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Source: Bulletin of the Wildlife Disease Association, 1(3) : 31-32

Published By: Wildlife Disease Association

URL: https://doi.org/10.7589/0090-3558-1.3.31

Bull. Wildlife Disease Assoc.
Vol. 1, July, 1965 pp. 31-32

Antibodies to *Myxovirus Parainfluenza 3* In Sera of Wild Deer[1]

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Received for publication 30 April 1965

Neutralizing and hemagglutination-inhibiting (HI) antibodies to *Myxovirus parainfluenza 3* were detected in sera of wild deer from India and the United States. The Indian specimens were from chital deer (*Axis axis*) in Kanha Park, a wildlife conservation area in Madhya Pradesh. They were collected from tranquilized deer, except for one specimen from a recently dead animal. The U. S. specimens were collected from recently killed white-tailed (*Odocoileus virginianus*) deer and sika (*Cervus nippon*) deer in Maryland and Virginia. The white-tailed deer came from Aberdeen Proving Ground north of Baltimore and had contact with cattle on the outskirts of the area. The sika deer were from a discrete environment in which they had little or no contact with mammals from other places. Both species were new to the areas since the late 1920's. Before that time there had been no deer in either area for a period of approximately 50 years.

A total of 49 sera were tested. Positive and negative reference sera prepared in guinea pigs were included in each test. Neutralization tests were performed with sera inactivated at 56°C/30 min. against 2.0 to 3.0 log units of *parainfluenza 3* virus of human origin. Antibodies were detected in sera of 6 of 10 chital, one of the 27 white-tailed, and none of 12 sika deer. Neutralizing antibody titers expressed as dilution of serum before virus addition ranged from 1:11 to 1:56. Antibodies were detected in sera from five of six chital adults, and one of three yearlings; a single specimen from a deer less than one year old was without antibodies. In 1:5 dilution, the positive sera also neutralized 2.0 log units of bovine strain SF 4 of *parainfluenza 3* virus.

For hemagglutination-inhibition tests, sera were inactivated and treated with kaolin (Togo, 1964, *Amer. J. Hyg.* 79, 250-257) or with commercially prepared receptor-destroying enzyme (RDE) (Chanock and Johnson, 1964, in "Diagnostic Procedures for Viral and Rickettsial Diseases," APHA, p. 470). Antibodies in titers ranging from 1:20 to 1:80 were detected in 4 of 10 chital, 1 of 27 white-tailed deer, and 1 of 12 sika deer. Among the U. S. specimens, the single serum with HI antibodies

[1] This investigation was supported by Public Health Service Grant GM 11326-04 from the National Institutes of Health to the Johns Hopkins Center for Medical Research and Training, and by a General Research Support Grant from the National Institutes of Health to the Johns Hopkins University School of Hygiene and Public Health.

(titer 1:80) also had a neutralization titer (1:56). In four of the Indian specimens, both HI and neutralizing antibodies were demonstrable. Two sera with low titers of neutralizing antibodies (1:11) were without demonstrable HI antibodies. Two other sera without neutralizing antibodies, but with inhibition at the lowest dilution at 1:10, were interpreted as negative.

In HI tests with *parainfluenza* viruses 1 and 2, all sera were negative. All of the Indian sera were negative when tested for HI antibodies to arboviruses Japanese B encephalitis, chikungunya and dengue 1, and for antibodies to *Brucella abortus* in precipitin tests.

The finding of antibodies to *parainfluenza 3* virus in sera of deer adds another host to the list of mammals naturally infected with this virus. In addition to the well documented infections of man and cattle, there is serological evidence of *parainfluenza 3* infection of sheep and of free-living rhesus monkeys (Fischman, 1965, *Proc. Soc. Biol. Exp. Med., 118,* 725; Shah and Southwick, 1965, *Ind. J. Med. Res. 53* (6)). In contrast, parainfluenza viruses 1 and 2 seem to have a more limited distribution.

In this small sample, the antibody prevalence in Indian deer (6 of 10) was higher than in the U. S. deer (1 of 39). A reason for this finding may be that in Kanha Park, the deer are more likely to be in contact with cattle which graze in the same forests and compete for forage. Additional evidence for the low prevalence of *parainfluenza* 3 antibodies in U.S. deer is provided by two studies. Antibodies to parainfluenza 3 virus were not detected in 100 deer sera from upstate New York (Kahrs *et al.,* 1964, *Cornell Vet.,* 54: 360-369) nor in sera from 18 reindeer in New York State (Bolton and Murphy, 1964, *Am. J. Vet. Res.,* 25: 178-181).