

Thirty-two control sera were tested against group A extract, 30 against group B, 24 against group C, 20 against group D, 11 against groups E, F, and G. Strong precipitation reactions were observed with group A extract in only 2 cases, one a case of hemolytic streptococcus septicemia (group A) and the other a case of nephritis. The serum from the case of hemolytic streptococcus septicemia also gave a strong precipitin reaction with the crude HCl extract of both groups B and G. This result further suggests that the extracts as prepared contained common antigenic constituents.

When purified group-specific carbohydrates of groups A and B were employed as precipitinogens strong reactions were obtained with the group A material only. It should be mentioned, however, that the purified material was prepared by different methods and the results may therefore not be strictly comparable.^{8, 9}

These results in general are in accord with those of McEwen, Chasis and Alexander⁸ although these workers obtained a greater number of cross reactions. Our findings indicate that such cross reactions can be accounted for by the presence of common antigenic constituents in the various groups and that both the agglutination and precipitation reactions in rheumatoid arthritis sera are characteristic for group A hemolytic streptococci.

8508 P

Antistreptolysin Titers in Rheumatoid Arthritis.

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The findings of Todd,¹ Coburn and Pauli,² and others indicate that the antistreptolysin test furnishes an accurate method for determining the presence of recent infection with hemolytic streptococci of group A. Coburn and Pauli showed that, following hemolytic streptococcal infections, the antistreptolysin titer of the serum rises rapidly, remains elevated for a variable number of months

⁹ Heidelberger, M., personal communication.

¹ Todd, E. W., *Brit. J. Exp. Path.*, 1932, **13**, 248; *J. Path. and Bact.*, 1934, **39**, 299.

² Coburn, A. F., and Pauli, R., *J. Exp. Med.*, 1935, **62**, 137; *J. Clin. Invest.*, 1935, **14**, 769.

and gradually tends to return to normal values. In nearly all cases in their series there was an appreciable fall in titer within 6 months and within 2 years over half the cases had reached natural levels. Myers and Keefer³ studied the antistreptolysin titer in 13 cases of active rheumatoid arthritis and found that, although the titers varied considerably, the average was not greater than in normal individuals. They stated that "in most of these patients the disease had existed for many months." Blair and Hallman⁴ determined the antistreptolysin titer in 45 patients with rheumatoid arthritis and found it to be above the normal range (over 100 units per cc.) in one-third of the cases. In their report no reference was made to the duration of the disease at the time of the observations or to the nature of the onset.

We have determined the antistreptolysin titer in 219 cases of rheumatoid arthritis, including 22 cases of rheumatoid spondylitis (Marie-Strümpell). Preliminary observations indicated that in the great majority of well established cases the titer was within normal limits, irrespective of the degree of clinical activity present. However, when the sera of early cases with acute onset were examined quite different results were obtained. In the present report, therefore, the cases are divided into 2 groups, "early" and "late" cases. For convenience, cases of less than one year's duration are considered as "early" and those of longer duration are considered as "late". In addition, the nature of onset, whether acute, subacute or insidious, has been recorded in each instance.

(1) *Early cases* (less than one year's duration.) No. of cases examined 40. Median 125. (Table I.)

TABLE I.
Early Cases.

Titer	Onset	Titer	Onset	Titer	Onset	Titer	Onset
1666	Acute	200	Insidious	125	Subacute	83	Insidious
1000	"	166	Acute	125	Insidious	71	"
500+	Subacute	166	Subacute	125	"	62	"
500+	Insidious	166	"	125	"	50	"
500	Acute	166	Insidious	125	"	33	"
250	Subacute	166	Subacute	125	"	25	Subacute
250	Acute	142	"	100	Acute	22	"
250	Subacute	125	Acute	100	Subacute	20	Insidious
250	"	125	Subacute	83	"	16	Acute
250	"	125	"	83	Insidious	14	Insidious

(2) *Late cases* (more than one year's duration.) No. of cases examined 151. Median 55.

³ Myers, W. K., and Keefer, C. S., *J. Clin. Invest.*, 1934, **13**, 155.

⁴ Blair, J. E., and Hallman, F. A., *J. Clin. Invest.*, 1935, **14**, 505.

The great majority of "late" cases showed a normal titer, irrespective of whether the onset had been acute, subacute or insidious. However, it was occasionally observed that among the "late" cases acute exacerbations were attended by a marked rise in the antistreptolysin titer.

Of particular interest was a third group of cases in which the differentiation between rheumatoid arthritis and rheumatic fever could not be made with certainty. Many of these cases conformed to that type designated as "secondary chronic polyarthritis" in the German literature. Twenty-eight such cases were examined and the titers varied from 10,000 to 25, with a median of 166. As in typical cases, the great majority of early cases in this group showed a markedly increased titer, more particularly in those instances in which the onset occurred in an acute or subacute manner. It is of some interest that the median in this group was higher than that observed in typical cases of rheumatoid arthritis.

Controls. The antistreptolysin titers were determined on 91 controls—24 cases of osteoarthritis, 24 of non-articular rheumatism (neuritis, bursitis, myositis, etc.), 9 of gonococcal arthritis, 2 of gout and 32 miscellaneous sera. The median titer observed in this control group was 62. Titers above 125 were observed only in 5 instances.

Summary. In "early" cases of rheumatoid arthritis the antistreptolysin titer is usually increased. The increase in titer is particularly well marked in those cases in which the onset was acute or subacute.

8509 P

Determination of Cholic Acid in Bile and in Duodenal Drainage.

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The Gregory-Pascoe¹ reaction was found to be specific for the determination of cholic acid. The Reinhold and Wilson² modification of this method was combined with the procedure of Harwood³

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¹ Gregory, R., and Pascoe, T. A., *J. Biol. Chem.*, 1929, **83**, 85.

² Reinhold, J. G., and Wilson, D. W., *J. Biol. Chem.*, 1932, **96**, 637.

³ Harwood, R. U., *J. Lab. and Clin. Med.*, 1934, **19**, 1003.