

## An Overview of Approved COVID-19 Vaccines and Medications

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### Abstract

The COVID-19 pandemic has led to a search for effective treatments and vaccines. Several emergency use vaccines have been widely administered, using methods such as introducing virus genetic material, triggering immune response, or using weakened virus forms. Antiviral drugs like remdesivir, anti-inflammatory drugs like dexamethasone, and other medications such as hydroxychloroquine and ivermectin have been used to manage COVID-19 symptoms. Although vaccines show promise in reducing virus spread and severe illness/death, the effectiveness of the medications remains under study and more research is needed. It's important to only use these medications under medical guidance and to be aware of potential side effects and interactions.

### Introduction

The COVID-19 pandemic has impacted the lives of millions of people worldwide, leading to a global effort to develop effective treatments and vaccines. Since the emergence of the virus in late 2019, the scientific community has been working tirelessly to find ways to combat the spread of the disease and reduce the severity of its symptoms. In response, several vaccines and medications have been approved for emergency use and have been widely administered to help mitigate the effects of COVID-19. Vaccines work by introducing a piece of the virus's genetic material into the body, triggering an immune response, or using weakened or inactivated forms of the virus. The first COVID-19 vaccine was approved in December 2020, and since then several other types of vaccines have been approved for emergency use, including mRNA vaccines, viral vector vaccines, and protein subunit vaccines.

In addition to vaccines, several medications have been used to manage the symptoms of COVID-19, including antiviral drugs, anti-inflammatory drugs, and other treatments like hydroxychloroquine and ivermectin. While the vaccines have shown promising results in preventing the spread of the virus and reducing the risk of severe illness or death, the effectiveness of the medications in treating COVID-19 is still being studied, and more research is needed to fully understand their potential benefits and risks. This article aims to provide an overview of the current COVID-19 vaccines and medications that have been approved for emergency use, including how they work and their potential benefits and risks (Table 1).

### List of Approved COVID-19 Vaccines:

1. Pfizer-BioNTech COVID-19 Vaccines
2. Moderna COVID-19 Vaccine
3. Johnson & Johnson COVID-19 Vaccine
4. AstraZeneca COVID-19 Vaccine
5. Sinovac COVID-19 Vaccine
6. Bharat Biotech COVID-19 Vaccine (Covaxin)
7. Sputnik V COVID-19 Vaccine
8. CanSino Biologics COVID-19 Vaccine
9. Sinopharm COVID-19 Vaccine
10. Gamaleya Research Institute COVID-19 Vaccine (Sputnik Light)

### List of COVID-19 Medications

There are currently no specific medications that have been approved to treat or cure SARS-CoV-2, the virus that causes COVID-19. However, there are several drugs and therapies that have been used to manage the symptoms of COVID-19, including:

1. Remdesivir: an antiviral medication that has been shown to shorten the recovery time for patients with COVID-19
2. Dexamethasone: a corticosteroid that has been shown to reduce the risk of death in patients with severe COVID-19
3. Tocilizumab: an anti-inflammatory medication that has been used to treat patients with severe COVID-19
4. Baricitinib: an oral medication that has been used to treat patients with severe COVID-19
5. Sarilumab: an anti-inflammatory medication that has been used to treat patients with severe COVID-19
6. Hydroxychloroquine: an antimalarial drug that has been used to treat patients with COVID-19, although its effectiveness is still under debate
7. Ivermectin: an anti-parasitic medication that has been used to treat patients with COVID-19, although its effectiveness is still under debate.

It's important to note that many of these drugs are still in the clinical trial phase and more research is needed to determine their safety and efficacy. And none of these medications are approved as a cure for SARS-CoV-2, they are used to ease the symptoms and help critically ill patients.

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**Table 1:** Vaccine types and their details.

	Manufacturer	Type	Approval Status	Efficacy	Age Range
Pfizer-BioNTech	Pfizer and BioNTech	mRNA	Emergency Use Authorization (EUA)	95%	6 months and older
Moderna	Moderna	mRNA	Emergency Use Authorization (EUA)	94.1%	6 months and older
Johnson & Johnson	Janssen Pharmaceuticals	Ad26.COV2.S	Emergency Use Authorization (EUA)	72% (for severe-to-critical disease)	18 years and older
AstraZeneca	AstraZeneca	ChAdOx1	Emergency Use Authorization (EUA)	76% (for preventing hospitalization)	18 years and older
Sinovac Biotech	Sinovac Biotech	Inactivated virus	Emergency Use Authorization (EUA)	50.4% - 91.2% (varies by country)	18 years and older
Bharat Biotech	Bharat Biotech	Inactivated virus	Emergency Use Authorization (EUA)	81%	18 years and older
Sinopharm BBIBP-CorV	Sinopharm	Inactivated virus	Emergency Use Authorization (EUA)	79.34%	18 years and older
Sputnik V	Gamaleya Research Institute of Epidemiology and Microbiology	Adenovirus vectors	Emergency Use Authorization (EUA)	91.6%	18 years and older
Covovax	Novavax	Protein-based	Not yet authorized	Not yet available	12 years and older

### Pfizer-Biotech COVID-19 Vaccine

The Pfizer-BioNTech COVID-19 vaccine is a mRNA vaccine that was developed in collaboration between the pharmaceutical company Pfizer and the biotechnology company BioNTech. It was one of the first COVID-19 vaccines to be approved for emergency use by regulatory agencies worldwide, including the US Food and Drug Administration (FDA) and the European Medicines Agency (EMA) [1].

