Fact Sheet

European bats and SARS-CoV 2

Current status: 07.04.2020

Due to the SARS-Coronavirus 2 (SARS-CoV 2), which is currently spreading worldwide and which triggers the disease Covid-19 in humans, people involved in bat conservation and bat research in Europe are facing increasing concerns from the general public.

The cause of concern is the fact that the media regularly refer to bats as the source of the novel virus SARS-CoV 2. This highly simplified representation of a more complex situation requires good expertise from people working on bat emergency phones and in bat ambulances to correct misconceptions and unfounded reservations and to counteract increasing antipathy towards European bats.

After various organizations and institutions have already published factual information on the subject [1a-1e], we now offer a summary of the current research results as well as references to scientific studies and technically correct journalistic articles. In the future, we will adapt this fact sheet to the developing knowledge base.

We hope that this fact sheet will contribute to educational work in bat conservation. At the same time, we would like to motivate all colleagues to devote themselves to this particularly important and challenging communication task for nature conservation to debunk the myth of the "bat as a virus thrower". The occurrence and spread of SARS-CoV 2 and other zoonoses are not caused by individual species or groups of species, such as bats, pangolins, rodents, etc., but must be understood as a direct result and feedback from the devastating handling of animals, ecosystems and the resulting loss of species [2].

Quick facts (current state of knowledge)

1. **Native European bats are not infected with SARS-CoV 2.**

2. **The human SARS-CoV 2 is genetically closely related to viruses found in different wildlife species, but the exact origin of SARS-CoV 2 or its precursor is still not known.**

3. **A transmission of SARS-CoV-like viruses from bats directly to humans is very unlikely.**

4. **Regarding the disease emergence process, past zoonoses reveal the importance of commercial industrial livestock production (e.g. in the case of Swine influenza virus) and wildlife markets where wildlife is offered for sale, either alive, freshly slaughtered or already processed.**

5. **Harming or killing bats due to a potential health hazard is without any reason and constitutes a criminal offence.**

6. **Honorary service in nature conservation is closely connected to research networks of universities and non-university research institutions and supports science.**

7. **It is unlikely that coronaviruses from bat droppings pose an imminent health hazard to humans.**

8. **According to current knowledge, SARS-like coronaviruses always require intermediate hosts through the process of several zoonotic transitions to transform to a human viral pathogen.**

9. **Globally, bats play a significant and indispensable role in ecosystems.**

10. **The probability of zoonotic pandemics in the future can be reduced by improving nature conservation and animal welfare.**

1. **Native European bat species are not infected with SARS-CoV 2.** Several corona viruses have been identified in native bat species. However, these are only distantly related to human SARS coronaviruses and therefore irrelevant for humans [3]. First infection experiments with SARS-CoV 2 in Egyptian fruit bats were successful, but the animals did not show any symptoms and did not efficiently transmit the infection to conspecifics [4]. This might be due to the fact that the binding regions of the virus do not effectively adhere to corresponding receptors of bats [5].

2. **Human SARS-CoV 2 is genetically closely related to animal viruses, but the exact origin of SARS-CoV 2 is still not conclusive.** Genetically similar viruses are found, for example, in horseshoe bats (Rhinolophidae) occurring in China [6] and in pangolins [7]. It is probable that the virus originated in a wild animal, but then gradually underwent changes - first in an intermediate host and then, after transmission to humans, in the humans themselves - in such a way that it was able to trigger Covid-19 in humans and make the transmission of the disease between people possible [5].

3. **Transmission of SARS-CoV-like viruses from bats directly to humans is very unlikely.** SARS-CoV-like viruses from Asian horseshoe bats cannot invade human cells because surface proteins of SARS-CoV-like viruses cannot bind efficiently to corresponding enzymes (human ACE2) of the human lung epithelium [5,8]. Therefore, even genetically closely related SARS-CoV-like viruses found in horseshoe bats are not considered to be infectious to humans [5].

