



Understanding COVID-19 Epidemiology, Treatment Strategies, And Vacation Effort

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ABSTRACT

2019, the coronavirus covid-19 is a bacterial disease present in the city of Wuhan, the capital of China, and the virus that causes this disease is called acute respiratory syndrome. Currently, there is no specific treatment designed to treat Covid-19. The effective identification of emergency treatments to treat patients and prevent the spread of coronavirus is necessary for those who have declared an outbreak of COVID-19. From December 2019 to July 2020, more than 10.4 million cases of Covid-19 have been reported in more than 188 countries.

KEY WORDS

- Corona virus
- Vaccines
- SARS-CoV-2
- Causative agent
- Diagnosis
- Symptoms

INTRODUCTION

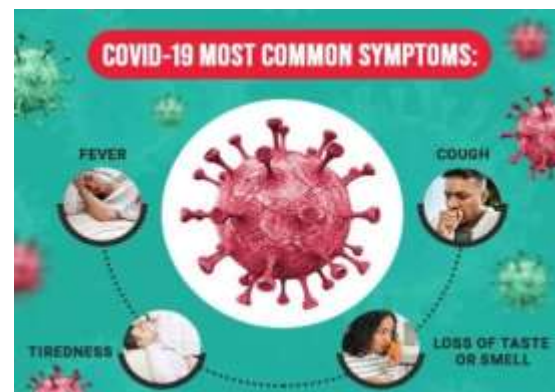
According to a report by the World Health Organization (WHO), the coronavirus (COVID- 19) is an infectious disease caused by a recently discovered coronavirus. Due to high contamination and high concentration, isolation and disposal are the best methods for long-term storage. Different countries have developed different measures to prevent COVID-19 based on their methods and circumstances. Although there are several treatments for Covid-19, no long-term cure has been developed. Vaccination as a social project In addition, it has created a connection with the residents and the depth here, it is a meaningful community for people. French In this article, first a brief description of Covid-19 and the

current problem of prevention, it discusses the treatment to understand that the status has been renewed during the epidemic.[1] Because of the 2019 coronavirus disease (COVID-19), a second serious coronavirus (SARS-CoV-2) is the second, seventh type of coronavirus that spreads from other hosts such as bald mice and rodents [2] since its discovery in December 2019 (Figure 2), SARS-CoV-2 has caused more than 6.8 million deaths. worldwide, making it one of the deadliest viruses in human history The impact of the COVID-19 pandemic in this country has been evident The ability to develop prevention and treatment strategies. So far, these efforts have led to several effective vaccines Very rapid turnaround [3,4] and comprehensive review There are several potential treatments in clinical trials, which have also reached the market (Table 1). Based on lessons learned from six decades of antiviral drug discovery [5–8], two types of anti-SARS-CoV-2 agents can be considered. The first type targets viral proteins (mainly viral enzymes) to disrupt the viral life cycle and is very selective if the targets do not have human counterparts, but drug resistance can be a risk. with new variants [5]. The second type targets host proteins involved in the viral life cycle (such as receptors involved in virus entry [9,10]), which can show broad antiviral activity, but with low selectivity and potentially weak immunogenicity [6]. In addition, agents such as human proteins, such as immunomodulators, are important in correcting the host's negative response to viral infections, such as the "cytokine storm" and the thrombosis.

Efforts to develop anti-Covid-19 drugs were studied during the epidemic [12-16], although clinical results were produced quickly, but these efforts were difficult to sustain for long time. Now, with the evidence gathered over the past three years, it is possible to summarize all the progress made, examine the needs and challenges that remain, and reflect on the lessons learned. Here, we present a comprehensive review of hosts infected with the virus and SARS-CoV-2, based on large-scale studies that have revealed more than 700 testimonials from active customers. Anti- SARS-CoV-2 in preclinical and clinical practice. Environmental or clinical studies have evaluated the clinical effect of immunomodulators and anticoagulants. We also discuss key issues related to the discovery and development of these agents, including the strengths and limitations of drug replication, relevant disease models, and clinical trial strategies. Due to limited space, readers are encouraged to refer to other reviews on SARS-CoV-2 vaccine [4,17], diagnosis [18,19], biology and pathogenesis [20, 21], acute and post-acute See [22 ,23] immunology and inflammation [24,25], protein structures and functions [26,27], new species [28,29] and antiviral drugs against other coronaviruses [30,31].

