

was not possible to wash the stearin choleic acid entirely free from dye by the use of ether. When the stearin choleic acid was decomposed by boiling with xylol, the dye was set free. The content of dye was about 1%. When stearin choleic acid was treated with rose bengal all of the dye could be removed by washing with water. The results suggest that possibly a compound was formed which contained both stearic acid and fat soluble dye.

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Localizations of Poliomyelitic Virus During Incubation Period after Intranasal Instillation in Monkeys.*

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During the interval, corresponding with the incubation period in man, between intranasal inoculation of poliomyelitic virus in the monkey and the onset of spinal symptoms, the localizations of the virus are, with one exception, unknown. The exception is the olfactory bulb, where Flexner and Clark¹ found virus 48 hours after application to the nasal mucosa. At that time none was demonstrable in the medulla or spinal cord. In the present study, *Macacus rhesus* monkeys were given 3 intranasal instillations, without trauma, of active MV virus at intervals of 3 hours, or within a total period of about 6 hours. Monkeys so treated were sacrificed on the third, fourth, fifth, sixth, and seventh days, respectively. Brain and spinal cord were removed under aseptic precautions. Specimens were removed from various parts of the central nervous system, ground and suspended in physiological salt solution to approximate 10% concentration and injected intracerebrally in monkeys in 1.5-2.0 cc. amounts. These animals were observed for the appearance of the usual signs of poliomyelitis and, if positive, were examined post-mortem for gross and histological lesions.

The efficacy of the intranasal method of inoculation employed was shown by a series of 26 monkeys used in a separate study (unpublished) by Schultz and Gebhardt, in which 23, or 88%, devel-

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¹ Flexner, S., and Clark, P. F., *Proc. Soc. Exp. Biol. and Med.*, 1912, **10**, 1.

oped typical poliomyelitis. The average incubation period in these was 8.2 days (minimum, 7 days; maximum, 10 days).

The results follow:

Three days' incubation: no virus in left olfactory bulb, left thalamus, medulla, cervical and lumbar cord (pooled), cervical and lumbar intervertebral ganglia (pooled). (6 monkeys.)

Four days' incubation: virus in left olfactory bulb; no virus in hippocampus, left hypothalamus, medulla, cervical and lumbar cord and intervertebral ganglia (pooled). (6 monkeys.)

Five days' incubation: virus in left olfactory bulb, right olfactory bulb, left hypothalamus, and medulla; no virus in hippocampus, thalamus, midbrain, cerebellum, or cervical cord. (10 monkeys.)

Six days' incubation: virus in left olfactory bulb, left hypothalamus, left thalamus, right thalamus, midbrain, medulla; no virus in right olfactory bulb, hippocampus, precentral gyrus, postcentral gyrus, right hypothalamus, caudate nucleus, cerebellum, cervical cord, lumbar cord, cervical and lumbar intervertebral ganglia. (17 monkeys.)

Seven days' incubation: virus in left olfactory bulb, right olfactory bulb, hippocampus, right thalamus, midbrain, medulla, cervical cord (anterior half), cervical cord (posterior half), lumbar cord (anterior half), cervical and lumbar cord (posterior half), left intervertebral ganglia, right intervertebral ganglia; no virus in precentral and postcentral gyri (pooled), left hypothalamus, right hypothalamus, left thalamus, cerebellum, lumbosacral segment of cord. (19 monkeys.)

The experiments show a gradual advance of the infection, apparently by continuity via connecting nerve tracts, through the central nervous system during the incubation period. The pathway of invasion extends from the portal of entry in the nasal mucosa and olfactory nerves to the olfactory bulb and thence down the brainstem to the spinal cord. The cord is not invaded until the seventh day. Late in the incubation period some areas in the upper brainstem that were previously infected no longer show virus in demonstrable amounts.