

A new study has concluded that there is no clear evidence that COVID-19 was transmitted from bats

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Fruit bat at night. Credit: Prof. Yossi Yovel

A new Tel Aviv University study rejects assertions that the origin of the COVID-19 outbreak lies in bats. According to the study, bats have a

highly effective immune system that enables them to deal relatively easily with viruses considered lethal for other mammals.

The study was led by Dr. Maya Weinberg from the laboratory of Prof. Yossi Yovel, Head of the Sagol School of Neuroscience and faculty member of the School of Zoology & Steinhardt Museum of Natural History at Tel Aviv University. The research team reviewed dozens of leading articles and studies in this field, and their conclusions were published in *iScience*.

The researchers explain that the infamous reputation of the [bats](#) is well known among both the [scientific community](#) and the public at large. Bats are often accused of being reservoirs of viruses, including COVID-19, and seen as posing a threat to public health. In the present study, Dr. Weinberg sought to show that bats play an important role in exterminating insects, replanting of deforested areas, and pollination of a number of crops.

While there is some evidence that a potential ancestral COVID-19 virus had originated in bats, to date, two years after the pandemic first broke out, we still do not know for sure what the exact origin of the COVID-19 variant is.



Fruit bat at day time. Credit: Yuval Barkai

Dr. Weinberg says that "in general, bats are mistakenly conceived of as reservoirs of many contagious diseases, only due to their being positive serologically positive; in other words, in possession of antibodies, which means that bats have survived the disease and developed an [immune response](#). After that, they overcame the virus altogether and disengaged from it; hence, they are no longer its carriers. Nevertheless, in many cases, a virus similar to a [human pathogen](#) is liable to be found in bats; however, it is not pathogenic to humans, and is not sufficient to use bats

as a reservoir."

Dr. Weinberg adds that "in order to examine the overall situation, we conducted a meta-analysis of the literature and checked the finding for over 100 viruses for which bats are considered potential reservoirs; such as Ebola, SARS, and COVID. We found that in a considerable number of cases (48%) this claim was based on the incidence of antibodies or PCR tests, rather than actual isolation of identical viruses. Moreover, many of the reported findings are not convincing."

"The mere isolation of a virus is not enough to see an animal as a reservoir, since a minimum number of index cases is required in which the virus is isolated in order to be considered a [reservoir](#) animal, as well as the existence of an established path of transmission. Furthermore, the very detection of a particular virus in bats does not necessarily ensure further infection, and other biological, ecological and anthropogenic conditions must exist in order for such an event to occur."

According to the researchers, evidence is accumulating of the fact that bats are capable of coping with different viruses—including lethal ones—better than humans and most other mammals. After over 100 years of focus on [viruses](#) carried by bats, it appears that bats' immune system are characterized by a restrained response during inflammatory processes. Bats have developed an excellent balance between resistance and tolerance: an increased defense response of the host, and immune tolerance through a number of different mechanisms. Moderate inflammatory pathways contribute to immune tolerance with bats and a well-balanced response that prevents the virus from developing.

Dr. Weinberg adds that "the comprehensive study we've conducted raises serious doubts regarding the possibility of bats being the origin of the COVID-19 outbreak. The findings give rise to the opposite perspective, according to which we must study in-depth the

immunological anti-viral capabilities of bats, and thus obtain new and effective means of coping in humanity's struggle against contagious disease, aging and cancer."

More information: Maya Weinberg et al, Revising the paradigm: Are bats really pathogen reservoirs or do they possess an efficient immune system?, *iScience* (2022). DOI: [10.1016/j.isci.2022.104782](https://doi.org/10.1016/j.isci.2022.104782)

Provided by Tel Aviv University

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