German and Austrian deer thus far spared SARS-CoV-2 infections, unlike US deer

April 1 2022

Red deer and European fallow deer in Germany. Credit: Dirk Martins, Unsplash

In North America, SARS-CoV-2 has spread from humans to white-tailed deer. The deer are now considered SARS-CoV-2 reservoirs and may even spill virus back to humans. A science team headed by the Leibniz

Institute for Zoo and Wildlife Research (Leibniz-IZW) and the Charité have now shown that in Germany and Austria this has not happened as all deer tested were negative for SARS-CoV-2 antibodies. The research is reported in the journal *Microorganisms* in a special issue on viruses of wild mammals.

SARS-CoV-2 (Severe acute respiratory syndrome coronavirus type 2) is a virus identified in 2020 as the causative agent of COVID-19 disease. White-tailed deer in North America have been shown to be infected with human derived SARS-CoV-2 variants at very high prevalence in many cases. There is preliminary evidence that SARS-CoV-2 can then spill back to humans from deer. This is a cause of concern as novel variants could evolve in their new deer host and eventually spill back to humans, with unforeseeable consequences. While white-tailed deer are a North American species, deer occur worldwide and in central Europe like North America, are heavily hunted and managed.

A team of scientists from the German Leibniz-IZW, the Institute of Virology of the Charité, the Austrian Research Institute of Wildlife Ecology (FIWI) and the German Federal Institute for Risk Assessment (BfR) examined sera from 433 roe, red and fallow deer, both pre-pandemic and pandemic collected for SARS-CoV-2 antibodies using an assay that previously confirmed antibody titers in North American deer. None of the deer from Germany or Austria were positive. The team also compared the ACE2 gene, the cellular receptor of hosts for the SARS-CoV-2 virus, among the different deer species. With the exception of one change which might potentially make red deer somewhat more resistant to infection, no changes were found in the receptor in the European species that could account for the drastic difference in results between central European and North American deer exposure.

A likely explanation for the differences in exposure are how deer are distributed and managed in North America and central Europe. In North

America, deer are often peri-urban and urban with high potential levels of contact with humans and human waste. Deer are managed principally by the federal government. In Germany and Austria, deer are generally not peri-urban or present in urban settings and an allocation of hunting licenses for a specific area (the Revier) is predominant where deer in a specific area are locally managed. The Revier structure likely prevents human-deer contact and also hinders the spread of pathogens among deer populations.

"Every effort should be made to maintain barriers to human-deer contact in central Europe to prevent the establishment of deer as a SARS-CoV-2 reservoir," says Prof Alex D Greenwood, Head of the Department of Wildlife Diseases at the Leibniz IZW.

More information: Andres Moreira-Soto et al, Serological Evidence That SARS-CoV-2 Has Not Emerged in Deer in Germany or Austria during the COVID-19 Pandemic, *Microorganisms* (2022). DOI: 10.3390/microorganisms10040748

Provided by Forschungsverbund Berlin e.V. (FVB)