SYMPTOMS OF COVID-19 ARE

- High fever
- Throat infection
- Nose flow
- Difficulties in breathing
- Low oxygen level in body
- Cold and cough
- Body pain
- Wet cough
- Weakness
- Loss of taste or smell
- Nausea or vomiting



- Sore throat

CAUSATIVE AGENTS

COVID-19 is caused by infection with the severe acute respiratory syndrome coronavirus 2, also called SARS-CoV-2

SARS-COV-2 TRANSMISSION

Patient-to-host transmission of SARS-CoV-2. The frequent sneezing and dry cough exhibited by the patient with COVID-19 generates viral plumes of thousands of droplets per cubic centimeter. Since it is believed that the SARS-CoV-2 infection is transmitted by aerosols and/or droplets, it is imperative to evaluate its particle characteristics, aerodynamic behavior, and the propensity to overcome various physiological barriers to enter the body of the 'host'. [44]

Characteristics of droplets/aerosols emitted by patients with COVID-19. Pathogens were originally thought to be carried by the patient in larger droplets, which are deposited on surfaces and then transported to the host by the dust that develops from the dried droplets.

It has recently been identified that sneezing and dry coughing experienced by patients with COVID-19 generate droplet sizes between 0.6 and 100 μm and the number of droplets increases proportionally to the frequency of coughing. [45] More than 97% of these drops tend to be smaller than 50 μm , and most of them are smaller than 10 μm . [46–48] Presymptomatic or asymptomatic patients can also generate and emit large amounts of droplets, smaller than 1 μm , through normal breathing and speech. [49] The particle size distribution can be shifted further down when air droplets are vaporized to form droplet nuclei.

particles for the right thing The nucleation of drops depends on the ambient temperature and humidity and the size of the particles A drop is less than 10 micrometers in size Ability to nucleate drops before landing Drops suspended in the sky more than the cough is caused by the air flow in the environment They are less than 50 μm in diameter and survive the column without excessive evaporation [50,51] leads to the contamination of floors and ventilation systems 41 How' and most viruses, the average size of SARS-CoV-2 is 0.1 μm . Even aerosol particles of 1–10 μm are large enough to carry a payload of live viral particles [52,53]

DIAGNOSIS OF COVID 19

Fast and accurate diagnostic tests are needed to confirm covid 19 disease, find its origin and suppress its transmission [14,15]. The current diagnostic strategies for COVID-19 are twofold and laboratory analysis

- **Clinical diagnosis**

French symptoms in patients with COVID-19 are progressive over about a week, initially with mild symptoms, then (in some cases) progressing to shortness of breath and shock [32]. Common symptoms - Fever onset (98%), cough (76%) or fatigue myalgia (44%); Even minor symptoms are salivary ileus (28%), diarrhea (8%), hemoptysis (5%) and diarrhea (3%) [32]. Guan et al [33] examined the clinical characteristics of patients with COVID-19 by obtaining data from 1099 laboratory-confirmed cases of COVID-19 in 552 hospitals. The average number of patients Lasted 47 years and the average time in the city was determined For four days, their main symptom was fever, followed by fever Cough (67.8%), the least common symptom is vomiting. Itching with nausea (5.0%) and diarrhea (3.8%). In addition, Zhu et al Workers [34] evaluated the clinical characteristics of 191 patients with Covid 19. Almost half of these patients are infected.