4. **A pattern of past zoonoses is the importance of intensive livestock farms (e.g. in the case of the swine influenza pandemic) and wildlife markets where wild animals are offered for sale, either alive, freshly slaughtered or already processed.** This is where, as in the case of SARS-CoV 1 and very probably also of SARS-CoV 2, pathogens can quickly mutate and spread by changing hosts [10]. Genetic studies on SARS-CoV 1, which first appeared in China almost 20 years ago, have shown that it is highly probable that viverrids (Viverridae) acted as an intermediary host for a bat virus [9,10]. SARS-CoV 1 spread from viverrids to humans (zoonotic transition) and was then able to spread from one person to another.

5. **Fighting bats because of an alleged health hazard is completely unjustified [11]. Moreover, this is a criminal act in the entire EU**. It is not the bats with their naturally developed viral diversity that are at the core issue [2], but mankind, whose treatment of animals, ruthless exploitation of natural resources and the associated global destruction of intact ecosystems, generates an increased risk of zoonotic pandemics [12].

6. **The honorary service in nature conservation is closely linked to academic and non-academic research and furthermore assists science.** In Germany, for example, the knowledge gained from studying the viral diversity of bats, especially after the occurrence of the earlier SARS-CoV 1, contributed to Germany having testing methods available shortly after SARS-CoV 2 occurred in Germany. This allowed a nationwide availability of tests in laboratories for the detection of infected people, even before SARS-CoV 2 actually appeared in Germany. Therefore, the spread of the disease Covid-19 could be monitored right from the start due to excellent laboratory diagnostics in Germany [16,17]. The honorary service in bat conservation will continue to support the research of coronaviruses in bats.

7. **It is unlikely that coronaviruses in bat faeces pose an immediate health risk to humans.** Large quantities of human SARS-coronavirus RNA can be detected in the faeces of patients, but it is unclear if the virus is still infectious [5, 8]. On the contrary, fresh faeces from European bats only contained small amounts of various different coronavirus RNA (not SARS-CoV 2) [3,18], which according to existing medical knowledge pose no danger to humans. It can therefore be concluded that bat faeces pose no immediate health risk from coronaviruses. Nonetheless it should be noted that dealing with bat faeces always requires basic protective measures, as faeces from wild animals generally have the potential to contain a range of pathogens [19]. In any case, it is important to follow the basic hygienic rules.

8. **According to the latest research, SARS-like coronaviruses always require intermediate hosts through the process of multiple zoonotic transitions to create a human viral pathogen** [5,8]. However, any medical briefing should mention the risk of a possible transmission of rabies viruses from an infected bat, because rabies viruses are the only viruses from bats that are known to have the ability to infect humans directly. If a person gets bitten by a bat, an immediate vaccination can actively protect the affected person. Bats, however, rarely come in contact with humans, as they are shy and live hidden. People who frequently come in contact with bats through their professional or voluntary activities in bat conservation should get immunised beforehand, which we highly recommend. Please refer to e.g. the Friedrich-Loeffler-Institute and the Robert-Koch-Institute for further information [20,21].

9. **Bats play a crucial and essential role in ecosystems around the world.** They regulate insect pests in agriculture and forestry and are especially important in subtropical and tropical ecosystems for distributing plant seeds and fertilizing important crops [12,13,14]. Due to their biological makeup as flying mammals and their special social structures (reproductive and hibernating societies in relatively large groups), they have acquired skills during the course of their evolution that provides them with vast benefits when it comes to containing pathogens. Science is only just starting to understand those adaptions and to gather insights of immense value to human and veterinary medicine.

10. **The probability of zoonotic pandemics can be reduced in the future.** In order to achieve that, the biodiversity of natural and cultural landscapes has to be protected more efficiently, by providing habitats for animals where they can exist without human disturbance. This should be based on the understanding that intact habitats, which include a large diversity of wildlife species, are important for human health in the long-term. It is crucial that wildlife conservation as well as animal welfare receive a higher priority in our society. On top of that it is important to regulate and restrict the hunting, trading and further use of wildlife that has zoonotic potential worldwide.

Sources:

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c: Koordinationsstellen Fledermausschutz Bayern: https://www.tierphys.nat.fau.de/fledermausschutz

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https://www.bmu.de/pressemitteilung/schulze-weltweiter-naturschutz-kann-risiko-kuenftiger-seuchen-verringern/

Compilation of recommended journalistic articles:

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