

## **Animal species susceptible to SARS-CoV-2 and public health risks**

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Academy

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Although the origin of the emergence of SARS-CoV-2 in December 2019 in Wuhan has been identified (bat coronavirus RaTG13), the intermediate host that may have acted as a vector remains uncertain, as the Pangolin hypothesis has not been formally demonstrated. Under natural conditions, SARS-CoV-2 infection has been observed with minor clinical signs in cats and dogs contaminated by their owners in many countries including France.

Under experimental conditions, cats, dogs and ferrets confirmed their susceptibility, as well as the possibility of recontamination by contact with control animals in cats and especially in ferrets. In addition, pigs and poultry have proved to be resistant to any inoculation by SARS-CoV-2 and cattle are very slightly sensitive. In the laboratory, the golden hamster, rabbit and rhesus monkey are susceptible to SARS-CoV-2 while laboratory mice and rats are resistant.

Among wildlife animals, contamination of captive felids (tigers, lions, puma) has been reported. Experimentally, deer mice have been found to be sensitive to SARSCoV-2 as were European bats (fruit bats). Raccoon dogs, present in the wild in Europe where they are considered harmful are highly susceptible to SARS-CoV-2 and could be intermediate hosts potentially involved in the spread of Covid-19.

Finally, mink, highly susceptible to infection, become rapidly infected in farms where the high density of animals in closed environments favors the production of infective aerosols and the rapid spread of the virus among animals and even to breeding staff. As early as April, the Netherlands announced the first cases of SARS-CoV-2 in mink farms, followed by the possibility of animal-to-human transmission. The number of infected farms has continued to rise without the exact

origin of the infections being known. Seven other countries have reported SARS-CoV-2 infection in mink farms (Spain, United States, Denmark, Italy, Sweden, Greece and most recently France).

Denmark, the world's largest mink producer with 1,138 farms, sounded the alarm on 4 November by announcing that it was culling all mink herds in the country to prevent the spread of a mutant SARS-CoV-2 (known as DFVI-spike) that had crossed the species barrier by infecting humans. The main risk associated with this mutation was to compromise the expected protection of vaccines currently in development. Although the information available in Denmark and the Netherlands does not demonstrate an increased risk of contagiousness by this mutant, although uncertainties remain, as not all cases are detected and not all viruses are sequenced, the precautionary principle has prevailed.

The low number of reported human cases and the scientific data available to date do not allow this DFVI-spike variant to be considered a health threat. However, **the National Academy of Medicine and the Veterinary Academy of France recommend:**

- to carry out additional studies to assess the risk presented by the DFVI-spike variant;
- if these studies reveal that this variant may escape the immune response developed against CoV-2-SARS, to assess the potential implications for diagnosis, treatment and vaccine development against Covid19;
- to monitor any new mutation of SARS-CoV-2 in the S protein, whether mink-bound or not, in order to be able to adapt vaccines to these mutations, as has been the case in veterinary medicine for avian infectious bronchitis for decades;
- not to limit surveillance to mink farms, but to extend it to other animal species (domestic or wild) in order to avoid the development of hidden animal reservoirs of SARS-CoV-2;
- to reinforce the recommended biosecurity measures for animals, and more particularly for mink;
- to improve coordination between the animal, human (including occupational health and safety) and environmental health sectors in a "one health" context in order to develop effective strategies to combat the Covid-19 pandemic.

## **Bibliography**

Opinion of the French National Academy of Medicine and Veterinary Academy  
"SARSCoV-2: sensitivity of animal species and public health risks" 24 November  
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