These include high blood pressure, diabetes and coronary heart disease. The most common multiple regression showed that an increased risk of death in hospital could be attributed to those aged 15 to 24 years. The main methods currently used for the analysis of clinical images of the chest COVID-19 include chest radiography and computed tomography. Computed tomography (CT) of this method is also necessary for the diagnosis of pneumonia and the assessment of severity. Most patients with COVID-19 have variations of the boxed picture, usually with double lips, including the ground glass surface in recovery. Evaluation of patients with mild symptoms in the part of pulmonary Integrity in patients with severe symptoms [35,38]. The chest x-ray shows interstitial changes and other dark points [32] are important in these cases Pulmonary Environment [39] Pneumonia in the early stages.

CURRENT SITUATIONS OF PREVENTION AND CONTROL

As of April 13, 2021, compared to December 2020, the number of confirmed cases and the number of deaths worldwide have decreased [40]. But this is not the case Fortunately, the COVID

19 pandemic continues to spread. Especially from February to April 2021, the number of confirmed cases and deaths in the world has also increased [40]. Among them, many people died. The United States and Europe are the most affected countries in the world, although China has had the highest number of confirmed cases with about 15 people per day by 2021 [40]. It is good news that countries are starting to plant vaccines whose value is linked to future data. The above information shows that China is the first country to experience multiple outbreaks of COVID-19 and at least a number of new cases and deaths have been recorded since April 2020. However, there are countries such as the United States and Brazil that they cannot. Control the epidemic.

Indeed, the policies of the two countries regarding the epidemic are different. Some countries, such as China, have adopted national prevention and control policies, but some have adopted very strong policies for external prevention and control and internal peace. Prevention and control According to the research of Dr. Qian, when a person is infected with SARS-CoV-2, he is in a vulnerable and isolated place. It is the work of the government that prompts some countries to implement domestic and Chinese methods of epidemic control. The best example of China used the gid government method to effectively control the mortality rate during the Spring Conference [42].

At the beginning of the epidemic, many Chinese provinces and cities started the first level of health care for people. The government has closed public recreation areas, locked down communities and severely restricted the floating population. Also, the

Chinese government insisted that people be treated fairly. Leave the house, stop work and school, and check the daily temperature, etc., is too indoor Prevention and control are effective. Spread and Activation Distribution China will resume production in April 2020. Today, most countries are still faced with new corona viruses, China has eliminated this virus. However, other countries have adopted stricter measures The policy of detention and control of foreigners, a policy of prevention and more flexible internal control, the United States and Europe are good examples. At the beginning of the epidemic, the United States, Australia, Indonesia and other countries implemented the control policy of “banning the entry of Chinese citizens and/or residents of other countries who are been in China in 14 days” to effectively manage rigorous inputs. And outputs [41].



Dr. Qian used a quantile regression model to compare countries that emphasize internal prevention and control with those that emphasize more external prevention and control and found that countries that emphasize more external prevention and control have relatively more people infected with COVID-19. [41]. This means that the strict immigration control policies adopted by these countries have not affected the prevention and control of the cross-border spread of the epidemic for these countries. He explained in a later report: "The test based on the Google search index first shows that compared to countries that implement relatively weak foreign protection policies, countries that implement strict foreign protection policies have a higher degree of attention to internal explosions It is practical, which explains the beginning It is a real situation of foreign policy The first stages of the epidemic have not been strictly controlled An epidemic will spread throughout the country. [41].

VACCINE

HOW DO VACCINES WORK?

The human immune system contains B lymphocytes that produce antibodies. These antibodies attack the pathogen and remove it from your body. But if it does not recognize them as foreign, the vaccine helps the B cells to fight the pathogen. This vaccine is known as a potent vaccine. In addition, vaccines also provide immunity by injecting antibodies from another person or animal. Vaccines work by injecting a safer version of the disease into your body through a weakened or attenuated form of the pathogen. There are two parts. Antigen and antigen adjuvants help trigger antibody production in the body's B cells. Although the vaccine helps the body resist the antigen, it becomes stronger. [43]

COVID 19 VACCINES ARE

1. Covishield vaccines
2. Covaxin
3. Booster dose



COVISHIELD

The human immune system is effective in fighting pathogens. But sometimes the organisms that enter the body are not recognized by the cells. So the immune system is infected and cannot effectively fight against pathogens. It is in these cases that vaccination is most important to prevent the disease. Vaccines help the immune system by identifying and eliminating pathogens from the body. Vaccines are new and have helped people fight major diseases like polio, measles, whooping cough, etc.

