

https://www.researchgate.net/publication/339070128_The_possible_origins_of_2019-nCoV_coronavirus

Go

JAN FEB MAR

14

2019 2020 2021



About this capture

2 captures

14 Feb 2020 – 15 Feb 2020

Keep up with your stats and more
Access scientific knowledge from anywhere

See all >
10 References

Download citation Share

Download full-text PDF

origins of 2019-nCoV coronavirus

IF Available) · February 2020 with 547 Reads

40/RG.2.2.21799.29601

publication

Botao Xiao
21.93 · South China University of Technology



Lei Xiao

19-nCoV has caused an epidemic of 28,060 laboratory-confirmed infections in human including 564 deaths in China by February 6, 2020. Descriptions of the virus published on Nature this week indicated that the genome sequences from patients were almost identical to the Bat HK45 coronavirus. It was critical to study where the pathogen came from and how it passed onto human. An article published on The Lancet reported that 27 of 41 infected patients were found to have contact with the Huanan Seafood Market in Wuhan. We noted two laboratories conducting research on bat coronavirus in Wuhan, one of which was only 280 meters from the seafood market. We briefly examined the histories of these laboratories and proposed that the coronavirus probably originated from a laboratory. Our proposal provided an alternative origin of the virus in addition to natural recombination and intermediate host.

for the world's research

https://www.researchgate.net/publication/339070128_The_possible_origins_of_2019-nCoV_coronavirus

Go

JAN FEB MAR

14

2019 2020 2021



About this capture

[2 captures](#)

14 Feb 2020 – 15 Feb 2020

Keep up with your stats and more
Access scientific knowledge from anywhere

uploaded by [Botao Xiao](#) Author content
may be subject to copyright.

[Download full-text PDF](#)

The possible origins of 2019-nCoV coronavirus

Botao Xiao^{1,2*} and Lei Xiao³

¹ Joint International Research Laboratory of Synthetic Biology and Medicine, School
of Biology and Biological Engineering, South China University of Technology,

https://www.researchgate.net/publication/339070128_The_possible_origins_of_2019-nCoV_coronavirus

Go

JAN FEB MAR

◀ 14 ▶

2019 2020 2021



▼ About this capture

[2 captures](#)

14 Feb 2020 – 15 Feb 2020

Keep up with your stats and more
Access scientific knowledge from anywhere

430074, China

³ Tian You Hospital, Wuhan University of Science and Technology, Wuhan 430064,

China

* Corresponding author: xiaob@scut.edu.cn

Tel / Fax: 86-20-3938-0631

https://www.researchgate.net/publication/339070128_The_possible_origins_of_2019-nCoV_coronavirus

Go

JAN FEB MAR

◀ 14 ▶

2019 2020 2021



▼ About this capture

[2 captures](#)

14 Feb 2020 – 15 Feb 2020

Keep up with your stats and more
Access scientific knowledge from anywhere

The 2019-nCoV coronavirus has caused an epidemic of 28,060 laboratory-confirmed infections in human including 564 deaths in China by February 6, 2020. Two descriptions of the virus published on Nature this week indicated that the genome sequences from patients were 96% or 89% identical to the Bat CoV ZC45 coronavirus originally found in *Rhinolophus affinis*^{1,2}. It was critical to study where the pathogen came from and how it passed onto human.

An article published on The Lancet reported that 41 people in Wuhan were found to have the acute respiratory syndrome and 27 of them had contact with Huanan Seafood Market³. The 2019-nCoV was found in 33 out of 585 samples collected in the market after the outbreak. The market was suspicious to be the origin of the epidemic, and was shut down according to the rule of quarantine the source during an epidemic.

