phagia. The spinal cord was the seat of corresponding changes; the membranes, except for slight mononuclear cellular infiltration, were normal. The cord itself was edematous and the nerve cells were degenerated. The nuclei of many of the nerve cells contained an acidophilic, granular material. Inclusion bodies were not detected.

The identification of the neurotropic nature of the vesicular stomatitis virus is based first on the characteristic local lesions following, invariably, the injection of pads with active brain tissue. These reactions are more marked than those obtained with ordinary pad virus, thus indicating a greater activity of the neurotropic virus. The second means of identification depends on cross-immunity, that is, animals recovered from a brain inoculum are immune to the original vesicular stomatitis virus injected in their pads, and conversely, guinea pigs recovered from pad inoculation of original virus develop resistance in their pads and in their central nervous system against active cerebral tissue.

Brain material retained its neurotropism after storage for at least 32 days in 50% glycerol. It was also found to be active in the cerebrospinal system of rabbits and white mice. Experiments with mice are still in progress.

In conclusion, a neurotropic strain of vesicular stomatitis virus has been described, which may prove of value when bacteria-free, yet unfiltered, active material is desired—heretofore unobtainable with pad virus.

6616

Further Studies on Neurotropism of Vesicular Stomatitis Virus.

HERALD R. COX AND PETER K. OLITSKY.

From the Laboratories of The Rockefeller Institute for Medical Research, New York.

In a preceding report[1] we have shown that intracerebral inoculation of guinea pigs with the virus of vesicular stomatitis of horses induces characteristic degenerative lesions in the organs of the central nervous system, and after the virus had become fixed by

[1] Cox, H. R., and Olitsky, P. K., PROC. SOC. EXP. BIOL. AND MED., 1933, **30**, 653.

several brain passages in guinea pigs, it exhibited neurotropic action in white mice and rabbits.

After 25 consecutive transmissions of the virus in guinea pig pads, the Indiana and New Jersey strains, already described,[1] were filtered through Seitz' discs and inoculated intracerebrally into white mice.* The amount injected was 0.03 cc. of filtrate, derived from 1:10 suspension of affected pad tissue ground in hormone broth at pH 7.5.

Within 30 to 40 hours after injection of either the Indiana or New Jersey strain, the mice develop marked hypersensitiveness, ruffling of the hair, tremors, weakness of the legs, ataxia, and spastic paralysis of the posterior extremities associated with generalized involuntary muscular contractions. The disease is uniformly fatal 48 to 72 hours after inoculation. To the present, 8 brain to brain passages have been made, and all the mice inoculated have developed symptoms.

The histopathological changes in the brain consist of edema and small, localized hemorrhages in the cerebrum. The meninges, however, are not involved. The characteristic lesion is the pronounced necrosis of most of the neurones, especially those of the motor nuclei in the brain stem. The cerebellum is also affected and a massive destruction of the Purkinje cells occurs along with invasion of their layers by an occasional monocyte. The spinal cord reveals a similar necrosis of the neurones.

The identification of the virus as that of vesicular stomatitis is based on cross immunity tests in the guinea pigs, using the guinea pig pad and mouse brain viruses.

White and hooded rats were also found to react to the intracerebral inoculation of filtered suspensions of guinea pig pads showing the vesicular stomatitis lesions. Rabbits, on the other hand, proved to be completely resistant, as previously confirmed.[2]

In conclusion, the neurotropism of vesicular stomatitis virus has again been demonstrated and the white mouse shown to be suitable as a substitute for the guinea pig as an experimental animal.

In view of the fact that vesicular stomatitis virus may be regarded as having a generic relationship to the incitant of foot-and-mouth disease,[3] the use of the white mouse may prove advantageous in experimental work with the latter virus.

* Ether anesthesia was used in all operations on animals.

[2] Olitsky, P. K., *J. Exp. Med.*, 1927, **45**, 969.

[3] Olitsky, P. K., in Rivers, T. M., Filterable Viruses, Williams and Wilkins Company, Baltimore, 1928, 205.