Vaccines help protect individuals and nations. Therefore, people should be vaccinated to get rid of diseases. As the outbreak spread around the world, scientists worked hard to understand the behavior of the virus so they could develop a vaccine as soon as possible. Many people have been affected by the coronavirus. What has worsened the situation is that no health insurance covers hospitalization for Covid in India. Later, the Indian government strongly mandated that all medical insurance plans cover hospitalization needs due to the coronavirus.[43]

COVAXIN

contains immunity amplifiers, called immunomodulators, which are added to the vaccine to strengthen and improve its immunity. This is a vaccination cycle with 2 injections administered 28 days apart.[43]

THE BOOST DOSE



Some vaccines are administered using the strategy of giving a first (or earlier) dose and a booster dose. During the initial dose, the immune system begins to recognize and produce antibodies against the virus intended to protect it. Reinforcement injections are prescribed to remind the immune system of the virus it must protect. It improves or strengthens the immune system.[43]

REFERENCE

1. Britannica, The Editors of Encyclopaedia. "Coronavirus". Encyclopedia Britannica, 23 Feb. 2021, <https://www.britannica.com/science/coronavirus-virus-group>. Accessed 30 May 2021.
2. Zhu, N. et al. A novel coronavirus from patients with pneumonia in China, 2019. *N. Engl. J. Med.* 382, 727–733 (2020).
3. Dolgin, E. Pan-coronavirus vaccine pipeline takes form. *Nat. Rev. Drug Discov.* 21, 324– 326 (2022).
4. Chaudhary, N., Weissman, D. & Whitehead, K. A. mRNA vaccines for infectious diseases: Principles, delivery and clinical translation. *Nat. Rev. Drug Discov.* 20, 817–838 (2021).
5. De Clercq, E. & Li, G. Approved antiviral drugs over the past 50 years. *Clin. Microbiol. Rev.* 29, 695–747 (2016).
6. Li, G. & De Clercq, E. in *Antiviral Discovery for Highly Pathogenic Emerging Viruses* (eds Muñoz-Fontela, C. & Delgado, R.) 1–27 (Royal Society of Chemistry, 2022).
7. Li, G., Jing, X., Zhang, P. & De Clercq, E. in *Encyclopedia of Virology (Fourth Edition)* (eds Bamford, D. & Zuckerman, M.) Ch. 1, 121–130 (Academic Press, 2021).
8. Meganck, R. M. & Baric, R. S. Developing therapeutic approaches for twenty-first-century Emerging infectious viral diseases. *Nat. Med.* 27, 401–410 (2021).
9. Kaufmann, S. H. E., Dorhoi, A., Hotchkiss, R. S. & Bartenschlager, R. Host-directed Therapies for bacterial and viral infections. *Nat. Rev. Drug Discov.* 17, 35–56 (2018).
10. Baggen, J., Vanstreels, E., Jansen, S. & Daelemans, D. Cellular host factors for SARS-CoV-2 infection. *Nat. Microbiol.* 6, 1219–1232 (2021).
11. Gu, S. X. et al. Thrombocytopenia and endotheliopathy: crucial contributors to COVID-19 Thromboinflammation. *Nat. Rev. Cardiol.* 18, 194–209 (2021).
12. Chen, Y. et al. Broadly neutralizing antibodies to SARS-CoV-2 and other human coronaviruses. *Nat. Rev. Immunol.* 23, 189–199 (2023).
13. Brilliant Social pharmacy book authors : prof.D. B Jagtap, prof .V. S Gaikwad, Prof.S.V Bhise
14. X. Li, M. Geng, Y. Peng, et al., Molecular immune pathogenesis and diagnosis Of COVID- 19, *J. Pharm. Anal.* 10 (2020) 102e108.

