

Special Issue-Biomarkers in COVID-19

Potential Biomarkers in COVID-19 and Their Diagnosis

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Received: January 23, 2023; **Accepted:** March 10, 2023;**Published:** March 17, 2023**Abstract**

Biomarkers are measurable indicators of a biological state or condition. In the context of COVID-19, biomarkers can be used to diagnose the disease, monitor its progression, and evaluate the effectiveness of treatments.

One common biomarker for COVID-19 is the presence of viral RNA in a patient's respiratory samples, as detected by Reverse Transcription Polymerase Chain Reaction (RT-PCR) tests. Antibody tests, which detect antibodies against the SARS-CoV-2 virus in a patient's blood, can also be used as biomarkers, although they may not be as reliable in the early stages of infection.

Other biomarkers that have been studied in the context of COVID-19 include proinflammatory cytokines, such as interleukin-6 (IL-6), which are known to be elevated in patients with severe disease. There are also several biomarkers being studied for their potential use as indicators of disease severity or risk of progression to severe disease.

It's important to note that biomarkers are changing rapidly as more research is being done on COVID-19, and new biomarkers are being discovered and characterized.

Keywords: COVID-19; Biomarker; SARS-CoV-2; RT-PCR**Introduction**

COVID-19, also known as coronavirus disease 2019, is a highly contagious respiratory illness caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The virus was first identified in Wuhan, China in 2019 and has since spread globally, leading to the ongoing COVID-19 pandemic [1,2].

Symptoms of COVID-19 can range from mild to severe and may appear 2-14 days after exposure to the virus [3]. The most common symptoms include fever, dry cough, and difficulty breathing. Other symptoms can include fatigue, muscle or body aches, sore throat, headache, loss of taste or smell, congestion or runny nose, nausea or vomiting, and diarrhea. Some people with COVID-19 may have no symptoms at all [4,5].

COVID-19 is primarily spread through respiratory droplets when an infected person coughs, sneezes, or talks. The virus can also spread by touching a surface or object that has the virus on it and then touching the mouth, nose, or eyes [6].

Preventive measures to reduce the spread of COVID-19 include washing hands frequently, practicing physical distancing, wearing a mask in public, avoiding large gatherings, and getting vaccinated [7].

Diagnostic tests for COVID-19 include RT-PCR tests, which detect the presence of the virus's genetic material in a sample taken from the respiratory tract, and antibody tests, which detect antibodies produced by the body in response to the virus. CT scans of the chest can also show characteristic changes in the lungs that are associated with COVID-19, such as ground-glass opacities or patchy consolidations [8].

Treatment options include self-isolation, supportive care such as oxygen therapy, and antiviral medications such as remdesivir. Vaccines have been developed and authorized for emergency use in several countries, which have been shown to be safe and effective in preventing severe disease and death [9].

It's important to note that the COVID-19 pandemic is a rapidly evolving situation, and new information and guidance are constantly being updated by public health officials and medical experts. It's important to stay informed and follow the recommendations of public health officials to protect yourself and others [9]. In this review article we summarized COVID-19 biomarkers responsible and their possible detection techniques.

Common Symptoms of COVID-19

The symptoms of COVID-19 can range from mild to severe and can appear 2-14 days after exposure to the virus. The main symptoms of COVID-19 are fever, dry cough, and difficulty breathing [10]. Other common symptoms include fatigue, muscle or body aches, sore throat, headache, loss of taste or smell, congestion or runny nose, nausea or vomiting, and diarrhea. Some people may also have a rash or discoloration of the fingers or toes. In severe cases, COVID-19 can lead to pneumonia, acute respiratory distress syndrome (ARDS), and death [11].

It's important to note that some people, particularly older adults and those with underlying health conditions, may be at higher risk for severe illness and death from COVID-19. If you experience any of the above symptoms, or if you have been in close contact with someone who has COVID-19, it is important to get tested and self-isolate [12].

Biomarkers of COVID-19

Biomarkers are important tools for the diagnosis, monitoring, and management of COVID-19. They can be used to quickly and accurately diagnose the disease, track the progression of the disease, and monitor the effectiveness of treatment. The use of biomarkers can also help healthcare professionals identify individuals who are at high risk of severe illness and death from COVID-19, and target interventions to those who need them most [13].

The use of biomarkers can also help with public health efforts to contain the spread of the disease by identifying and isolating infected individuals early on. Biomarkers can also be used to track the prevalence of the disease in a population and monitor for outbreaks. In addition, biomarkers can play an important role in vaccine development, helping researchers to evaluate the safety and effectiveness of potential vaccines and monitor the immune response to vaccination [14].

