

Studying the Origin of COVID-19 from a Systematic Perspective

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Abstract: The new coronavirus is very likely to already exist in the complex system of human society, including the population and the surrounding environments. Therefore, the research focus of the origin of COVID-19 should be shifted from how wild animals spread it to humans to how it was triggered by complex natural, social, and living systems. We advocate three levels of attribution (i.e., the source of the virus), inducement (i.e., the incentive factors triggering the outbreak), and cause (i.e., the birth of the virus) to reveal the origin of COVID-19 from the shallower to the deeper. It not only meets the urgent needs of short-term prevention and control, but also provides technical weapons for the long-term fight against emerging viruses.

Keywords: COVID-19; origin; incentive factors of the outbreak; systematic perspective.

1. Systematic Perspective on the Origin of COVID-19

The new coronavirus may already exist in nature in high probability, including the natural environment, animals, and humans. This attack on humans might be caused by specific external conditions. It may not be as simple as eating/contacting wild animals and spreading it to humans [1, 2]. It has been probably deposited in the human body or in close surroundings. From a systematic point of view [3], what is new is incentive conditions rather than viruses. This may be evidenced by a few isolated cases in Japan, Singapore, Iran, Britain, America, Brazil, and other parts of the world without a history of travel in China [4]. Genetic research further proves that Wuhan's coronavirus is different from the world [5]. Therefore, the focus of research on COVID-19 should be causal factors rather than transmission. Instead of sole tracking how the virus spreads from remote mountainous wild animals to humans, we should pay more attention to how it mutates to lead to disease in the population.

Increasing biological evidences confirm that new coronaviruses do not suddenly enter the population. On March 17, 2020, Kristian Andersen, a researcher at the Scripps Institute in California, USA, and five scholars from the United States, the United Kingdom, and Australia published a communication article in *Nature Medicine* [6]. The paper sorted out the related studies and proposed two possible sources of SARS-CoV-2: 1) natural selection occurred in the animal host before infecting humans; 2) natural selection was carried out when circulating through the population. Just on March 26, the director of the National Institutes of Health (NIH), Dr. Francis Collins, expressed his opinion on the origin of COVID-19 [7]. While affirming the work of experts' natural host (possibly bats or pangolins), he also pointed out another possibility "The new coronavirus crossed from animals into humans before it became capable of causing human disease. Then, as a result of gradual evolutionary changes over years or perhaps decades, the virus eventually gained the ability to spread from human-to-human and cause serious, often life-threatening disease." On March 27, Robert Garry, a professor at Tulane University in the United States, expressed his opinion on the new coronavirus [8]. He believes that the new coronavirus has actually been epidemic in the population for years, but during the epidemic, its surface proteins have been mutated that triggered the outbreak.

2. Methodology to Study the Origin of COVID-19

To trace the cause (origin) of the virus, in my opinion, it is recommended to follow the three progressive steps of attribution-incentive-formation, as follows.

(1) Attributive cause: i.e., “what”, alternatively, the sources of the coronavirus. There are many possibilities, for example, natural hosts such as wildlife, human beings, somewhere on earth far from human life. There are even more extreme guesses, such as biological weapons, or leaked from the laboratory.

(2) Incentive cause: i.e., “why”, alternatively, the factors triggering the outbreak or mutation. If the source is the natural host, is it spread to humans by edible wild animals, or is it triggered by external factors such as specific climatic conditions (e.g., greenhouse effect), environmental changes (e.g., glacial melting), natural environmental damage (e.g., environmental pollution), ecological disasters (e.g., Australian bushfire), geological disasters (e.g., earthquake), meteorological events (e.g., extreme weather climate), geographical events (e.g., volcanic eruption in Indonesia), Astronomical event (e.g., outer space meteor)? If the virus that is originally parasitic in the population has been mutated or activated, what are the triggers? If it was leaked from the laboratory, was it a mistake or intentional?

(3) Formative cause: i.e., “how”, alternatively, the birth mechanism of the coronavirus. How did the virus develop and evolve when it originated in a natural host?

If the outbreak was triggered by a specific environment or climate change, we can identify natural relevant spatiotemporal anomalies in recent years and bridge an association between the two. This may hopefully provide a means for understanding the origin of COVID-19.

In a brief survey of the world pandemic map, as shown in Fig. 1, we can find a very interesting phenomenon. Several countries with severe epidemics, such as China, Iran, Italy, and the United States, are almost at the same latitude. Further inspection, from the world map, the worst areas, namely Wuhan, Lombardy, and New York, almost constitute an isosceles triangle, while Tehran in Iran is nearly at the bottom of the triangle. In nature, organisms (viruses are also organisms) usually have sudden outbreaks of reproduction under certain external conditions, and they also show geographical properties, although these conditions may not be known yet.

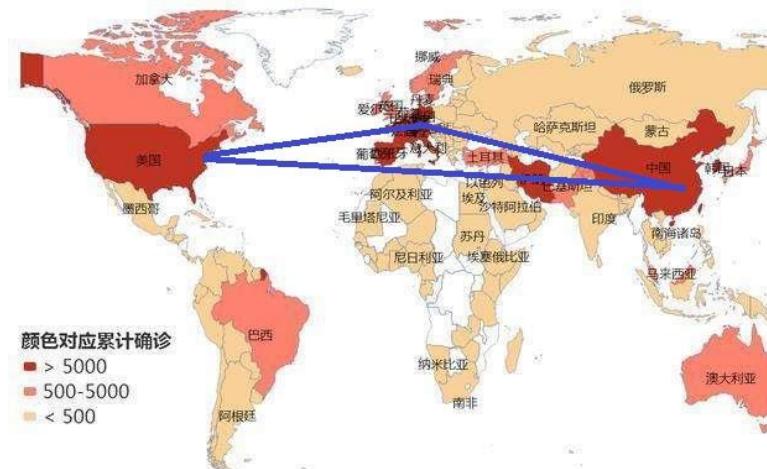


Figure 1. World epidemic map and interesting distribution of severely epidemic regions.

It is essential to reveal the origin of COVID-19. If the virus hidden in the natural environment (including animals, humans, etc.) is triggered by certain external conditions, once these conditions are understood, it will be possible to predict whether it will make a comeback, so early warning and prevention (under immutable natural conditions) or avoidance of outbreaks (under controllable environmental conditions) can be made. Further, we should adopt the same attitude to carry out early research on other seemingly mild viruses. Otherwise, it will always be a dead end.

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