The bats carrying CoV ZC45 were originally found in Yunnan or Zhejiang province, both of which were more than 900 kilometers away from the seafood market. Bats were normally found to live in caves and trees. But the seafood market is in a densely-populated district of Wuhan, a metropolitan of ~15 million people. The probability was very low for the bats to fly to the market. According to municipal reports and the testimonies of 31 residents and 28 visitors, the bat was never a food source in the city, and no bat was traded in the

https://www.researchgate.net/publication/339070128_The_possible_origins_of_2019-nCoV_coronavirus

Go

JAN FEB MAR

◀ 14 ▶

2019 2020 2021



▼ About this capture

[2 captures](#)

14 Feb 2020 – 15 Feb 2020

Keep up with your stats and more
Access scientific knowledge from anywhere

(WHCDC) (Figure 1, from Baidu and Google maps). WHCDC hosted animals in laboratories for research purpose, one of which was specialized in pathogens collection and identification ⁴⁻⁶. In one of their studies, 155 bats including *Rhinolophus affinis* were captured in Hubei province, and other 450 bats were captured in Zhejiang province ⁴. The expert in collection was noted in the Author Contributions (JHT). Moreover, he was broadcasted for collecting viruses on nation-wide newspapers and websites in 2017 and 2019 ^{7,8}. He described that he was once by attacked by bats and the blood of a bat shot on his skin. He knew the extreme danger of the infection so he quarantined himself for 14 days ⁷. In another accident, he quarantined himself again because bats peed on him. He was once thrilled for capturing a bat carrying a live tick ⁸.

Surgery was performed on the caged animals and the tissue samples were collected for DNA and RNA extraction and sequencing ^{4,5}. The tissue samples and contaminated trashes were source of pathogens. They were only ~280 meters from the seafood market. The WHCDC was also adjacent to the Union Hospital (Figure 1, bottom) where the first group of doctors were infected during this epidemic. It is plausible that the virus leaked around and some of them contaminated the initial patients in this epidemic, though solid proofs are needed in future study.

The second laboratory was ~12 kilometers from the seafood market and belonged to Wuhan Institute of Virology, Chinese Academy of Sciences ^{1,9,10}. This laboratory reported that the Chinese horseshoe bats were natural reservoirs for the severe acute respiratory syndrome coronavirus (SARS-CoV) which caused the 2002-3 pandemic ⁹. The principle investigator participated in a project which generated a chimeric virus using

https://www.researchgate.net/publication/339070128_The_possible_origins_of_2019-nCoV_coronavirus

Go

JAN FEB MAR

◀ 14 ▶

2019 2020 2021



▼ About this capture

[2 captures](#)

14 Feb 2020 – 15 Feb 2020

Keep up with your stats and more
Access scientific knowledge from anywhere

the SARS-CoV reverse genetics system, and reported the potential for human emergence¹⁰. A direct speculation was that SARS-CoV or its derivative might leak from the laboratory.

In summary, somebody was entangled with the evolution of 2019-nCoV coronavirus. In addition to origins of natural recombination and intermediate host, the killer coronavirus probably originated from a laboratory in Wuhan. Safety level may need to be reinforced in high risk biohazardous laboratories. Regulations may be taken to relocate these laboratories far away from city center and other densely populated places.

Contributors

BX designed the comment and performed literature search. All authors performed data acquisition and analysis, collected documents, draw the figure, and wrote the papers.

Acknowledgements

This work is supported by the National Natural Science Foundation of China (11772133, 11372116).

Declaration of interests

All authors declare no competing interests.

https://www.researchgate.net/publication/339070128_The_possible_origins_of_2019-nCoV_coronavirus

Go

JAN FEB MAR

◀ 14 ▶

2019 2020 2021



▼ About this capture

[2 captures](#)

