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INFECTIVITY AND DISTRIBUTION OF SKUNK
RABIES VIRUS IN MICE FOLLOWING ORAL
AND PARENTERAL ADMINISTRATION

by

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A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Laboratory Medicine

KANSAS STATE UNIVERSITY

Manhattan, Kansas

1980

Approved by:



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INTRODUCTION

Rabies is one of the world's oldest and deadliest zoonoses. It is caused by a neurotropic rhabdovirus. Viral proliferation in the central nervous system results in a gruesome clinical disease in man and animals. This zoonoses is present worldwide (Kaplan, 1977). Because of its human and veterinary medical significance, rabies, for centuries, has been the target of extensive studies, especially since the time of Pasteur. Certain aspects of this disease, however, remain unresolved.

One is the question of rabies viremia. The rabies virus is capable of replicating in a variety of non-nervous tissues, including tissue cultures (Wiktor and Clark, 1975). Thus, several workers have considered the possibility of a hematogenous pathway in the spread of the virus in the body of rabid individuals. The missing evidence to support this hypothesis is the failure to regularly demonstrate the rabies virus in the blood.

If rabies viremia occurs consistently, the implications --aside from the pathogenesis--would be great. Oral infection has been demonstrated; hence, viremic blood could be a good common source of rabies infection and transmission, as for example vampire bats (Desmodus rotundus) and arthropods feeding on a bovine host. Noble and Noble (1976) mentioned in their book *Parasitology: The Biology of Animal Parasites* that "rabies of many mammals in the USSR has been reported as being transmitted by ticks...", and studies on rabies

transmission by ticks continue in that country (Vanag, 1978).

Other implications are related to finding viremia in rabies. It would focus attention on development of much better rabies prophylaxis or therapeutics. The blood could be an appropriate diagnostic specimen, especially in cases where the brain is not available or the disease is not yet terminal. In public health, a generalized distribution of the rabies virus, particularly in the blood, would emphasize the danger of eating raw or inadequately cooked food from rabid animals, handling dead rabies cases as in autopsies, and in receiving tissue or organ transplant from rabid donor. The possibility of these kinds of rabies infection in man are not remote as may be imagined. Rabies in cattle and swine and in wild food-animals occurs in many parts of the world, and the slaughter of animals in the incubation period of the disease could place virus-infected meat and products in the market. In certain areas, particularly the Far East and Africa, local customs of eating raw or undercooked meat could make rabies a real food-related hazard. Lastly, the danger of rabies being acquired from the laboratory or from receiving transplant is already documented in three human cases, the most interesting being that of a woman who got rabies from a corneal transplant (Houff et al., 1979; U.S. Center for Disease Control, 1979).

The present study dealt with rabies viremia in mice infected with a skunk rabies strain by three routes: oral, intramuscular, and intranasal. Parenteral inoculation by the bite is the foremost and classic mode of rabies trans-

mission, but nonbite transmission by inhalation or ingestion of rabies-infected material has been proven and, therefore, had to be considered.

The isolate used was from a naturally-rabid striped skunk (Mephitis mephitis). This wildlife species is one of the leading reservoirs of rabies in the United States, being by far the most commonly reported rabid since 1961 (Parker, 1975).

This investigation also compared the infectivity of the skunk rabies virus by the intramuscular, intranasal, or oral routes. The organ distribution of the virus at the terminal stage consequent to these routes of inoculation was determined.

LITERATURE REVIEW

Rabies history dating back to the records of antiquity and extending up to the middle of the present century has been thoroughly reviewed by Steele (1975). Throughout this period, some ancient mythologies aside, people knew rabies transmission to be exclusively by rabid animal bite or saliva contamination of pre-existing wounds or lesions. Hence, according to Steele, the Roman writer Cardanus described the infectivity of saliva of rabid dogs while Celsus, a first century A.D. physician, emphasized the danger in all rabid animal bites and recommended "caustics, burning, cupping, and also sucking the wounds of those bitten".

In their rabies historical reviews, Tierkel (1971) and