

Render Unto Pets the Things that are Pet's: More a COVID-19 Victim than a Zoonotic Villain

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Based upon genomic sequence analysis [1] and other coronaviruses (including SARS-CoV and MERS-Cov), SARS-CoV-2 originates from bats, but further studies are still needed to confirm whether it is or not transmitted directly or through an intermediate host. Other animals, such as ferrets and pangolins, are susceptible to SARS-CoV-2 and may be potential intermediate hosts, but there may be several intermediate hosts [2].

Recently, awareness regarding cat's role in SARS-CoV-2 pandemics has increased since its susceptibility to COVID-19 has been established. Shi., *et al.* [3] reported that SARS-CoV-2 infect cats and limited airborne transmission from infected to uninfected cats [3]. Nevertheless, we need to take some things into perspective. Firstly, the transmission rate was meager, with three positive cats transmitting to one out of three exposed cats. Secondly, the evaluation of the transmission was far from the reality since animals were displayed side-by-side in cages for an extended period (at least three days). A second study evaluated a nasal shedding of SARS-CoV-2 from inoculated cats and the subsequent transmission of the virus to cats with no previous contact with the virus [4]. In this study, cats with no prior infection became positive only after two days (one cat) or five days (the other two exposed cats).

Regarding both studies, although the transmission was possible and should not be neglected when compared to human-to-human transmission, rates are meager. Still, both studies create an

experimental method to evaluate airborne transmission far from what happens in natural conditions. This study did not completely clarify the exposition of uninfected cats to the infected ones (size of the space where cats co-habited and the air circulation). One last concern is that in both studies, cats presented pre-existing conditions that were not clarified.

Along with studies of human susceptibility to COVID-19, concern has grown, and studies related to infection and transmission of SARS-CoV-2 in dogs and cats due to increasingly close contact between humans and pets. With the emergence of cases in animals, the concern arose as to whether they would transmit the virus to their guardians—this increased fear of a possible abandonment and sacrifice of dogs and cats [5]. Among companion animals, it has been reported cases of COVID-19 on only 115 cats and 81 dogs around the world.

Until January 2021, Brazil reported only five cases of SARS-CoV-2 infection in cats and six cases in dogs. Recently a study was developed to detect infection in companion animals and whether they developed neutralizing antibodies [5] and, nine dogs and four cats were positive for RT-PCR. Until now, the natural infection of these animals is restricted to contact with infected tutors, and it is already known that cats are more susceptible than dogs and can transmit to other cats under laboratory conditions. The transmission among companion animals has not yet been proven.

A study carried out in Rio de Janeiro evaluated 96 animals, including 49 cats and 47 dogs. Of those, 85.4% (82/96) were owned pets, and 14.6% (14/96) were stray animals. Among owned animals, surprisingly 75.6% (62/82) were from a household with no history of COVID-19 cases. The other 24.4% (20/82) came from a household with a history of a human COVID-19 case [6]. That highlights the need for continuous monitoring of human cases and their animals since all infected animals are from households with owners that were tested positive for COVID-19 and probably were infected by them [3]. The monitoring of these animals is necessary because it is not yet known whether they can serve as a reservoir of the disease and further promote the reinfection of their guardians, reintroducing the virus into the human population.

Additional evidence reinforces that COVID-19 poorly infects cats under natural conditions. A veterinary diagnostic company assessed thousands of specimens from companion animals for SARS-CoV-2 without obtaining any positive results [7]. Those specimens came from pets located in the United States, South Korea, Canada, and Europe, including regions that were concurrently experiencing a high number of human COVID-19 cases. A retrospective serological survey of cats during the pandemic in Wuhan reported only 12 seropositive among 102 cats using the ELISA methodology and virus-neutralizing antibody tests without reporting any clinical signs in the positive cats [8]. Also, studies ruled out cats as the possible link between bats and humans and other 34 animal species [9].

With all that in mind, the scientist should be careful when evaluating domestic pets, especially cats, as a possible zoonotic source of SARS-CoV-2. That can incite guilty in cats that do not exist yet. Inconclusive studies with no statistical significance may cause more uncertainty at a delicate time and threaten even more the well-being of pet animals and public health. Abandonment and ill-treatment of cats have already been reported elsewhere [10,11]. So far, the only human-to-cat transmission was observed and not vice-versa. There is no solid evidence that cats could spread the virus. Without a doubt, since other coronaviruses can infect cats and cause other infection diseases, further investigation should be conducted to prove whether they play a role in the transmission of COVID-19 to humans.

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