EDITORIAL

COVID-19: An effective vaccine is needed

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A novel coronavirus named SARS-CoV-2 is responsible for the present pneumonia outbreak called COVID-19 that started in early December 2019 in Wuhan City, Hubei province, China. Until March 12, SARS-CoV-2 had caused 80,980 infections and 3,173 deaths in China, but even worst, it is currently spreading fast in other countries, reaching 452,937 infections and 14,606 deaths outside China, being the most affected countries Italy, Iran and South Korea.

New cases identified in Wuhan are thought to have acquired the infection from a zoonotic source, as many reported visiting or working in the Huanan Wholesale Seafood Market. The coronaviruses are naturally hosted and evolutionarily shaped by bats1,4. The whole-genome sequence identity of the SARS-CoV-2 has 96.2% similarity to a bat SARS-related coronavirus (SARSr-CoV; RaTG13) collected in Yunnan province, China16. Nevertheless, this percentage indicates that an intermediate species should be responsible for the transmission to humans.

The incredibly rapid and effective response from the Chinese government in managing the virus widespread transmission resulted in the creation of a comprehensive epidemiological strategy that has led to the nature of newer diagnostic tools as well as a more advanced clinical management. On top of that, all scientific research has been primarily focused on the virus and its outbreak, allowing China, in a record time of just three months, to gather groundbreaking findings to share with the scientific and health community worldwide. So far, we can identify the critical issues associated with the current outbreak. First, the high virus spreads based on direct and indirect forms of transmission. SARS-CoV-2 is transmitted through droplets and fomites during close and unprotected contact between an infected person or an uninfected one. Airborne spread of the virus has not been reported; however, it may be envisaged whether specific aerosol generation procedures are carried out in health care facilities1. Researchers are trying to relate the particular nature of the Spike protein and its interaction with the host cell to explain the high level of transmission3. Second, in a recent study involving 10,991 patients in Wuhan province, China, fever was present in 43.8% of patients at the time of admission but developed in 88.7% during hospitalization9. This means that people infected with afebrile are abundant during the initial period of the disease and therefore favor the spread of the virus while escaping temperature control. Third, about 20% of confirmed patients develop severe clinical manifestations35. This situation is a challenge for any health system. Fourth, WHO has recently estimated a global fatality rate of 3.4%, but this figure must be confirmed once the epidemic is over41. As for China, until March 12, the estimated fatality rate of the outbreak was 3.9%30.

The combination of the factors mentioned above indicates that we are facing an unprecedented respiratory virus infection. This is in line with the high level of required prevention and control measures implemented by China to reach an effective reduction in the number of daily new infected cases. Given the previous factors, as well as the current spreading of the virus across the globe (particularly in Italy, which is currently lockdown), the preventive vaccination appears to be the most effective solution to contain the virus. Why is a vaccine against SARS-CoV-2 possible? Because the results obtained so far, either in preclinical or clinical trials with other two lethal Beta coronaviruses, can guide the development of a vaccine against SARS-CoV-212,13. It has been demonstrated the protective capacity of neutralizing antibodies and cell-media

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The entire globe is now facing a big challenge: the effective containment of the SARS-CoV-2 transmission. Based on China’s experience so far, the implementation of stringent and rigorous control measures is currently the most successful strategy in the world. Given this unfavorable scenario, the development of vaccines against SARS-CoV-2 should be accomplished with a strategic viewpoint. An effective vaccine should be able to protect not only against the three already known lethal coronaviruses, but also be able to prevent against another potentially fatal human Beta CoVs, which could cause similar outbreaks in the future. In fact, one Research Proposal based on this approach is being currently assessed in the World Health Organization’s Innovative Technology Assessment Committee (CTBIC), in the Yongzhou Municipality of Hunan Province, China. The world should be ready to combat these proven events occurring in nature.

Conclusions

The entire globe is now facing a big challenge: the effective containment of the SARS-CoV-2 transmission. Based on China’s experience so far, the implementation of stringent and rigorous control measures is currently the most successful way to reduce infections. However, given the critical issues related to the current outbreak and the economic differences of the world’s countries, an effective vaccine will be the ultimate goal to stop the ongoing coronavirus transmission and next virus zoonosis.

Bibliographic references

34. DNA vaccine. The Lancet Infectious Diseases vol. 19 924–925 (2019).