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## Therapeutic experiments with Rosenow's antipoliomyelitic serum.

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Opinions of bacteriologists on the etiology of poliomyelitis divide them into two well-defined camps. One group affirms that the streptococci bear a causal relationship to poliomyelitis and are biologically akin to the globoid bodies of Flexner and Noguchi; the other group denies that they are of essential etiologic importance and regards them as secondary invaders. The question is important because of its relation to the problems of prevention and treatment of the disease.

Because of the failure to produce in large animals a serum possessing therapeutic properties for the treatment of poliomyelitis, serum derived from recovered cases has been used. A far greater measure of success has recently been claimed in treatment of human cases by the use of serum produced in animals such as the horse by the repeated intravenous injections of streptococci. Obviously the treatment of a long series of cases from several epidemics is necessary before any definite conclusion can be reached concerning the efficiency of a specific serum. In the present case, however, we believe that the question may be more expeditiously answered by the experimental method.

An injection of minute amounts of active poliomyelitic virus intracerebrally into the monkey invariably results in paralysis and generally in death of the animal, but intravenous injections of much larger amounts of the same virus produce no symptoms. If, however, at the time of the intravenous injection or a few hours before, the meninges and choroid plexus are inflamed by the introduction of small amounts of sterile monkey, horse or human serum, or even sterile isotonic solutions of electrolytes, the virus passes from the blood into the nervous tissues and induces characteristic changes which lead to paralysis and death. Flexner and Amoss have shown that repeated injections of immune

serum invariably offset the effects of aseptic inflammation, probably by neutralizing the virus as it passes through. Two separate sets of experiments were carried out with Rosenow's serum, normal horse serum, and immune monkey serum, in order to determine whether the former contained neutralizing substances rendering it suitable for therapeutic application. The results are clearly decisive.

Experiment I, Nov. 12: *Macacus rhesus A* (control) received 50 c.c. of clear supernatant fluid obtained by centrifuging a 5 per cent. suspension of fresh active poliomyelitic tissue. The monkey remained well.

*Macacus rhesus B.* 5 p.m., November 11, received intraspinally 3.0 c.c. normal horse serum. November 12, 11:15 a.m., received 50 c.c. of the same virus suspension as Monkey *A* received. At 12 m. 3.0 c.c. normal horse serum were injected intraspinally. Repeated daily intraspinal injections of 3 c.c. normal horse serum were made until November 17, when the animal became slow. Later in the same day the animal became prostrate and died November 18. Typical lesions of poliomyelitis.

*Macacus rhesus C* received at 5 p.m., November 11, 3.0 c.c. activated Rosenow's horse serum intraspinally. On November 12 the intravenous injection of 50 c.c. of virus suspension was given, followed by intraspinal injection of 3.0 c.c. activated Rosenow's serum. The intraspinal injections were repeated daily. This monkey became slow on November 17, excited on November 19. On November 20 it dragged the right leg and climbed awkwardly. November 23, legs were paralyzed and deltoids weak. November 24, prostrate. November 26 moribund; etherized. Typical lesions of poliomyelitis.

*Macacus rhesus D* received at 5 p.m., November 11, 3.0 c.c. of pooled serum from monkey which had been paralyzed, recovered and reinforced by subcutaneous injections of active virus suspensions. On November 12 Monkey *D* received an intravenous injection of 50 c.c. of virus suspension, followed immediately by an intraspinal injection of immune serum. The intraspinal injections of the immune serum were continued for 6 days. The monkey remained well.

Experiment II differed from Experiment I only in the amount

of serum injected intraspinally. Instead of 3.0 c.c. of normal horse serum, Rosenow's serum, or immune monkey serum, 2.5 c.c. were used. The results were identical with those obtained in Experiment I.

The results of these two experiments unequivocally demonstrate that Rosenow's serum is devoid of protective power against poliomyelitic virus, while serum from paralyzed monkeys possesses perfect protective power, as has been shown previously by Flexner and Amoss.

There is a further corollary to this general deduction. Once it is established that the antibodies yielded by streptococci differ essentially from those induced by poliomyelitic virus, the contention that poliomyelitic virus and streptococci are identical becomes untenable.

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## On the comparative absorptive power for drugs of the bladder and urethra (male).

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In other communications dealing with the absorption of drugs from the conjunctiva[1] and from the vagina,[2] published elsewhere, the author called attention to the fact that apomorphin, by virtue of its being a centrally acting emetic, furnishes a convenient means of demonstrating absorption of drugs through unusual channels. If a 1 per cent. solution of apomorphin hydrochloride is introduced into the bladder of a male dog through a hard catheter, the latter instrument being allowed to remain in place, the solution remains in the bladder and owing to the powerful spasmodic contraction of the urethral sphincter in the male dog, practically none of the drug gets into the urethra. Under these circumstances vomiting may occur not sooner than half an hour after the introduction of the poison and sometimes after the lapse of an hour

[1] *Jour. A. M. A.*, 1917, LXVIII, p. 1230.

[2] *Jour. of Pharmacol. and Exp. Therap.*, Vol. X, 1918, p. 509.