

Mini Review

# Can house flies mechanically carry and/or transport sars-cov-2?

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## Abstract

The new coronavirus SARS-CoV-2 that causes different infections in humans has become a challenge for humanity because it has caused many deaths worldwide. This new virus is considered as a zoonotic infectious particle, the clear mechanisms of the pathogenicity and transmissibility of this virus are not exactly known. Therefore, here some characteristics of a possible transmission are analyzed for house flies.

## Introduction

Currently, there are different studies associated with the transmission of the new SARS-CoV-2 “coronavirus” have been published. This virus that belongs to the family of Coronaviridae is genetically classified into four main genres named as follows: Alphacoronavirus, Betacoronavirus, Gammacoronavirus, and Deltacoronavirus. Highlighting the genus Betacoronavirus that affects animals, including birds and mammals, even humans mainly. Emphasizing the coronavirus causing severe acute respiratory syndrome (SARS-CoV) and coronavirus of the respiratory syndrome of the Middle East (MERS-CoV) [1,2].

This new coronavirus has caused the appearance of a new condition called coronavirus 19 diseases (COVID-19), causing lung and intestinal damage, cardiac and even neurological damage [3]. To the date it has been confirmed that the virus has spread to 184 countries reporting 1,292,564 infections and 70,798 deaths (accessed April 6, 2020) However the World Health Organization [4],

indicates that this 2019-nCoV can occur in patients without symptoms (asymptomatic) which could increase the rate of carrying and spreading it. The transmission of this new SARS-CoV-2 virus is one of the many concerns which has caused this infectious particle made-up of proteins and a single-stranded RNA with a positive meaning naturally housed in Bats [5]. It has been shown that SARS-CoV-2 and beta-coronavirus RaTG13 isolated from the Bat shows 96% similarity [6] However, Zhang and Holmes 2020 [7], states that the virus was not transmitted directly from Bats to

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humans but through intermediate mammalian hosts that facilitated its transmission.

Including civet cats and raccoon dogs that are consumed as exotic foods in China presented the mutations necessary for human transmission to be successful. Showing that the entry of the virus depends on the receptor for angiotensin-converting enzyme 2 (ACE2) in humans, clearly contributing to the understanding of the transmissibility and pathogenesis of SARS-CoV-2 [8].

The place where the virus was first isolated possessed different types of exotic animals that are commercialized such as snakes, Chinese bamboo rats, cats of different breeds, porcupines, dogs, birds, and other farm animals. Because of body fluids and blood from the various animal species traded in these places, represent an exceptional source for the spread of infectious viruses, also delineate a high rate of infection pathogens that mainly affects humans. Traders and buyers are exposed to these pathogens direct [9]. Because of this, it has demonstrated the different samples of transmission mechanisms that include animal-to-human transmission (anthropozoonosis) direct and indirect human-to-human transmission and human-to-animal transmission (zooanthroposis) [10].

The appearance of SARS-CoV-2 is complex, according to the relationship between human-animal, the condition of the ecosystem, and human habits. Different studies conclude that SARS-CoV-2 can be found in domestic animals such as cats and dogs, however, it has been reported that this virus can also be found in farm animals such as pigs, chickens, and duck, highlighting that the virus can replicate and be transmitted between domestic cats through respiratory drops. There is still a lack of scientific evidence that reports whether feces may be another infectious mechanism of this particle to infect animals. Consequently, it should be noted that this behavior is not observed in dogs or farm animals, however, this virus is secreted in the feces of these creatures which can cause those pets to become a potentially dangerous reservoir for humans [11].

Therefore, in this review, the question emerges whether also if this virus can be transported by other animals such as insects specifically house flies. It has been shown that this insect can spread infectious agents such as bacteria, fungus, parasites, and even some types of diseases. Spreading these agents in different ways, either by some structure (part) of its body (F.e the hackle, legs, abdomen, wings, or foot) due to the regurgitation of contaminated food and/or defecation. This last feature gives the insect a power of protection against the infectious agent that causes disease in humans. As far as we are aware of, house flies can transport different virus families (prototypes). Chakrabarti, et al. 2008 [12] report that a virus that infects poultry belonging to the paramyxoviridae family is transported by flies causing diseases to animals. As per Calibeo-Hayes, et al., 2008 [13] in his work, affirms that the house fly works strictly as a mechanical vector of a virus belonging to the Coronaviridae family that affects turkeys. Schurrer, et al., 2004 [14] prompt in his research that the flies can transmit infectious virus porcine reproductive and respiratory syndrome. Demonstrating in his research that the fly can travel about 1.7 km from one place to another and thus spread the virus affecting healthy pigs. In light of the above, there is a possibility that the new SARS-Cov-2 coronavirus could be transmitted by houses flies, which would involve further studies to monitor whether this virus has adhesion capacity, permanence, and active dissemination in house flies (Figure 1).



**Figure 1:** Possible mechanism of infection by mechanical transmission of SARS-CoV-2 by house flies.

Another important character is the possibility of fecal-oral transmission of 2019-nCoV, considering that flies play an important role in this mechanism of infection, highlighting that flies live in garbage dumps and in places where they proliferate or there are residues of fecal matter. Taking into account that the new coronavirus can be found actively in these sites without decreasing out other places where the virus has not been inactivated with some antiseptic agent (detergent or ethanol). It should be clarified, flies can be found in these zones and this infectious viral particle can join some of the external structures or ingested bone contributing to greater dissemination of the new coronavirus SARS-Cov-2.

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