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RESEARCH NOTES/CASE REPORTS

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Experimental Infection of Vampire Bats with Foot and Mouth Disease Virus

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Vampire bats (*Desmodus rotundus*) are confirmed transmitters of rabies virus, especially to cattle (Acha, 1967, Bull. Off. Int. Epizoot. 67: 342–382), and have also been shown to be capable of infection with *Brucella* sp. (Ricciardi et al., 1976, J. Wildl. Dis. 12: 52–54) and with bovine and equine trypanosomes (Bühler et al., 1965, Acta Trop. 22: 204–216). An early study of the virus of foot and mouth disease in vampire bats done in Brazil (Torres, 1935, Rev. Dep. Nac. Prod. Animal 2: 417–420) indicated that although the bats did not become infected, they could transmit the virus mechanically to domestic animals. This study did not have the advantages of present systems for studying this virus.

Understanding the epizootiology of foot and mouth disease virus in order to bring about its control through sanitation measures, requires an elucidation of the possible role of vampire bats of transmitting this virus between cattle. To obtain this type of information the following experimental infections of vampires were made with strains O and A of foot and mouth disease virus.

Three experimental studies were conducted. The first study was carried out with five captive vampire bats, infecting them with strain OcaE71 of foot and mouth disease virus. The bats were kept individually in separate cages and maintained on a diet of defibrinated blood. They were inoculated intranasally/orally (without scarification) with 0.10 ml of the modified live virus vaccine (OcaE71 sm susp. 1/10, titer $10^{7.8}$/0.05 ml) (strain O) (origin: Venezuelan bovine, 1973, four passages in BHK_{21}, vaccine elaborated in the Vesicular Diseases Section [VDS], Instituto de Investigaciones Veterinarias [IIV], Maracay, 1978).

Saliva was sampled with cotton tipped swabs on days 0 (before inoculation), 1, 3, 4, 8, 9, 18 and 25 postinoculation (DPI). The cotton swabs were placed in 2-ml vials with 1 ml of maintenance medium and stored at −70 C. Later the suspension was inoculated into 5-day-old laboratory mice with 0.05 ml of suspension intraperitoneally. Isolations of virus from mice were confirmed by complement fixation tests.

The second study was conducted with 10 captive vampire bats, kept similarly as in the first study. They were inoculated with two drops (0.05 ml) into each nasal fossa with a suspension of triturated whole suckling mice diluted 1/60 (titer of 1/60 susp. $10^{4.5}$/0.05 ml) with strain A32E9 clone 108-I (strain A) (origin: Venezuelan bovine, 12 passages in BHK_{21}, isolated by VDS, IIV, Maracay, 1974). Saliva was sampled from the bats as in the first test on 0 (prior to inoculation), 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 and 15 DPI. Isolations of virus were done as in test one and were confirmed by the complement fixation test.

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A third test was made with five vampire bats which were inoculated with 1 ml in each nasal fossa of strain Ocura71 (diluted 1/40,000, the diluted suspension of which titered $10^{4.5}$/0.05 ml) (strain O) (origin: Venezuelan bovine, three passages in BHK_{21}, isolated by VDS, IIV, Maracay, 1977). Saliva from the vampires was sampled on 0 (before inoculation), 1, 2, 3, 4, 6, 7, 8 and 9 DPI. Isolations of virus were made as in the first test and likewise confirmed by the complement fixation test.

In the first test (oral-nasal route), virus was recovered from five of five bats through 4 DPI, and from two of four bats on 9 DPI. One bat of this test died at 9 DPI and two others died at 18 DPI. Virus was recovered from heart tissue of all three dead bats.

In the second test (nasal route), virus was recovered from one of 10 bats through 6 DPI and from another bat at 1 DPI. In the third test (nasal route) virus was recovered from only one bat (of five) at 1 DPI.

All virus isolations were confirmed as being identical to the strain inoculated by the complement fixation test.

The recovery of strains of foot and mouth disease virus from the saliva of experimentally infected vampire bats from 1 to 9 DPI indicates that this species needs to be further studied to determine its possible role in the natural epizootiology of this disease in South America.

The death of three of five bats infected with strain OcaE71, a vaccine strain (inoculated nasally/orally), and the variability in infections between the three tests, indicated a varied response of vampires to strain, dose, inoculation route, or combinations of these. In any case further studies to elucidate this aspect would be useful.

Should future experimental studies of captive vampire bats show their capability of becoming infected through feeding on infected bovines and transmitting the virus to non-infected cattle, clearly needed then are field studies of virus prevalence in wild vampires in regions where cattle are known to be infected.

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