The Influence of Novel Coronavirus on Human Body System

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Abstract: Covid-19 virus has infected tens of millions of people since 2020. Its extremely high mortality rate has a huge impact on the development of the world. The influence of new coronavirus on the human body was discussed from two aspects: Antibody level and virus-cell attack. In addition, the study of the impact of the virus on the human body, expands the content of vaccine development and introduction. We can accurately study the relationship between the two through their structural differences, so as to have a good grasp of the structure of the vaccine.

Key words: Human body system, novel coronavirus, vaccine.

1. Introduction

Since the outbreak of novel coronavirus pneumonia in December 2019, the number of confirmed cases of new coronavirus pneumonia has reached 15 million, and the number of deaths has exceeded 600 thousand by the end of February 2021. If we continue this novel coronavirus pneumonia will not only pose a great threat to the health and safety of the people of the world but will also continue to affect the trend of world development. Under the threat of novel coronavirus pneumonia, many countries in the world have actively participated in the research of medical-specific drugs and vaccines. This initiative effectively controls the probability of recurrence of case history mortality and rehabilitation. But after the patient's illness and medical treatment, we can't help but want to explore the impact of the new coronavirus on him.

From [1], we can know that the new coronavirus uses the surface spike glycoprotein on its envelope to attach to the host cells and mediate the fusion of host cell membrane and virus membrane in the process of infection, leading to host disease. In the process of infection, the virus attacks the cell membrane, which makes the immune system in the cytokine storm against the virus. In a short period of time, it leads to a large number of organ failures in the body, leading to the death of the patient. Even if the patient does not have an accident during the fight, the virus will probably mutate, which will still lead to the aggravation of the patient's condition.

In this work, we describe the effects of the virus on the human body from three aspects and expand the content of vaccine development and introduction. This article is organized as follows: Section 2 presents two aspects of the virus's impact on the human body. We describe the vaccine development and introduction in Section 3, followed by a conclusion.

2. The Effects of COVID-19 and Its Antibodies on HUMAN Body

2.1. The Influence of Antibody Level on Human Body

We know that some new coronavirus-infected people will produce lgM and lgA antibodies within a week after the onset of the disease. The dynamic changes of the two can affect the effectiveness of the immune system against the virus in patients. Some neutralization antibodies are some immunoglobulins aiming at some surface proteins and antivirus bodies, which are mainly used as reference indicators in the immune protection effect. The level of neutralization antibody decreased after discharge in some patients, and the decrease of symptomatic infection was more obvious than that of asymptomatic ones. In addition, there are still a few serious infections that cannot detect antibodies after the onset of the disease, there is a possibility that the disease will be aggravated due to the inability to produce antibodies [1].

Although there are certain differences in antibody levels produced by different individuals, the positive rate of female antibodies in different periods of the new crown virus is generally higher than that of men, but no clear causal relationship has been found between them. Secondly, we can compare the new coronavirus infected people with similar SARS infections, and we know that the antibody level of patients is mainly affected by the severity of the disease. The more severe the disease, the higher the level of antibody in the body. Although antibodies can effectively prevent the possibility of re-positive, the severity of the disease also leads to poor treatment effects, which affects the cure rate of patients.

2.2. The Influence of Virus Cell Attack on The System in Vivo

Clinical research shows that most patients will have a fever, dry cough, and weakness in the early stage of infection. Patients in the later stage will suffer from dyspnea, and the serious patients will face death. Most patients have abnormal CT, mainly manifested as double lung multiple membrane glass shadow. It can be seen that the virus through the fusion of cell membrane not only directly damaged the lung tissue of the patients but also damaged the pulmonary capillary endothelial cells and alveolar epithelial cells, leading to diffuse alveolar injury and the formation of lung transparent membrane. Thus, it seriously affects the respiratory function of the lung, accelerates the deterioration of the lung, and develops into pulmonary fibrosis. Many rehabilitation patients will have different degrees of pulmonary fibrosis in the months or years after discharge, so we need to take necessary anti-inflammatory treatment to protect lung function in the early stage [2].

Secondly, we found that a large proportion of the patients included in the research team of academician Zhong Nanshan suffered from cardiovascular diseases such as heart machine injury. Through the follow-up study, we can know that cardiovascular disease is a common comorbid disease among patients with COVID-19. This is due to the increase of ctn1 level in the body of the patients with COVID-19, and the decrease of fat tissue density in the extracardiac model detected by CT Inflammation of the heart, which translates into myocardial injury and heart failure [3].