Overall, biomarkers are critical to the effective diagnosis, management, and control of COVID-19. They can help healthcare professionals make informed decisions, improve patient outcomes, and contribute to public health efforts to curb the pandemic [14].

Role of Biomarkers in COVID-19 and Their Diagnosis

Biomarkers play an important role in the diagnosis, monitoring, and management of COVID-19 [15]. They can be used to:

Diagnosis: Biomarkers such as RT-PCR test, Antibody tests, and CT scan can be used to quickly and accurately diagnose COVID-19. These tests can detect the presence of the virus or its genetic material, or the body's response to the virus.

Monitoring disease progression: Biomarkers such as blood markers, inflammatory markers, and CT scans can be used to track the progression of the disease and monitor the effectiveness of treatment.

Identifying high-risk individuals: Biomarkers can help

healthcare professionals identify individuals who are at high risk of severe illness and death from COVID-19, and target interventions to those who need them most.

Containing the spread of the disease: Biomarkers can be used to identify and isolate infected individuals early on, which can help to contain the spread of the disease.

Vaccine development: Biomarkers can play an important role in vaccine development, helping researchers to evaluate the safety and effectiveness of potential vaccines and monitor the immune response to vaccination.

In population screening: Biomarkers can be used to track the prevalence of the disease in a population and monitor for outbreaks.

It's important to note that the use of biomarkers in COVID-19 management is still being researched and is a fast-evolving field. New biomarkers and diagnostic methods are being developed and authorized as the understanding of the disease progresses [15].

Main Points of Biomarkers of COVID-19

The main points of biomarkers of COVID-19 include [16]:

1. Biomarkers are important tools for the diagnosis, monitoring, and management of COVID-19.
2. The most widely used diagnostic test for COVID-19 is RT-PCR, which detects the presence of the virus's genetic material in a sample taken from the respiratory tract.
3. Antibody tests can be used to determine if someone has been infected with the virus in the past, even if they don't have symptoms currently.
4. CT scans of the chest can also show characteristic changes in the lungs that are associated with COVID-19, such as ground-glass opacities or patchy consolidations.
5. Other biomarkers such as blood markers, inflammatory markers, and clinical parameters can also indicate the presence or severity of the disease.
6. Biomarkers can be used to identify and isolate infected individuals early on, which can help to contain the spread of the disease.
7. Biomarkers can play an important role in vaccine development, helping researchers to evaluate the safety and effectiveness of potential vaccines and monitor the immune response to vaccination.
8. The use of biomarkers in COVID-19 management is still being researched and is a fast-evolving field. New biomarkers and diagnostic methods are being developed and authorized as the understanding of the disease progresses.

Various Tests for Detection of Markers in COVID-19

COVID-19 markers are any indicators that can help identify the presence or severity of the disease. Some common markers for COVID-19 [17-19] include:

RT-PCR test: This is the most widely used diagnostic test for COVID-19, it detects the presence of the virus's genetic material in a sample taken from the respiratory tract.

Antibody tests: These tests detect antibodies produced by

the body in response to the virus. They can be used to determine if someone has been infected with the virus in the past, even if they don't have symptoms currently.

CT scan: A CT scan of the chest can show characteristic changes in the lungs that are associated with COVID-19, such as ground-glass opacities or patchy consolidations.

Blood markers: Elevated levels of certain inflammatory markers such as C-Reactive Protein (CRP) and Erythrocyte Sedimentation Rate (ESR) may be seen in patients with COVID-19.

Oximetry: measuring oxygen saturation in the blood, low levels can indicate the severity of the disease.

Clinical parameters: including fever, age, gender, comorbidities, and symptoms. It's important to note that no single marker can confirm or rule out a COVID-19 diagnosis. A combination of tests and clinical evaluation is usually necessary to make a diagnosis [20].

Conclusion

In conclusion, biomarkers are important tools for the diagnosis, monitoring, and management of COVID-19. The most widely used diagnostic test for COVID-19 is RT-PCR, which detects the presence of the virus's genetic material in a sample taken from the respiratory tract. Antibody tests, which detect antibodies produced by the body in response to the virus, can be used to determine if someone has been infected with the virus in the past, even if they don't have symptoms currently. CT scans of the chest can also show characteristic changes in the lungs that are associated with COVID-19. Other biomarkers such as blood markers, inflammatory markers, and clinical parameters can also indicate the presence or severity of the disease.

It's important to note that no single biomarker can confirm or rule out a COVID-19 diagnosis. A combination of tests and clinical evaluation is usually necessary to make a diagnosis. Additionally, the use of biomarkers in COVID-19 management is still being researched and is a fast-evolving field. New biomarkers and diagnostic methods are being developed and authorized as the understanding of the disease progresses.

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Conflict of Interest

Authors have no conflict of interest.

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