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Distribution of Virus of Louping-ill in Blood and Brain of Intranasally Infected Mice.

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Mice given an intranasal instillation of louping-ill virus, following an incubation period of 6-7 days, regularly develop signs of encephalitis and die 8-10 days after inoculation with characteristic lesions in the central nervous system.^{1, 2} Studies on the presence of the virus in blood and brain of intranasally inoculated mice will now be reported.*

White-face and Swiss mice have been inoculated by dropping into the nose 0.03 cc. of a 1 to 10 suspension in physiological salt solution of the brains of mice dying of louping-ill. The virus content of the blood has been studied in 2 ways. In one experiment mice were inoculated and bled twice daily from the tail for 8 to 9 days—that is, until dead. One or 2 drops of blood were collected in 0.25 cc. of a solution of heparin, 1-1,000 in salt solution, and 0.03 cc. of this was inoculated into each of 2 other mice. In the second case, 36 mice were inoculated and 4 were killed daily, the whole blood being withdrawn directly from the heart and inoculated immediately into 2 mice. The mice were then killed, the brains removed and emulsified, and this suspension was also inoculated into other mice.

The results of these experiments showed that virus did not appear in the blood stream of nasally infected mice in quantity until the 2nd day after inoculation. From then on to the 6th day, when the mice became sick, the virus was usually demonstrable in the blood. After the 6th day, until the animals were moribund, the virus tended to disappear. The brains of these mice occasionally contained demonstrable virus as early as the first day but in 50% of cases not until the 3rd day. After the 3rd day the virus was invariably present in large amounts.

¹ Webster, L. T., and Fite, G. L., *PROC. SOC. EXP. BIOL. AND MED.*, 1933, **30**, 656.

² Elford, W. J., and Galloway, I. A., *J. Path. and Bact.*, 1933, **37**, 385.

* Greig, Brownlee, Wilson and Gordon³ and MacLeod and Gordon⁴ have demonstrated the virus in the blood stream of experimentally infected sheep.

³ Greig, J. R., Brownlee, A., Wilson, D. R., and Gordon, W. S., *Vet. Rec.*, 1931, **11**, 253.

⁴ MacLeod, J., and Gordon, W. S., *J. Comp. Path. and Therap.*, 1932, **45**, 240.

To correlate the appearance of virus in blood and brain of nasally infected mice with the appearance of lesions in the central nervous system, groups of white-face mice were inoculated intranasally and 4 killed each day for 8 days. The brains and cords were sectioned and stained for study. Definite lesions were not observed before the 5th day, at which time they were not extensive. On the 6th and 7th days, however, the lesions were fully developed.

It appears, therefore, that louping-ill virus introduced into the noses of susceptible mice gains access to blood and brain and is demonstrable in both by the 2nd day. It persists in the blood until cortical lesions develop and the animal becomes ill, at which time it tends to disappear. Virus is present in the brain at least 4 days before the animal appears sick and persists and multiplies there until the animal succumbs to encephalitis.

TABLE I.

Relation of Presence of Louping-Ill Virus in Blood and Brain of Intranasally Inoculated Mice to Appearance of Central Nervous System Lesions and Course of Disease.

Remarks	Days after Intranasal Inoculation									
	1	2	3	4	5	6	7	8	9	10
Virus in blood	0	+	+	+	+	±	±	±	±	±
" " brain	±	+	+	++	++	++	++	++	++	++
Lesions in central nervous system	0	0	0	0	±	+	++	++	++	++
Signs of disease	0	0	0	0	±	+	++	++	++	++

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Ultra-Filtration Experiments with the Encephalitis Virus from the St. Louis Epidemic.

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Webster and Fite¹ showed recently that the virus isolated from cases of encephalitis in the St. Louis and Kansas City epidemics of 1933, passes through Berkefeld N candles in a relatively high concentration. While these findings indicate that the virus particles are exceedingly small, it was considered of interest to determine

¹ Webster, L. T., and Fite, G. L., *Science*, 1933, **78**, 463.