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Site of Origin of Syphilitic Reagin in Spinal Fluid of Patients with Neurosyphilis.*

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Two theories have been offered to account for the presence of syphilitic reagin in the spinal fluid of patients with neurosyphilis: (1) that the reagin is derived from the blood by filtration due to impairment of the normal physiologic barrier,[1] (2) that the reagin is largely formed locally.[2]

It is generally accepted by immunologists that the syphilitic reagin is a true antibody, this belief being supported by the parallel behavior of syphilitic reagin and other antibodies both in the test-tube and in the body.[3] As an example of the latter, and in relation to the present problem, may be cited the conditions under which syphilitic reagin and other antibodies occur in umbilical cord blood. Thus, it has been shown that the isoagglutinins are not developed in newborn infants, and any present in such serum were derived from the mother by filtration through the placenta. In the course of a few weeks or months these "borrowed" isoagglutinins disappear and then the child forms its own.[4] The behavior of the syphilitic reagin is exactly parallel; a positive Wassermann or flocculative reaction on umbilical cord blood or the blood of newborn infants being diagnostic of syphilis in the mother and not necessarily in the child.[5]

Accordingly, one method of attacking the problem whether or not syphilitic reagin present in the spinal fluid was derived from the blood by passive transfer is the comparison of the behavior of the reagin with that of the isoagglutinins.

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1 Dujardin, B., *Ann. d. Mal. Vén.*, 1920, **129**, 129.

2 For review of literature, see: Eagle, H., *Laboratory Diagnosis of Syphilis*, C. V. Mosby Co., St. Louis, 1937.

3 Sachs and Weil, *Deutsche med. Wchnschr.*, 1925, **51**, 589; Sachs and Klopstock, *Deutsche med. Wchnschr.*, 1927, **53**, 394. For additional bibliography, see Eagle, *loc. cit.*

4 Wiener, A. S., *Blood Groups and Blood Transfusion*, p. 19, C. C. Thomas, Springfield, 1935.

5 Fildes, *J. Obst. and Gyn. Brit. Emp.*, 1915, **27**, 124; Faber, H. K., and Black, W. C., *Am. J. Dis. Child.*, 1936, **51**, 1257.

TABLE I.

Titers of Isoagglutinins and Syphilitic Reagins in Blood Serum and Spinal Fluid of Patients with General Paresis.

Blood of	Tested with	Dilution of Blood Serum									Dilution of Spinal Fluid				
		1:1	1:2	1:4	1:8	1:16	1:32	1:64	1:128	1:256	1:1	1:2	1:4	1:8	1:16
B.W.	A_1	++++	++++	++++	++++	+++	++	±	—	—	—	—	—	—	—
Group	B	++++	++++	++++	+++	+++	++	—	—	—	—	—	—	—	—
O	e.k.*	++++	++++	++++	++++	+++	+	—	—	—	++++	++++	++	—	—
R.E.	A_1	++++	++++	++++	++++	++++	+++	+±	Tr.	—	—	—	—	—	—
Group	B	++++	++++	++++	+++	+++	±	—	—	—	—	—	—	—	—
O	e.k.*	++++	++++	++++	++++	++++	++++	++++	++±	—	++++	++++	++++	++±	—
J.S.	A_1	++++	++++	+++	++	±	—	—	—	—	—	—	—	—	—
Group	B	++++	+++	+	—	—	—	—	—	—	—	—	—	—	—
O	e.k.*	++++	++	—	—	—	—	—	—	—	++++	+++	—	—	—
C.B.	A_1	++++	++++	++++	++++	+++	++	—	—	—	—	—	—	—	—
Group B	e.k.*	++++	+++	—	—	—	—	—	—	—	++++	+++	—	—	—

*Kline exclusion-emulsion.

Parallel titrations were made with the sera and spinal fluids of a series of patients with neurosyphilis in order to determine their content of reagin and isoagglutinins. In order that the findings on serum and spinal fluid might be comparable, identical technics were used in testing both sorts of fluids. In the tests for isoagglutinins, known cell-suspensions, A_1 and B, were used; the test antigen for determining the reagin-content was the so-called Kline exclusion-emulsion for heated serum.[6]

Table I summarizes a few representative experiments. If the syphilitic reagin in spinal fluid were derived by filtration from the serum, there should be a simultaneous filtration of the isoagglutinins. (Naturally, this statement is based upon the not unreasonable assumptions that the molecules of syphilitic reagin and of isohemagglutinin do not differ significantly in size, and that they are sufficiently alike in electric charge so that the blood-brain-barrier would not be likely to pass selectively only one of the antibodies.) Therefore, the ratio between the titers of the reagin in serum and spinal fluid should be approximately equal to the ratio between the titers of the isoagglutinins. Actually it was found that whereas the titer of the reagin in the spinal fluid not infrequently equalled the titer in the serum, in no instance could an appreciable amount of isoagglutinin be demonstrated in the spinal fluid even when the titer of the isoagglutinin in the serum was higher than that of syphilitic reagin.

These findings cannot readily be explained by the theory of passive filtration, and support the assumption that the syphilitic reagin in the spinal fluid of patients with neurosyphilis is at least in large part formed locally.

[6] For details of technic, see: Kline, B. S., *Microscopic Slide Precipitation Tests for Diagnosis and Exclusion of Syphilis*, Williams and Wilkins Co., Baltimore, 1932; Wiener, A. S., *J. Lab. and Clin. Med.*, 1937, **22**, 1062.