15. C. Shen, N. Yu, S. Cai, et al., Quantitative computed tomography analysis for stratifying the severity of Coronavirus Disease 2019, *J. Pharm. Anal.* 10(2020) 123e129.
16. stratifying the severity of Coronavirus Disease 2019, *J. Pharm. Anal.* 10(2020) 123e129.
17. stratifying the severity of Coronavirus Disease 2019, *J. Pharm. Anal.* 10(2020) 123e129.
18. Tregoning, J. S., Flight, K. E., Higham, S. L., Wang, Z. & Pierce, B. F. Progress of the COVID-19 vaccine effort: viruses, vaccines and variants versus efficacy, effectiveness and escape. *Nat. Rev. Immunol.* 21, 626–636 (2021).
19. Drain, P. K. Rapid diagnostic testing for SARS-CoV-2. *N. Engl. J. Med.* 386, 264–272 (2022).
20. Peeling, R. W., Heymann, D. L., Teo, Y. Y. & Garcia, P. J. Diagnostics for COVID-19: moving from pandemic response to control. *Lancet* 399, 757–768 (2022).
21. Lamers, M. M. & Haagmans, B. L. SARS-CoV-2 pathogenesis. *Nat. Rev. Microbiol.* 20, 270–284 (2022).
22. V’Kovski, P., Kratzel, A., Steiner, S., Stalder, H. & Thiel, V. Coronavirus biology and replication: implications for SARS-CoV-2. *Nat. Rev. Microbiol.* 19, 155–170 (2021).
23. Gupta, A. et al. Extrapulmonary manifestations of COVID-19. *Nat. Med.* 26, 1017–1032 (2020).
24. Nalbandian, A. et al. Post-acute COVID-19 syndrome. *Nat. Med.* 27, 601–615 (2021).
25. Diamond, M. S. & Kanneganti, T. D. Innate immunity: the first line of defense against SARS-CoV-2. *Nat. Immunol.* 23, 165–176 (2022).
26. Minkof, J. M. & tenOever, B. Innate immune evasion strategies of SARS-CoV-2. *Nat. Rev. Microbiol.* 21, 178–194 (2023).
27. Yang, H. & Rao, Z. Structural biology of SARS-CoV-2 and implications for therapeutic development. *Nat. Rev. Microbiol.* 19, 685–700 (2021).
28. Malone, B., Urakova, N., Snijder, E. J. & Campbell, E. A. Structures and functions of coronavirus replication-transcription complexes and their relevance for SARS-CoV-2 drug design. *Nat. Rev. Mol. Cell Biol.* 23, 21–39 (2022).
29. DeGrace, M. M. et al. Defining the risk of SARS-CoV-2 variants on immune protection. *Nature* 605, 640–652 (2022).
30. Li, J., Lai, S., Gao, G. F. & Shi, W. The emergence, genomic diversity and global spread of

SARS-CoV-2. *Nature* 600, 408–418 (2021).

