STUDIES OF RABIES STREET VIRUS IN THE SYRIAN HAMSTER

REGINALD L. REAGAN, H. ODETTE LINEWEAVER, DOROTHY M. SCHENCK,
AND A. L. BRUECKNER

*Live Stock Sanitary Service Laboratory, Maryland State Board of Agriculture, University of
Maryland, College Park, Maryland*

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The rabies virus, strain V 308, used in the present study was isolated in Swiss albino mice from a dog brain sent to this laboratory for a routine examination for rabies. The history of this strain is given in a previous paper which dealt with electron microscopy studies of Negri bodies (Reagan and Brueckner, 1950). The strain was pathogenic for 2 species of bat (Reagan and Brueckner, 1951). Each of six 4-week-old Swiss albino mice was inoculated intracerebrally with 0.03 ml of a 10 per cent virus-bearing brain suspension of the second mouse passage which titrated 10^{-4} in mice. Six days after injection the mice showed tremors and paralysis, but no evidence of furious rabies was noted. The brains of 4 paralyzed mice were removed aseptically. Touch preparations from the Ammon's horns of these brains were stained with Sellers' stain (Sellers, 1927) and, upon examination under an optical microscope, were found to contain numerous Negri bodies. A 10 per cent suspension in physiological saline of these mouse brains was used to initiate the present study in hamsters. The titer of this material in mice was $10^{-3.5}$.

Diagnosis of rabies in a hamster was made on the following factors: presence of symptoms of rabies in the hamster and demonstration of Negri bodies in the Ammon's horn of the hamster brain. The presence of Negri bodies was determined by staining touch preparations of the Ammon's horn with Sellers' stain and examining the slides under an optical microscope.

Thirty-six healthy Syrian hamsters (age 18 days) were divided into 9 groups of 4 hamsters each. The hamsters of each group were administered the virus by one of the following methods: intracerebral, intraperitoneal, intradermal, intravenous, intratesticular, intramuscular, and intralingual; and rectal and intranasal instillations. In all routes of exposure, the inoculum per hamster consisted of 0.03 ml of 10 per cent virus-bearing mouse brain suspension (third mouse passage).

After symptoms of rabies appeared, some hamsters were allowed to die to determine the length of time elapsing between onset of symptoms and death. The remainder of the hamsters were sacrificed when symptoms were evident. In both cases the brains of the hamsters were removed and examined for the presence of Negri bodies.

Serial passages were continued from hamster to hamster for 5 passages by intracerebral inoculation and for 3 passages by intranasal instillation. The hamster brains of each passage were removed aseptically. After microscopic examination showed the presence of Negri bodies, the brains were ground with alundum and

diluted to a 10 per cent suspension with physiological saline. For the intracerebral series, 0.03 ml of suspension was inoculated intracerebrally into each hamster of the second subculture, and the same method was used for the succeeding passages. In the intranasal series, 0.03 ml of suspension was instilled nasally in both nostrils. The animals were anesthetized before exposure in all cases. No attempts were made to pass the virus from hamsters showing symptoms of rabies after infection by the other methods.

EXPERIMENTAL RESULTS AND DISCUSSION

Table 1 shows the response of hamsters infected with rabies virus by different routes of exposure. All hamsters exposed succumbed to the disease. The time

TABLE 1
Response of hamsters to rabies virus

ROUTE OF INOCULATION	NO. OF ANIMALS EXPOSED	NO. SHOWING SYMPTOMS	MINIMUM-MAXIMUM INCUBATION PERIOD* (IN DAYS)
Intraperitoneal.....	4	4	9-10
Rectal.....	4	4	9
Intradermal.....	4	4	9-10
Intratesticular.....	4	4	9
Intravenous.....	4	4	7-10
Intramuscular.....	4	4	9
Intralingual.....	4	4	7-9
Intracerebral			
passage 1.....	4	4	4-6
passage 2.....	4	4	4-5
passage 3.....	4	4	4
passage 4.....	4	4	4
passage 5.....	4	4	4
Intranasal			
passage 1.....	4	4	8-12
passage 2.....	4	4	8-12
passage 3.....	4	4	6-9

* Incubation period = time between exposure to virus and onset of symptoms.

between administration of the virus and onset of symptoms ranged between 4 to 6 days for hamsters infected intracerebrally and between 6 to 12 days for hamsters infected by other routes.

All hamsters infected intracerebrally and intranasally showed the furious form of rabies with such manifestations as extreme irritability, spasms, excessive salivation, inability to swallow, and occasional guttural cries. Several hamsters showed excessive scratching of the mouth area with the forepaws followed by complete paralysis, prostration, and death within 24 hours. Hamsters infected by the other routes generally exhibited the furious form of rabies, but occasionally the dumb form was noted.

Although the V 308 strain generally produced furious rabies in the Syrian

hamster, it produced the dumb form of rabies in Swiss albino mice. Yen (1936*a, b*) working with a different strain of rabies virus found that Chinese hamsters infected intracerebrally showed the dumb form of rabies.

SUMMARY

A strain of rabies virus isolated from a dog brain and passaged 3 times in Swiss albino mice has been successfully transmitted to the Syrian hamster for one passage using the following routes of exposure: intracerebral, intraperitoneal, intradermal, intravenous, intratesticular, intramuscular, rectal, intranasal, and intralingual. The virus was carried for 5 serial passages by intracerebral inoculation and for 3 passages by intranasal instillation. Serial passage was not attempted by the other routes of exposure.

This strain of virus, which had produced paralytic rabies in mice, generally produced furious rabies in the hamsters.

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