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Editorial

The Mystery of COVID-19: More Questions Emerge

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New coronavirus, with the other name of SARS-Cov-2, first emerged in China's Wuhan city of Hubei province in December 2019. The virus causes a disease varying from asymptomatic course to acute respiratory distress syndrome or multiple organ failure. The disease caused by this virus discovered in 2019 named Coronavirus Disease-19 (COVID-19), and then, a global epidemic (pandemic) has been declared on March 11, 2020, byWorld Health Organization (WHO).[1,2] Since COVID-19 cases have similar symptoms, clinical and laboratory findings with SARS-Cov and MERS-Cov patients, previously performed studies thought to be a pathfinder to define the pathogenesis of the disease.[2,3] However, there are still some unsolved issues for the various aspects of COVID-19, although more than six months passed from the appearance of the first case in China. Of course, scientists have been studying the coronavirus to spread reliable life-saving information, as well as combating dangerous misunderstandings. Here are some of the most important questions to solve the mystery of COVID-19.

Where the virus comes from?

Knowing how coronavirus infections evolve and spread may provide insights improved tracing of emerging coronavirus infections. Also, this may give some hints for effective treatments in the future. Researchers still are not sure how the coronavirus across the human from bats. In the case of previous SARS-Cov infection, the weasel-like civet blamed as the most likely intermediate animal host. For the SARS-Cov-2, researchers have suggested that civets, pigs, snakes, or possibly pangolins were an intermediary host. On the other hand, it is also possible that the virus passed straight from bats to humans, or this virus is a hybrid of bat and pangolin viruses.[4] However, currently available data do not support any of these ideas.

How many people got really infected with SARS-Cov-2?

People who infected with SARS-Cov-2 but did not get sick and had no symptoms have been

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one of the most confounding factors to determine actual numbers of infected individuals. Also, some people develop quite mild or atypical symptoms or who were accepted as asymptomatic until they demonstrate the unexpected manifestations of COVID-19. Additionally, many asymptomatic cases went unnoticed because diagnostic testing is only performed on cases with typical symptoms. So all these suggest that the absence of symptoms does not mean the absence of infection, and the actual number of cases is much higher than reported by officials. Indeed, The Centers for Disease Control and Prevention proclaimed that the exact number of COVID-19 cases in the U.S., including asymptomatic cases, maybe ten times higher than what has been reported by the government at the end of June 2020.[5] There was again some confusion about the nature of asymptomatic spread. Therefore, knowing the actual prevalence of the cases, including the asymptomatic ones, is important to understand how the virus spreads, and if asymptomatic cases have developed efficient immunity against reinfection.

Do we gain long-term immunity against SARS-Cov-2?

Previous coronaviruses like SARS and MERS, antibodies seemed to last for a year or more after peaking within months of infection. But studies performed so far showed that antibodies against SARS-CoV-2 remain high for two to three months after infection, but then typically begin to wane.[6] Several studies also demonstrated that higher antibody titers are associated with more severe clinical cases.[7-10] Although higher antibody titers have been seen in critically ill patients, it is not clear whether these antibody responses lead to pulmonary pathology. On the other hand, a study from Mount Sinai Hospital in New York mentioned that longer or more severe cases did not necessarily produce more antibodies than mild or asymptomatic ones.[11] Long-term protection is provided by the induction of long-lived plasma cells and memory B cells. Still, no one is certain about the prospects for long-term humoral immunity and the specific levels of antibodies required for full immune protection. But there is a great interest to understand the lifespan of B cell memory responses to SARS-CoV-2 since this is essential to develop vaccination strategies.[12] This is also critical for controlling the pandemic since it will enable officials to lift social-distancing restrictions for people who have already recovered from COVID-19.

Would vaccine work?

By now, 140 candidate coronavirus vaccines are in preclinical evaluation. Twenty-three of them are already being tested in clinical trials.[13] First data from animal studies and early-stage human trials mainly test safety, and no trial-limiting safety concerns were reported in association with candidate vaccines. Also, multiple research groups have conducted challenge trials in which animals or humans received the candidate vaccine and were then exposed to SARS-Cov-2, to examine whether the candidate vaccine can prevent infection. Studies in macaque monkeys demonstrated that vaccines might efficiently prevent lung infection resulting in pneumonia, but not block infection elsewhere in the body, such as the nose.[14] These initial results suggest that the COVID-19 vaccine may prevent severe diseases but not protect from the viral spread. Experimental COVID-19 vaccine being developed by the Pfizer and the BioNTech triggered immune responses in healthy patients, whereas this vaccine led to fever and other mild side effects, especially at higher doses.[15] But, it is needed to conduct large studies with substantial follow-up time that aim to test vaccine efficacy. Also, future studies will need to include a more diverse group, such as pregnant women, participants from different ethnicity, elderly people.

Conflict of interest

The author declared that there are no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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