31. Zumla, A., Chan, J. F., Azhar, E. I., Hui, D. S. & Yuen, K. Y. Coronaviruses — drug discovery and therapeutic options. *Nat.Rev. Drug. Discov.* 15, 327–347 (2016).
32. C. Huang, Y. Wang, X. Li, et al., Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China, *Lancet* 395 (2020) 497e506.
33. W. Guan, Z. Ni, Y. Hu, et al., Clinical characteristics of coronavirus disease 2019 in China, *N. Engl. J. Med.* 382 (2020) 1708e1720.
34. F. Zhou, T. Yu, R. Du, et al., Clinical course and risk factors for mortality of Adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort Study, *Lancet* 395 (2020) 1054e1062.
35. H. Shi, X. Han, N. Jiang, et al., Radiological findings from 81 patients with COVID-19 pneumonia in Wuhan, China: a descriptive study, *Lancet* 20(2020) 425e434.
36. N. Zhu, D. Zhang, W. Wang, et al., A novel coronavirus from patients with pneumonia in China, 2019, *N. Engl. J. Med.* 382 (2020) 727e733.
37. N. Chen, M. Zhou, X. Dong, et al., Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study, *Lancet* 395 (2020) 507e513.
38. J.F.W. Chan, S. Yuan, K.H. Kak, et al., A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster, *Lancet* 395 (2020) 514e523.
39. J.F.W. Chan, S. Yuan, K.H. Kak, et al., A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster, *Lancet* 395 (2020) 514e523.
40. WHO Coronavirus Disease (COVID-19) Dashboard, 11 Sept. 2020, covid19.who.int.
41. Qian Xuesong, Ding Hai, and Zheng Dechang. "The COVID-19 epidemic, the early prevention and control measures of the international community and the evaluation of their effects-an empirical study based on the perspectives of external prevention and internal control." *Financial Research* 47.03 (2021): 4-18. doi: 10.16538 /j.cnki.jfe.20201115.403.

42. Wei, Yujun et al. "COVID-19 prevention and control in China: grid governance." *Journal of public health (Oxford, England)* vol. 43, 1 (2021): 76-81. doi:10.1093/pubmed/fdaa175
43. Google
44. Jayaweera, M.; Perera, H.; Gunawardana, B.; Manatunge, J. Transmission of COVID-19 virus by droplets and aerosols: A critical review on the unresolved dichotomy. *Environ. Res.* 2020, 188, 109819.
45. Yang, S.; Lee, G. W.; Chen, C. M.; Wu, C. C.; Yu, K. P. The size and concentration of droplets generated by coughing in human subjects. *J. Aerosol Med.* 2007, 20 (4), 484–494.
46. Duguid, J. P. The numbers and the sites of origin of the droplets expelled during expiratory activities. *Edinb Med. J.* 1945, 52,385–401.
47. Zayas, G.; Chiang, M. C; Wong, E.; MacDonald, F.; Lange, C.F; Senthilselvan, A.; King, M.; et al. Cough aerosol in healthy participants: fundamental knowledge to optimize droplet-spread infectious respiratory disease management. *BMC Pulm. Med.* 2012,12, 11.
48. Bourouiba, L.; Dehandschoewercker, E.; Bush, J. W. M. Violent expiratory events: on coughing and sneezing. *J. Fluid Mech.* 2014, 745, 537–563.
49. Asadi, S.; Bouvier, N.; Wexler, A. S.; Ristenpart, W. D. The coronavirus pandemic and aerosols: Does COVID-19 transmit via expiratory particles? *Aerosol Sci. Technol.* 2020, 54 (6), 635–638.
50. Han, Z. Y.; Weng, W. G.; Huang, Q. Y. Characterizations of particle size distribution of the droplets exhaled by sneeze. *J. R. Soc.Interface* 2013, 10 (88), 20130560.
51. Johnson, G. R.; Morawska, L.; Ristovski, Z. D.; et al. Modality of human expired aerosol size distributions. *J. Aerosol Sci.* 2011, 42(12), 839–851.
52. Heyder, J.; Gebhart, J.; Rudolf, G.; Schiller, C. F.; Stahlhofen, W. Deposition of particles in the human respiratory tract in the size range 0.005–15 µm. *J. Aerosol Sci.* 1986, 17 (5), 811–825.
53. Asadi, S.; Bouvier, N.; Wexler, A. S.; Ristenpart, W. D. The coronavirus pandemic and aerosols: Does COVID-19 transmit via expiratory particles? *Aerosol Sci. Technol.* 2020, 54 (6), 635–638.