14 Feb 2020 – 15 Feb 2020

Keep up with your stats and more
Access scientific knowledge from anywhere

3. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The Lancet* 2019. [https://doi.org/10.1016/S0140-6736\(20\)30183-5](https://doi.org/10.1016/S0140-6736(20)30183-5).
4. Guo WP, Lin XD, Wang W, et al. Phylogeny and origins of hantaviruses harbored by bats, insectivores, and rodents. *PLoS pathogens* 2013; **9**(2): e1003159.
5. Lu M, Tian JH, Yu B, Guo WP, Holmes EC, Zhang YZ. Extensive diversity of rickettsiales bacteria in ticks from Wuhan, China. *Ticks and tick-borne diseases* 2017; **8**(4): 574-80.
6. Shi M, Lin XD, Chen X, et al. The evolutionary history of vertebrate RNA viruses. *Nature* 2018; **556**(7700): 197-202.
7. Tao P. Expert in Wuhan collected ten thousands animals: capture bats in mountain at night. *Changjiang Times* 2017.
8. Li QX, Zhanyao. Playing with elephant dung, fishing for sea bottom mud: the work that will change China's future. *thepaper* 2019.
9. Ge XY, Li JL, Yang XL, et al. Isolation and characterization of a bat SARS-like coronavirus that uses the ACE2 receptor. *Nature* 2013; **503**(7477): 535-8.
10. Menachery VD, Yount BL, Jr., Debbink K, et al. A SARS-like cluster of circulating bat coronaviruses shows potential for human emergence. *Nature medicine* 2015; **21**(12): 1508-13.

https://www.researchgate.net/publication/339070128_The_possible_origins_of_2019-nCoV_coronavirus

Go

JAN FEB MAR

◀ 14 ▶

2019 2020 2021



▼ About this capture

[2 captures](#)

14 Feb 2020 – 15 Feb 2020

Keep up with your stats and more
Access scientific knowledge from anywhere

https://www.researchgate.net/publication/339070128_The_possible_origins_of_2019-nCoV_coronavirus

Go

JAN FEB MAR

◀ 14 ▶
2019 2020 2021



▼ About this capture

[2 captures](#)

14 Feb 2020 – 15 Feb 2020

Keep up with your stats and more
Access scientific knowledge from anywhere

Figure 1. The Huanan Seafood Market is close to the WHCDC (from Baidu and Google maps).

is (0)

References (10)

ures of patients infected with 2019 novel coronavirus in Wuhan, China. *The Lancet*

https://www.researchgate.net/publication/339070128_The_possible_origins_of_2019-nCoV_coronavirus

Go

JAN FEB MAR

◀ 14 ▶

2019 2020 2021



▼ About this capture

[2 captures](#)

14 Feb 2020 – 15 Feb 2020

Keep up with your stats and more
Access scientific knowledge from anywhere

t in Wuhan collected ten thousands animals: capture bats in mountain at night. Changjiang Times 2017.

elephant dung, fishing for sea bottom mud: the work that will change China's future

ao. Playing with elephant dung, fishing for sea bottom mud: the work that will change China's future. thepaper 2019.

a outbreak associated with a new coronavirus of probable bat origin

[Full-text available](#)

NATURE

ou · ● Xinglou Yang · Xian-Guang Wang

[w abstract](#)

avirus associated with human respiratory disease in China

[Full-text available](#)

NATURE

Zhao · ● Bin Yu · ● Yong-Zhen Zhang

[w abstract](#)

onary history of vertebrate RNA viruses

[Full-text available](#)

ature

ii · Xian-Dan Lin · Xiao Chen · ● Yong-Zhen Zhang

[w abstract](#)

https://www.researchgate.net/publication/339070128_The_possible_origins_of_2019-nCoV_coronavirus

Go

JAN FEB MAR

14
2019 2020 2021



2 captures

14 Feb 2020 – 15 Feb 2020

About this capture

Keep up with your stats and more
Access scientific knowledge from anywhere

cluster of circulating bat coronaviruses shows potential for human emergence

Full-text available

at Med

Menachery · Boyd Yount · Kari Debbink · Ralph S Baric

ow abstract

d characterization of a bat SARS-like coronavirus that uses the ACE2 receptor

Full-text available

ature

e · Jia-Lu Li · Xinglou Yang · Zhengli Shi

ow abstract

nd Origins of Hantaviruses Harbored by Bats, Insectivores, and Rodents

Full-text available

uo · Xian-Dan Lin · Wen Wang · Yong-Zhen Zhang

ow abstract

Show more

https://www.researchgate.net/publication/339070128_The_possible_origins_of_2019-nCoV_coronavirus

