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COVID-19 UPDATE (26): ANIMAL, NORTH AMERICA, WILD DEER AS RESERVOIRS
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https://edition.cnn.com/2023/07/12/health/covid-humans-deer-study/index.html

People spread the virus that causes COVID-19 to wild white-tailed deer in the United States more than 100 times in late 2021 and early 2022, according to a new study from the US Department of Agriculture's Animal and Plant Health Inspection Service. The infection circulated widely in the deer population, and in at least 3 instances, researchers suspect that humans caught the virus from deer.

The study also found that many coronavirus lineages such as alpha, delta, and omicron continued to circulate in deer after they had left the human population.

If the virus continues to circulate in deer, as it has in humans, the study suggests that these animals could become a long-term reservoir, allowing the virus to hide out and develop new and potentially more dangerous mutations.

Scientists fear that those viruses could then jump back into the human population and spark another severe wave, as they did when omicron arrived seemingly out of the blue. Although that scenario is concerning, it's still largely theoretical.

Experts say that a reservoir in wild animals would be a bigger deal if we'd actually managed to control the virus in humans. But the infection is still spreading among humans, and it's most likely to mutate in us because we're its preferred hosts.

"The more species it's in and the more transmission that occurs, the greater the risk of new variants. However, it's hard to say whether deer constitute much of a risk in the grand scheme at this point," said Scott Weese, a veterinarian who studies diseases that pass between animals and people at the University of Guelph in Canada.

The US government plans to continue and expand its survey of animals to keep tabs on how the virus moves through animal populations, according to a USDA news release announcing the study results. The study was published Monday [10 Jul 2023] in the journal Nature Communications [see reference below].

"We'd rather not have it in deer, to avoid one more potential mechanism for variant emergence and to avoid exposure to even more wildlife species," said Weese, who was not involved in the new study.

"But there's little we could do to stop it from spreading now," he said. Scientists sometimes vaccinate wild animal populations to prevent disease spread, but it's an expensive proposition.

Just like there's no vaccine that completely prevents COVID-19 infections from passing between people, there's no inoculation that prevents transmission in animals.

Deer and humans have strikingly similar ACE2 receptors, the gateways the virus uses to break into cells.

For the study, scientists spent months collecting nearly 9000 respiratory swabs from wild deer in 26 states and the District of Columbia. Those swabs yielded nearly 400 viral sequences from 34 lineages of the virus that causes COVID-19. They were able to closely compare those sequences to find viruses in people that were very similar to those found in deer.

In 109 cases, researchers say, they were able to show that deer had been infected by human viruses.

In at least 3 cases, human infections cataloged in databases closely matched the genetic sequences of viruses previously carried by deer, leading researchers to suspect that those people could have caught their infections from the animals.

Deer have become common in the US, even in urban environments. Population surveys have estimated America's deer population at 30 million animals, who may hunt for food in human trash or drink from contaminated wastewater. Humans may come into contact with deer directly while feeding or hunting them, or through droppings.

House cats who spend time outdoors could also act like a kind of intermediary, Weese says, catching the virus outside and bringing it home with them. Cats are susceptible to the virus too, as are many other species that are farmed -- such as mink -- or kept in zoos.

The US Centers for Disease Control and Prevention says a person's risk of catching Covid-19 from domestic or wild animals is low. The agency advises that certain groups, such as hunters, take special precautions to further lower their risk.

[Byline: Brenda Goodman]

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[Reference

Feng A, Bevins S, Chandler J, et al. Transmission of SARS-CoV-2 in free-ranging white-tailed deer in the United States. Nat Commun. 2023; 14(1): 4078; https://doi.org/10.1038/s41467-023-39782-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, and it was experimentally proven that after intranasal inoculation, deer become infected by SARS-CoV-2, shed the virus, and transmit it to non-inoculated contact deer. Later on, many wild white-tailed deer populations across USA and Canada were found infected at high prevalences with several SARS-CoV-2 variants. These consistent findings strongly suggest that following the introduction of SARS-CoV-2 from humans, transmission has been occurring among deer in the wild at a rate which makes deer populations a suitable compartment where the virus may be maintained and evolve, and then perhaps spill back to humans or other animals as a new variant, as suggested by this article.

This is another compelling example of the relevance of the 'One Health' approach. This approach recognizes the inextricable links between people and nature and visualizes the health and disease phenomenon from an integrative angle. The COVID-19 pandemic urges us to acknowledge the interconnection between people and the remaining forms of life, and with the environments they share, and demonstrates that the improvement of global health needs a collaborative, multisectoral, and transdisciplinary approach, acting at the local, regional, and global levels. This concept becomes paramount when taking into account that most diseases -- not only COVID-19 -- affecting humans in the last decades have been caused by pathogens that originated in animals - Mod.PMB

ProMED map:
United States: https://promedmail.org/promed-post?place=8711124,106]

See Also

2022

COVID-19 update (92): animal, Canada, wild deer 20220408.8702494
COVID-19 update (83): animal, USA, mule deer 20220329.8702286
COVID-19 update (80): animal, USA, deer, transmission 20220325.8702212
COVID-19 update (63): animal, Canada, wild deer 20220303.8701773
COVID-19 update (43): animal, USA, wild deer, omicron 20220209.8701357
COVID-19 update (451): animal, USA, wild deer 20211230.8700589
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
16 Jan 2021 COVID-19 update (20): animal, deer, experimental infection
2020

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