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CORONAVIRUS DISEASE 2019 UPDATE (451): ANIMAL, USA, WILD DEER

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https://www.cidrap.umn.edu/news-perspective/2021/12/third-ohio-deer-test-positive-covid-19-virus

Researchers have found SARS-CoV-2 in 36% of white-tailed deer in Ohio, with evidence of deer-to-deer spread, according to a study late last week in Nature [see reference below].

Though a study last month [November 2021] found about the same level of COVID-19 infection in Iowa deer and Canada reported SARS-CoV-2 in deer earlier this month [December 2021], evidence from the new study "leads toward the idea that we might actually have established a new maintenance host outside humans," said Andrew Bowman, associate professor of veterinary preventive medicine at the Ohio State University and senior author, in an Ohio State news release [https://www.eurekalert.org/news-releases/938738].

Ohio State University scientists obtained nasal swab samples from 360 white-tailed deer at 9 sites in January through March 2021 in north eastern Ohio and found that 129 (25.8%) tested positive for SARS-CoV-2 via real-time polymerase chain reaction (PCR). The deer had been culled in an effort to control the population. Each site was sampled up to 3 times, for a total of 18 sample collection dates.

Deer in 6 locations were infected with 3 SARS-CoV-2 lineages (B.1.2, B.1.582, B.1.596 -- none of which are variants of concern). The B.1.2 viruses, dominant in people in the state at the time of testing, infected deer at 4 sites. The researchers analyzed the evolutionary relationships of the lineages and found evidence for 6 human-to-deer transmission events. The authors also note, "Probable deer-to-deer transmission of B.1.2, B.1.582, and B.1.596 viruses was observed," as they noted mutations to the viral spike protein in some deer samples that are not commonly seen in human infections.

The investigators said the prevalence of infection varied from 13.5% to 70% across the 9 sites, with the highest prevalence observed in 4 sites that were surrounded by more densely populated neighborhoods. "Based on evidence from other studies, we knew [deer] were being exposed in the wild and that in the lab we could infect them and the virus could transmit from deer to deer. Here, we're saying that in the wild, they are infected," Bowman said in the release. "And if they can maintain it, we have a new

potential source of SARS-CoV-2 coming into humans. That would mean that beyond tracking what's in people, we'll need to know what's in the deer, too."

Sample collection occurred before the more transmissible delta and omicron variants were known to be infecting people, and the Ohio State team did not detect either variant in the deer. The researchers are testing more samples to check for new variants as well as older variants to see if indeed the deer population is serving as a viral reservoir. "The working theory based on our sequences is that humans are giving it to deer, and apparently we gave it to them several times," Bowman said. "We have evidence of 6 different viral introductions into those deer populations" He said of the study, "It could complicate future mitigation and control plans for COVID-19."

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[Reference

Hale VL, Dennis PM, McBride DS, et al. SARS-CoV-2 infection in free-ranging white-tailed deer. Nature. 2021 Dec 23. doi: 10.1038/s41586-021-04353-x.

White-tailed deer (_Odocoileus virginianus_) is the cervid most widely distributed east of the Rocky mountains. The ACE2 receptor (where SARS-CoV-2 binds to enter the cell) of white-tailed deer is very similar to that of humans. An experimental study (doi: 10.1128/JVI.00083-21) showed that this species, after intranasal inoculation, becomes infected by SARS-CoV-2, sheds the virus and transmits it to non-inoculated contact deer.

A number of reports now have confirmed high prevalences in wild white-tailed deer populations in USA and Canada. The consistent findings strongly suggest that following introduction of SARS-CoV-2 from humans, transmission is occurring among deer at a rate which make deer populations a suitable compartment where the virus may be maintained. It is crucial that surveillance and more research is conducted in this species to prevent that the virus finds in this deer a niche where to be maintained and evolve circulating endemically as immunity in people builds up globally due to natural infection and vaccination. It is also crucial that surveillance efforts are uptaken in other deer of the Capreolinae subfamily (New World deer). - Mod.PMB

ProMED map:
Ohio, United States: https://promedmail.org/promed-post?place=8700589,237]

See Also

COVID-19 update (413): animal, Canada, wild deer 20211202.8700020
COVID-19 update (373): animal, USA, wild deer, transmission 20211102.8699412
COVID-19 update (260): animal, USA, wild deer, exposure, RFI 20210729.8554149
COVID-19 update (20): animal, deer, experimental infection 20210116.8108967
2020

COVID-19 update (536): animal, USA (UT) wild mink, 1st case 20201213.8015608
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