

rate the statements of Spemann¹ and Vintemberger² that a transplanted dorsal lip involutes better in the marginal (mesodermal) region than in the roof of the egg. These results emphasize further that the successful involution of the dorsal lip depends specifically upon its attachment to laterally located mesoderm, rather than upon its relationship to the egg as a whole. Thus, a dorsal lip will involute well even when placed into the roof (ectoderm) of the egg, provided however that it is accompanied by a sufficient quantity of laterally located mesoderm.

Summary. Our work with *Hyla regilla* shows that the mesoderm of the dorsal lip of the blastopore has little or no inherent capacity for involution. The material immediately around the early blastopore (the pharyngeal endoderm and prechordal mesoderm), although itself having a strong capacity for involution, does not bring about the involution of the mesoderm above it. On the other hand, *excellent involution of the dorsal lip mesoderm occurs when it is transplanted together with laterally located mesoderm.*

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Vaccination of Monkeys with Agar-Tissue Cultures of European Rickettsiae.

FLORENCE K. FITZPATRICK. (Introduced by H. Zinsser.)

From the Department of Bacteriology and Immunology, Harvard University Medical School.

In a previous paper, we reported the successful vaccination of guinea pigs against European typhus, using agar-slant tissue cultures.¹ Since guinea pigs do not give a Weil-Felix reaction, and since they show very little other than a temperature during the course of a typhus infection, it seemed desirable to test our vaccine on animals which more nearly resemble man in their reactions. Three *Macacus rhesus* monkeys of approximately the same size were selected. One was reserved as a control, the other 2 were vaccinated with formalized vaccine prepared in the following manner: Rickettsiae of classical typhus were grown with minced mouse embryo tissue on agar slants for 7 to 9 days. The tissue was removed from the slants and ground in a small mortar, after which 3 cc of 0.2% formalized saline were added for each slant. (For human use, we rec-

¹ Zinsser, H., FitzPatrick, F., and Wei, H., *J. Exp. Med.*, 1939, **69**, 179.

ommend a light centrifugation at this point.) After being cultured for sterility, the vaccine was allowed to stand in the ice box for a week before use to insure the death of the rickettsiae. The vaccine was administered subcutaneously at 5-day intervals. Monkey No. 1 was given a total of 4 cc, the equivalent of $1\frac{1}{3}$ agar slant cultures, the amount used in the guinea pig experiments previously reported. Two weeks after the last dose, the Weil-Felix reaction was negative, the agglutination for European Rickettsiae $1/20++$, $1/40++$, $1/80++$, $1/160+$. Monkey No. 2 was given a total of 6 cc of vaccine, representing 2 agar slant cultures, in doses of 1, 1, 2, and 2 cc. Three weeks after the last dose this monkey's serum showed an agglutination with *B. proteus* O x 19, of $1/20$ and a Rickettsia agglutination of $1/20+++$, $1/40+++$, $1/80++$, $1/160++$, $1/320+$. No local or general reactions were observed in the animals during vaccination. The test for immunity was performed 6 weeks after vaccination on monkey No. 1, 3 weeks after on monkey No. 2. They received 4 cc of virulent passage blood intraperitoneally, a normal monkey, No. 3, serving as control. The vaccinated monkeys maintained their good appetites and remained well. The control developed fever and loss of appetite on the 7th day, these symptoms persisting for 7 days. Sixteen days after inoculation, this animal had a Weil-Felix of $1/640$ and a rickettsia agglutination of $1/1280$. There was no change in the titer of agglutinins in the vaccinated monkeys. Brain sections of the control made on the sixteenth day showed very few lesions, giving the impression that the brain had been removed too late for pathological study.

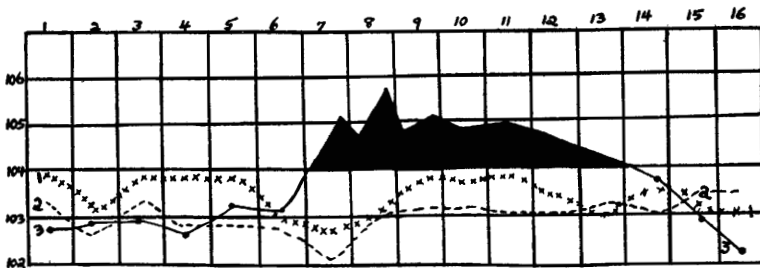


CHART 1.

Temperature curves of vaccinated monkeys (1 and 2) and of control monkey (3) after receiving 4 cc of European passage blood intraperitoneally. (Black area indicates significant temperature elevation.)