

NOTES

Naturally Acquired Rabies in an Armadillo (*Dasypus novemcinctus*) in Texas

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The first case of rabies in an armadillo is reported. The rabies fluorescent-antibody test and mouse inoculation procedure were used to substantiate the presence of the virus. The Centers for Disease Control authenticated our findings and was able to determine the source of infection by monoclonal antibody typing.

Forty years ago human rabies was a zoonotic disease resulting from the association of humans with domestic animals. Immunizations and animal control efforts have limited the prevalence of the disease primarily to wildlife. When domestic animals do become infected, their exposure usually results from contact with rabid wild animals rather than domestic animals.

Wildlife species, skunks predominantly, are responsible for most of the rabies-positive animals confirmed at the Texas Department of Health. In 1984, 91% of all reported rabies cases in Texas occurred in wildlife species (1). Of this 91%, 81% occurred in the striped skunk *Mephitis mephitis* (Schreber). Bats, at 17%, had the second highest rate of positivity. Combined, skunks and bats constituted 98% of the rabid wildlife reported in 1984. Similar numbers have been reported each year through 1987, with skunks and bats constituting from 94 to 98% of all rabid wildlife.

The purpose of this paper is to report the first case of rabies in the armadillo *Dasypus novemcinctus* (Linnaeus) in the United States.

In Hillsboro, Tex. (Hill County), about midday on 29 March 1987, a 10-year-old girl observed an armadillo walking in a supermarket parking lot. It is unusual for this species to be seen within a residential area during daylight. When the girl grasped the animal's "shell," the armadillo humped up but made no effort to escape. The animal was taken to the family home and released into the backyard. Fearlessly, it roamed the backyard. It actively approached the girl's father, who had to kick it away to avoid contact. That evening, the animal was placed in a wire cage in the garage, from which it actively tried to escape by digging. Later that evening it was observed lying on its side in the cage, with frothy saliva around its mouth. The cage was covered and left for the evening. The next day the animal was found dead.

Aware of the prevalence of rabies in wildlife, especially skunks, the local veterinarian removed the head. The head was submitted to the Texas Department of Health for rabies examination.

On receipt in the laboratory, the brain was removed, and impression smears were made from the hippocampus, cerebellum, and brain stem. These smears were tested by the rabies fluorescent-antibody procedure. Initially, smears

were stained with fluorescein isothiocyanate (BBL Microbiology Systems)-conjugated antirabies conjugate diluted in normal rabbit brain suspension. This test showed numerous, typical specific fluorescing particles of 4+ intensity and density. Control slides gave appropriate results. Because of the findings in such a unique animal, the test was repeated using Centocor fluorescein isothiocyanate-conjugated antirabies monoclonal antibodies. Additional slides were made from all three test sites. The Centocor conjugate was diluted both in normal and rabies-infected mouse brain suspensions. The test side, diluted in normal brain suspension, gave 4+ positive fluorescence. The control side, diluted in rabies-infected brain suspension, gave negative results, with no evidence of nonspecific staining.

Because this was the first case of a rabid armadillo in Texas, the sensitive mouse inoculation test was done for confirmation. Eight suckling mice were inoculated with 0.03 ml of a 10% suspension of the brain material and observed daily for death or evidence of illness. On day 12, three mice were ill and were sacrificed. The brains of these animals were examined by the rabies fluorescent-antibody test using BBL conjugate. All were found to be rabies positive. On day 13, one dead mouse was found eaten and unsuitable for testing. On day 16, the other four mice were moribund and were sacrificed without testing.

A portion of the armadillo brain was sent to the Centers for Disease Control Rabies Laboratory for monoclonal antibody typing of the virus (2). Their results showed that the armadillo virus was identical to that found in skunks of the south central states. Hill County reported six cases of skunk rabies from seven animals submitted in 1987.

The structure of armadillos is unique among mammals. They possess a heavy coat of armor called a carapace, with large shields on the shoulders and rump. There are nine movable bands between the shields; thus, they are referred to as nine-banded armadillos. These bands are not rigid but are connected by folds in the skin. This allows the armadillo to bend its body to some extent, like an accordion (3). It is not flexible enough to roll up completely, like a ball, and its soft underbelly is not protected by armor. Armadillos have a series of simple, peglike cheek teeth set well back on the jaws. They are insectivores and have large, strong claws used to probe for food. They depend on their frantic speed, especially through thorny vegetation, to keep them clear of

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pursuers. Few predatory animals can match their skittering course. If an armadillo is caught, the underbelly is vulnerable. Because it is not protected by the carapace, the soft underbelly seems the likely area of viral entry following exposure to a rabid skunk.

This is the first reported case of rabies in an armadillo. This species is not to be considered a major vector or reservoir of the disease. This case does demonstrate two important lessons. The first is the need for humans to avoid any contact with wild animals, especially ones that behave abnormally. Any attempt to take them as pets must be discouraged. The second is the possibility of rabies infection in any mammalian species. Laboratorians and veterinarians should never assume a species to be free from rabies infection because it has never been reported in the species.

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