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CORONAVIRUS DISEASE 2019 UPDATE (373): ANIMAL, USA, WILD DEER, TRANSMISSION

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Date: Mon 1 Nov 2021
Source: bioRxiv [edited]
https://www.biorxiv.org/content/10.1101/2021.10.31.466677v1

ref: Kuchipudi SV, Surendran-Nair M, Ruden RM, et al. Multiple spillovers and onward transmission of SARS-CoV-2 in free-living and captive white-tailed deer (_Odocoileus virginianus_) bioRxiv 2021.10.31.466677

Many animal species are susceptible to SARS-CoV-2 and could potentially act as reservoirs, yet transmission in non-human free-living animals has not been documented. White-tailed deer (_Odocoileus virginianus_), the predominant cervid in North America, are susceptible to SARS-CoV-2 infection, and experimentally infected fawns transmit the virus to other captive deer. To test the hypothesis that SARS-CoV-2 may be circulating in deer, we evaluated 283 retropharyngeal lymph node (RPLN) samples collected from 151 free-living and 132 captive deer in Iowa from April 2020 through December 2020 for the presence of SARS-CoV-2 RNA. 94 of the 283 deer (33.2%; 95% CI: 28, 38.9) samples were positive for SARS-CoV-2 RNA as assessed by RT-PCR. Notably, between [23 Nov 2020], and [10 Jan 2021], 80 of 97 (82.5%; 95% CI 73.7, 88.8) RPLN samples had detectable SARS-CoV-2 RNA by RT-PCR. Whole-genome sequencing of the 94 positive RPLN samples identified 12 SARS-CoV-2 lineages, with B.1.2 (n = 51; 54.5%), and B.1.311 (n = 19; 20%) accounting for ~75% of all samples. The geographic distribution and nesting of clusters of deer and human lineages strongly suggest multiple zooanthroponotic spillover events and deer-to-deer transmission. The discovery of sylvatic and enzootic SARS-CoV-2 transmission in deer has important implications for the ecology and long-term persistence, as well as the potential for spillover to other animals and spillback into humans. These findings highlight an urgent need for a robust and proactive One Health approach to obtaining a better understanding of the ecology and evolution of SARS-CoV-2.

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[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

(https://doi.org/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 report by the USGS [United States Geological Survey] in July (2021) stated that about 30% of free-ranging white-tailed deer sampled had antibodies against SARS-CoV-2, which strongly suggested that transmission is occurring among deer, as it would be very unlikely that 30% of wild deer came in close enough contact to acquire the infection from humans. The findings reported in this preprint (not peer-reviewed as yet) add support to this hypothesis and highlight the importance of paying attention to the wildlife-human interface in a pandemic context. It is crucial that more research is conducted in this species to prevent the virus finding in white-tailed deer a niche where it may be maintained and evolve, circulating endemically (to see why I refuse to use 'enzootically' see https://www.nature.com/articles/368284c0.pdf, Epidemiology) as immunity in people builds up globally due to natural infection and vaccination. - Mod.PMB

HealthMap/ProMED map:
United States: https://promedmail.org/promed-post?place=8699412,106]

See Also

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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