

## Letter to the Editor

### **SARS-CoV-2, a spillover from animals to man, a spillback from man to animals and....what next?**

Based upon the data reported by Dr Shi and coworkers (1) as well as by other investigators, cats, ferrets, hamsters, tigers, lions and minks represent, along with macaques and other non-human primates, animal species that are susceptible to natural and/or experimental infection by the "Severe Acute Respiratory Syndrome (SARS) Coronavirus (CoV)-2", the seventh officially recognized human coronavirus responsible for "CoronaVirus Disease 2019" (CoViD-19). A far less prominent sensitivity to experimental SARS-CoV-2 infection has been also described in dogs, with avian species like chickens and ducks additionally turning out to be refractory to it (1). Similarly to what ascertained in mankind, cats would be prone to acquire SARS-CoV-2 infection by the respiratory route, with infected (and asymptomatic) felines being also capable to shed the virus by means of aerosolization, thereby infecting their conspecifics housed in close contact with them (1).

Noteworthy, SARS-CoV-2 infection has been recently detected in mink farms in The Netherlands, with minks likely acquiring the virus from infected caregivers, in a similar fashion to what previously occurred with tigers and lions held in the Bronx Zoo in New York City, as well as with privately owned cats in Hong Kong, Belgium and USA. Nevertheless, based upon the finding that the viral isolates characterized from some of the aforementioned patients in Holland had a genome sequence closer to that of SARS-CoV-2 strains obtained from infected minks, as compared to the viral isolates identified in the "general population" residing in the same area, it seems biologically plausible that humans (mink caregivers) might have acquired the infection from minks rather than by human-to-human transmission.

This is of great concern, I believe, especially in consideration of the intricate and complex dynamics of a natural (and pandemic) infection like that caused by SARS-CoV-2 betacoronavirus, likely originating from bats (*Rinolophus affinis*) and which could have subsequently "jumped" into an "intermediate" (and hitherto unidentified) species before making its "definitive" spillover into mankind. This is in no way an "unprecedented" finding, provided that the SARS and the "Middle East Respiratory Syndrome" (MERS) coronaviruses had done (more or less) the same in 2002-2003 and in 2012, respectively, and provided at the same time that, even more important, no less than 70% of "emerging infectious diseases" (EIDs) are caused by pathogens originating, either certainly or suspectedly, from animals (2).

Summarizing, the pandemic infection by SARS-CoV-2, which has now overtaken the dramatic figures of 17 millions cases and 700,000 deaths worldwide, is a complex issue, in a similar way to many, if not to all the other zoonoses. As a consequence, a multidisciplinary approach is absolutely needed in handling zoonotic EIDs, taking into special consideration the "One Health" concept, a crucial "common denominator" mutually and indissolubly linking human, animal and environmental health into a common and unique "triangle".