Could Mustelids spur COVID-19 into a panzootic?

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Veterinaria Italiana 2020, **56** (2-3), 65-66. doi: 10.12834/VetIt.2375.13627.1
Accepted: 09.09.2020 | Available on line: 09.09.2020

The ongoing pandemic caused by SARS-CoV-2 has spilled over into humans from an animal reservoir. Notably, the virus is now spilling back into a variety of animal species. It appears striking that American (*Neovison vison*) and European (*Mustela vison*) minks are the first intensively farmed animal to experience outbreaks. Neither of these have occurred in Asia or Africa but rather in Europe – namely Spain, Denmark, Netherlands and in the US, at a mink farm in Utah. Current evidence indicates that the virus was transmitted to the animals through infected human workers on the farm.

At the time of writing, SARS-CoV-2 infection has not been documented in any other intensively farmed species, suggesting that mustelids may exhibit a higher susceptibility to the virus. Studies have shown that domestic ferrets have an extremely low resistance to COVID-19 infection (Shi *et al.* 2020). Mustelids comprise approximately 60 different species (Kollas *et al.* 2015) and are widely distributed across a number of habitats, both aquatic (marine and freshwater), and terrestrial (prairies, steppes, tundra, forests). Several wild mustelids have become acclimated to urban areas – such as otters and badgers, and some are raised in households as pets – such as ferrets. The latter are perhaps at greater risk of infection than their cousins inhabiting the wild, but it is the former that we should be most worried about. If infection by SARS-CoV-2 spills into wild mustelids, these have the potential to become a permanent reservoir of infection for other animal species. Such a scenario has been seen before with rabies in raccoons and skunks (Rupprecht *et al.* 1995) and with bovine tuberculosis in badgers (Gallagher and Clifton-Hadley 2000).

We believe that it is important to prioritize studies in mustelids on their putative role as reservoirs and amplifiers of SARS-CoV-2 infection in animals and subsequently humans. The development of appropriate surveillance and intervention strategies will determine if mustelids are one of the key links in the chain to the initiation of an unprecedented epochal event: a panzootic.

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