Go

JAN FEB MAR

14

2019 2020 2021



About this capture

2 captures

14 Feb 2020 - 15 Feb 2020

Keep up with your stats and more
Access scientific knowledge from anywhere

National Natural Science Foundation of China (11372116)

● Botao Xiao

[View project](#)

Project

National Natural Science Foundation of China (11772133)

● Botao Xiao · John F. Marko · Yang Liu

[View project](#)

https://www.researchgate.net/publication/339070128_The_possible_origins_of_2019-nCoV_coronavirus

Go

JAN FEB MAR

◀ 14 ▶

2019 2020 2021



▼ About this capture

[2 captures](#)

14 Feb 2020 – 15 Feb 2020

Keep up with your stats and more
Access scientific knowledge from anywhere

A recent study provides a platform for generating infectious coronavirus genomes using sequence data, examining their capabilities of replicating in human cells and causing diseases in animal models, and evaluating therapeutics and vaccines. Similar approaches could be used to assess the potential of human emergence and pathogenicity for other viruses.

[Read more](#)[Article](#) [Full-text available](#)

Evaluation of MICRO-CHEM PLUS as a Disinfectant for Biosafety Level 4 Laboratory in China

March 2018

Huajun Zhang · Chen Peng · Bobo Liu · [...] · Zhengli Shi

MICRO-CHEM PLUS Detergent Disinfectant Cleaner (MCP) is a commonly used disinfectant at biosafety level 4 (BSL-4) laboratories where research activities involving the most dangerous pathogens must be conducted. Using bat severe acute respiratory syndrome (SARS)-like coronavirus (CoV) WIV1 as a surrogate pathogen, we extensively evaluated the disinfection efficacy of 5% MCP in the first BSL-4 ... [\[Show full abstract\]](#)

[View full-text](#)

https://www.researchgate.net/publication/339070128_The_possible_origins_of_2019-nCoV_coronavirus

Go

JAN FEB MAR

◀ 14 ▶

2019 2020 2021



▼ About this capture

[2 captures](#)

14 Feb 2020 – 15 Feb 2020

Keep up with your stats and more
Access scientific knowledge from anywhere

Wereport the isolation and characterization of a novel bat coronavirus which is much closer to the severe acute respiratory syndrome coronavirus (SARS-CoV) in genomic sequence than others previously reported, particularly in its S gene. Cell entry and susceptibility studies indicated that this virus can use ACE2 as a receptor and infect animal and human cell lines. Our results provide further ... [\[Show full abstract\]](#)

[View full-text](#)

Article

Longitudinal surveillance of SARS-like coronaviruses in bats by quantitative real-time PCR

February 2016 · Virologica Sinica

● Meiniang Wang · ● Wei Zhang · Yu-Tao Gao · [...] · Zheng-Li Shi

[Figure not available: see fulltext.] © 2016, Wuhan Institute of Virology, CAS and Springer Science+Business Media Singapore.

[Read more](#)[Discover more](#)

https://www.researchgate.net/publication/339070128_The_possible_origins_of_2019-nCoV_coronavirus

Go

JAN FEB MAR

◀ 14 ▶

2019 2020 2021



▼ About this capture

[2 captures](#)

14 Feb 2020 – 15 Feb 2020

Keep up with your stats and more
Access scientific knowledge from anywhere

Company

Support

Business solutions

[About us](#)

[Help Center](#)

[Advertising](#)

[News](#)

[Recruiting](#)

[Careers](#)

© 2008-2020 ResearchGate GmbH. All rights reserved.

[Terms](#) · [Privacy](#) · [Copyright](#) · [Imprint](#)