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CORONAVIRUS DISEASE 2019 UPDATE (345): ANIMAL, CAT, RESEARCH, EXPERIMENTAL INFECTION

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<https://www.biorxiv.org/content/10.1101/2020.08.04.235002v1.full.pdf>

Citation: Gaudreault NN, Trujillo JD, Carossino M, et al. SARS-CoV-2 infection, disease and transmission in domestic cats.

<https://doi.org/10.1101/2020.08.04.235002> (preprint, not been certified by peer review)

#### Abstract

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Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is the cause of coronavirus disease 2019 (COVID-19) and responsible for the current pandemic. Recent SARS-CoV-2 susceptibility and transmission studies in cats show that the virus can replicate in these companion animals and transmit to other cats. Here, we present an in-depth study of SARS-CoV-2 infection, associated disease and transmission dynamics in domestic cats. Six 4- to 5-month-old cats were challenged with SARS-CoV-2 via intranasal and oral routes simultaneously. One day post challenge (DPC), 2 sentinel contact cats were co-mingled with the principal infected animals. Animals were monitored for clinical signs, clinicopathological abnormalities and viral shedding throughout the 21 DPC observation period. Postmortem examinations were performed at 4, 7 and 21 DPC to investigate disease progression. Viral RNA was not detected in blood but transiently in nasal, oropharyngeal and rectal swabs and bronchoalveolar lavage fluid as well as various tissues. Tracheobronchoadenitis of submucosal glands with the presence of viral RNA and antigen was observed in airways of the infected cats on 4 and 7 DPC. Serology showed that both, principal and sentinel cats, developed SARS-CoV-2-specific and neutralizing antibodies to SARS-CoV-2 detectable at 7 DPC or 10 DPC, respectively. All animals were clinically asymptomatic during the course of the study and capable of transmitting SARS-CoV-2 to sentinels within 2 days of comingling. The results of this study are critical for our understanding of the clinical course of SARS-CoV-2 in a naturally susceptible host species, and for risk assessment of the maintenance of SARS-CoV-2 in felines and transmission to other animals and humans.

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[Some segments from the discussion chapter follow (for the omitted references, please go to the full paper at the source URL):

"These findings warrant COVID-19 screening of felines for surveillance/epidemiological purposes and for implementing of mitigation strategies; they also point towards nasal swabs/washes and rectal swabs as appropriate diagnostic samples. This information will be important for providing appropriate veterinary care for infected cats and other cats in their surroundings, for protection of veterinary personnel, animal caretakers and pet owners, and for implementing quarantine measures to prevent transmission between felines, people and potentially other susceptible animals."

"The ease of transmission between domestic cats indicates a significant public health necessity to investigate the potential chain of human-cat-human transmission potential. It is also critical that pet owners are educated on the risks and preventative measures in order to calm fears and discourage animal abandonment."

"Asymptomatic cats can be productively infected and readily transmit SARS-CoV-2 to other susceptible cats, and thus may serve as potential models for asymptomatic COVID-19 infections in humans. It could also offer a viable model for testing vaccines and antiviral candidates for companion animals and for drugs with a problematic pharmacokinetic profile in rodents, ferrets or nonhuman primates."

"Further research is needed to adapt models to recapitulate severe disease observed in humans. One area to explore is the effect of age on associated disease and recovery. Only cats less than 1 year old were evaluated in this study and [2 previous] studies, but what SARS-CoV-2 infection looks like in adult and older aged cats, as well as if reinfection of cats can occur and what re-infection looks like, was not explored in these studies."

Previous experimental infection trials in cats, referred to in the above study, are indicated in the references below.

So far, the following countries have reported to the OIE (natural) CoV-SARS-2 infections in cats (Date of event):

Belgium (28 Mar 2020)  
USA (22 Apr 2020)  
France (2 May 2020)  
Spain (11 May 2020)  
Germany (13 May 2020)  
Russia (26 May 2020)  
United Kingdom (28 Jul 2020)

Infections are known to have been identified in some other countries (e.g., China, Netherlands).

#### References

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2. Shi J, Wen Z, Zhong G, et al. Susceptibility of ferrets, cats, dogs, and other domesticated animals to SARS-coronavirus 2. Science. 2020; 368(6494): 1016-20. <https://science.sciencemag.org/content/368/6494/1016/tab-pdf>  
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## See Also

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COVID-19 update (319): Spain (AR) animal, farmed mink, 1st rep 20200717.7584560  
COVID-19 update (317): Netherlands (NB) animal, farmed mink, spread 20200716.7578453  
COVID-19 update (322): USA (SC) animal, dog 20200719.7588843  
COVID-19 update (312): China, SARS-CoV2 origin, animal reservoir, WHO mission 20200711.7565035  
COVID-19 update (308): USA (TX) animal, dog conf 20200708.7554832  
COVID-19 update (299): USA (GA) animal, dog conf 20200703.7535112  
COVID-19 update (284): Denmark (ND) animal, farmed mink, spread, dog 20200624.7506728  
COVID-19 update (281): Netherlands (NB, LI) farmed mink, spread, animal, global 20200623.7502849  
COVID-19 update (280): animal, pangolin, research 20200623.7502805  
COVID-19 update (267): animal, domestic, wild, cat, research 20200617.7480013  
COVID-19 update (266): Denmark (ND) animal, farmed mink, 1st rep 20200617.7479510  
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COVID-19 update (231): USA (NY) animal, dog conf. 20200602.7420541  
COVID-19 update (230): Netherlands (NB, LI) animal, farmed mink, spread, control 20200602.7420433  
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COVID-19 update (198): Netherlands (NB) farmed mink, animal-to-human infect susp 20200520.7359976  
COVID-19 update (189): Netherlands (NB) animal, farmed mink, research, cat, dog 20200517.7344274  
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COVID-19 update (181): Germany (BY), France (AC), cat, OIE animal case definition 20200513.7332909  
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COVID-19 update (141): India, animal, wild tiger, susp, clarification, RFI 20200430.7281768  
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