According to [2], if the new coronavirus infected people have diabetes and other chronic diseases characterized by hyperglycemia, long-term hyperglycemia will make the body's immunity decline in varying degrees, which is more vulnerable to the erosion of the virus and will increase the risk of morbidity and mortality during the infection.

In patients with diabetes, obese people are more likely to be infected, which is also one of the main complications in severe pneumonia patients. Excessive fat can lead to direct infection of the virus, aggravation of inflammation, and increase mortality.

Then, the influence of new coronavirus on the body mechanism still exists in the digestive system of the patients. After the direct attack of virus and the immune response of cells to a certain extent, the gastrointestinal system of patients will lead to the damage of their tissues and organs. Moreover, the higher

the degree of infection, the more likely the liver function will be damaged. The human cellular system will have immunosuppression, which will damage the liver function of patients in the early stage, and it is very likely to lead to inflammation such as hepatitis in the process of treatment, So as to affect the patient's digestive system.

Finally, there are many patients with autoimmune hemolytic anemia after discharge. This is due to immune thrombocytopenia after autoimmune injury, leading to anemia, seasonal infection, and other immune diseases [4].

3. Development and Introduction of Vaccines

Coronavirus is RNA virus, which has a high false mutation rate. Such mutation is likely to accelerate the virus mutation and enhance its toxicity. So far, a variety of virus mutation cases have been found abroad, which have caused great resistance to our medical research. Because, the mutation of the virus will not only cause the failure of the vaccine but also increase the risk of infection of ordinary people and the risk of death of infected people. We can't take out accurate and effective drugs to curb its spread at the first time when the virus mutates. Therefore, the rapid increase in the frequency of mutation of the virus adds a lot of pressure to global medical research [2].

We know that in infectious diseases, the vaccine, as an effective means to protect susceptible people and block transmission, has been regarded as one of the most effective and important means to prevent infectious diseases. Besides, novel coronavirus pneumonia is not available for us now, so the existence of vaccine is particularly important.

Currently, novel coronavirus pneumonia vaccines have five aspects. They are inactivated vaccine, live attenuated vaccine, recombinant protein vaccine, viral vector vaccine, and nucleic acid vaccine [5]. Among them, inactivated vaccine is the most mature and relatively safe vaccine, but it also has shortcomings. Because of its poor immunogenicity, it needs to be strengthened by multiple doses, which also leads to the shortage of production and the increase of the cost. In addition, its immune effect for the elderly is not ideal, and it has greater selectivity for the metabolic efficiency of the human body [6].

The variability of the virus is very strong, so we have to worry about the failure of the vaccine before it is on the market. Global comparative analysis of genome sequences of nearly 60000 new coronaviruses showed that the genomes had high sequence similarity, and neutralizing antibodies against viral proteins could cover almost all epidemic strains. Nevertheless, we can't ignore the mutation of the virus, we should pay more attention to their development, to explore whether it has its biological significance, so as to have the most accurate control of the candidate vaccine in future vaccine research and development [5].

However, there are many challenges in the process of vaccine development. After the vaccine enters the human body, the antibody in the vaccine can not only inhibit the virus from entering the cells but also enhance the replication ability of the virus, causing more serious infection. Thus, in addition, as mentioned above, the effect of the vaccine in elderly patients and patients with chronic diseases is greatly reduced. For such groups, we can only readjust the injection volume according to their physical condition and vaccine dosage, and we must ensure a small number of continuous injections to improve their antibody level [7].

4. Conclusion

Through these studies, we can see that the new coronavirus and its antibodies affect our body in varying degrees. Moreover, under the current situation at home and abroad, the infection rate of new coronavirus pneumonia is also increasing, and COVID-19 is also changing. This situation is very disadvantageous to vaccine research. Although we have the latest vaccines in the vaccination stage, and some are in the research and development and experimental stage, we should not only conduct in-depth research from the

aspects of virus damage to the human body, virus mutation and phenomenon but also need to study the antibody level of different types of patients, so as to balance the vaccine effect and the probability of patients' positive from the antibody level value, so as to increase the efficiency Add the infectivity of the general population, reduce the re positive rate of patients, so as to achieve a better therapeutic effect.

Conflict of Interest

The authors declare no conflict of interest.

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Ruolin Liu was born in Sichuan, China in October 2001. At present, she is a junior majoring in applied chemistry at Sichuan University.

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