

THE AGGLUTINATION OF HÆMOLYTIC STREPTOCOCCI BY SERA FROM CASES OF SCARLET FEVER.

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AN examination of the literature shows that there is considerable difference of opinion on this subject. Some workers found that sera obtained from cases of scarlatina agglutinated scarlet fever streptococci to a high titre, while others believed that no agglutination could be obtained unless the sera were concentrated.

In previous papers (1926, 1927) I have shown that the strains of streptococci from cases of scarlet fever may belong to different serological types. This study was therefore undertaken in order to determine the agglutinin content of a patient's serum for the strain of *S. haemolyticus* isolated from the throat at the commencement of the illness.

METHODS.

On admission to hospital a throat swab was obtained from each suitable case of scarlet fever. From this material the patient's strain of *S. haemolyticus* was isolated and identified by the agglutinin absorption test.

A specimen of blood was obtained as early as possible after admission and another during convalescence, the serum from both samples being stored in the refrigerator until the whole series had been completed.

To obtain the streptococcal suspension for the agglutination test, a strain was grown in 10 per cent. horse serum broth. The culture was then centrifuged, the supernatant fluid discarded, the deposit suspended in distilled water and again centrifuged. The deposit was then diluted to the required density with 0.001N NaOH solution. As it is a common occurrence to find that a culture of streptococci may on occasion be either inagglutinable or much too sensitive to the agglutinins present in a serum, a suspension of the strain was, when possible, first tested against its respective type serum, and if satisfactory, was then used in the test with the patient's serum. One volume of various dilutions (1 in 12½ to 1 in 400) and one volume of streptococcal suspension were then placed in each agglutination tube, and the various tests with their controls were incubated in the water bath at 55° C. for 4 hours.

RESULTS.

The results obtained when the two specimens of serum were tested against the same suspension of the patient's own strain of streptococci are summarised in Table I from which it will be seen that the serum from 8 cases showed a

definite increase in the amount of agglutinins present in the second sample while from 11 cases neither the first nor the second specimen gave any agglutination with the infecting strain. The sera from cases 3 and 7 gave agglutina-

Table I. *Agglutination Results.*

Case No.	Day of disease on which specimen was obtained		Highest dilution of serum showing agglutination	Type of patient's strain
1	1st	4	0	I
	2nd	28	1 in 25	
2	1st	2	0	I
	2nd	26	1 in 50	
3	1st	3	1 in 50	I
	2nd	24	0	
4	1st	4	0	I
	2nd	26	1 in 200	
5	1st	3	0	III
	2nd	22	0	
6	1st	3	0	I
	2nd	23	1 in 50	
7	1st	4	1 in 25	III
	2nd	20	0	
8	1st	2	0	II
	2nd	21	0	
9	1st	2	0	I
	2nd	21	0	
10	1st	4	0	II
	2nd	16	0	
11	1st	4	0	I
	2nd	21	0	
12	1st	2	0	I
	2nd	20	1 in 25	
13	1st	3	0	I
	2nd	19	1 in 100	
14	1st	4	0	X
	2nd	20	0	
15	1st	5	0	I
	2nd	22	0	
16	1st	3	0	Unclassified
	2nd	20	0	
17	1st	4	0	I
	2nd	18	0	
18	1st	3	0	X
	2nd	20	1 in 25	
19	1st	3	0	X
	2nd	17	1 in 100	
20	1st	2	0	I
	2nd	15	0	
21	1st	4	1 in 25	Unclassified
	2nd	16	1 in 25	
22	1st	1	0	I
	2nd	12	0	

tion in dilutions of 1 in 50 and 1 in 25 respectively with the first samples, but no agglutination was obtained with either of the second samples, and both samples of serum from case 21 agglutinated the patient's own strain in a dilution of 1 in 25. When these results are examined in relation to the clinical

condition of the patients nothing of consequence can be noted. The whole series of cases was extremely mild in character. Cases 1, 2, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 16, 18, 19, 20, 21 and 22 had no secondary complication whatsoever. Case 3 developed an otitis on the 22nd day of the disease, two days before the second specimen of blood was taken; cases 9 and 15 had marked adenitis; case 17 developed an otitis on the eighth day of the illness, but this had no apparent influence on the production of agglutinins since the second specimen of serum taken on the 18th day of the disease gave no agglutination in a dilution of 1 in 25.

The classification of the various strains by the absorption tests showed that 13 cases were infected with strains belonging to Type I streptococci which, as has already been shown, is the predominant type causing scarlet fever. Two cases gave a Type II streptococcus, two a Type III, three a Type X and the strains from two cases were unclassified.

CONCLUSION.

The results indicate that the *Streptococcus haemolyticus* plays a definite part in the etiology of scarlet fever, since it has been found that 40 per cent. of cases showed a definite increase in the agglutinin titre of their serum during the course of the disease, and this increase occurred irrespective of secondary pyogenic complications.

REFERENCES.

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