and Cohn[3] failed to ob-

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