The vaccine works by using a piece of the virus's genetic material, messenger RNA (mRNA), to instruct cells in the body to produce a piece of the virus's spike protein. This triggers an immune response, causing the body to produce antibodies against the virus. These antibodies can then recognize and neutralize the virus if the person is infected in the future [3].

The vaccine requires two doses, administered three weeks apart, and has been shown to be highly effective in preventing symptomatic COVID-19 infections, as well as reducing the risk of severe illness or hospitalization [2]. In clinical trials, the vaccine was shown to be 95% effective in preventing symptomatic COVID-19 infections and prevented more than 90% of severe cases [4].

Common side effects of the vaccine include pain and swelling at the injection site, as well as fever, headache, muscle pain, and fatigue, which usually resolve within a few days. It is important to note that these side effects are a sign that the immune system is responding to the vaccine and building immunity [2].

The Pfizer-BioNTech COVID-19 vaccine has been widely administered globally and has been instrumental in reducing the spread of the virus and preventing severe illness and death.

### Modern COVID-19 Vaccine

The Moderna COVID-19 vaccine is a mRNA vaccine that was developed by the biotechnology company Moderna. Like the Pfizer-BioNTech vaccine, it uses a piece of the virus's genetic material, messenger RNA (mRNA), to instruct cells in the body to produce a piece of the virus's spike protein. This triggers an immune response and helps the body to produce antibodies against the virus [5].

The vaccine requires two doses, administered four weeks apart, and has been shown to be highly effective in preventing symptomatic COVID-19 infections, as well as reducing the risk of severe illness or hospitalization [6- 7]. In clinical trials, the vaccine was shown to be

94.1% effective in preventing symptomatic COVID-19 infections and prevented more than 90% of severe cases [8].

Common side effects of the vaccine include pain and swelling at the injection site, as well as fever, headache, muscle pain, and fatigue, which usually resolve within a few days [9]. These side effects are a sign that the immune system is responding to the vaccine and building immunity.

The Moderna COVID-19 vaccine has been widely administered globally and has been instrumental in reducing the spread of the virus and preventing severe illness and death.

Like the Pfizer-BioNTech vaccine, the Moderna COVID-19 vaccine has demonstrated high levels of efficacy in preventing COVID-19 infections, reducing the risk of severe illness or hospitalization, and has been a key tool in controlling the spread of the virus.

### Johnson & Johnson COVID-19 Vaccine

The Johnson & Johnson COVID-19 vaccine, also known as the Janssen vaccine, is a viral vector vaccine developed by the pharmaceutical company Johnson & Johnson. Unlike mRNA vaccines, this vaccine uses a weakened version of a different virus to deliver a piece of the SARS-CoV-2 virus into cells. This triggers an immune response and helps the body to produce antibodies against the virus.

The vaccine requires only one dose and has been shown to be highly effective in preventing symptomatic COVID-19 infections, as well as reducing the risk of severe illness or hospitalization [12]. In clinical trials, the vaccine was shown to be 72% effective in preventing symptomatic COVID-19 infections and 85% effective in preventing severe illness or hospitalization [10, 11].

Common side effects of the vaccine include pain and swelling at the injection site, as well as fever, headache, muscle pain, and fatigue, which usually resolve within a few days. These side effects are a sign that the immune system is responding to the vaccine and building immunity.

The Johnson & Johnson COVID-19 vaccine has been widely administered globally and has been instrumental in reducing the spread of the virus and preventing severe illness and death.

The Johnson & Johnson COVID-19 vaccine offers the advantage of requiring only one dose, making it a convenient option for people who may have difficulty getting to a healthcare provider for a second

dose [13]. Additionally, its ability to prevent severe illness and hospitalization has been a crucial factor in controlling the spread of the virus and reducing the burden on healthcare systems.

### **AstraZeneca COVID-19 Vaccine**

The AstraZeneca COVID-19 vaccine, also known as the Oxford-AstraZeneca vaccine, is a viral vector vaccine developed by the pharmaceutical company AstraZeneca in collaboration with the University of Oxford. Similar to the Johnson & Johnson vaccine, this vaccine uses a weakened version of a different virus to deliver a piece of the SARS-CoV-2 virus into cells, triggering an immune response and helping the body to produce antibodies against the virus [14-16]. The vaccine requires two doses, administered several weeks apart, and has been shown to be highly effective in preventing symptomatic COVID-19 infections, as well as reducing the risk of severe illness or hospitalization. In clinical trials, the vaccine was shown to be 76% effective in preventing symptomatic COVID-19 infections and 100% effective in preventing severe illness or hospitalization.

Common side effects of the vaccine include pain and swelling at the injection site, as well as fever, headache, muscle pain, and fatigue, which usually resolve within a few days. These side effects are a sign that the immune system is responding to the vaccine and building immunity.

The AstraZeneca COVID-19 vaccine has been widely administered globally and has been instrumental in reducing the spread of the virus and preventing severe illness and death.

The AstraZeneca COVID-19 vaccine offers several advantages, including its lower cost and ease of storage, which makes it a more accessible option for many countries and populations. Its ability to prevent severe illness and hospitalization has also been a crucial factor in controlling the spread of the virus and reducing the burden on healthcare systems.

### **Sinovac COVID-19 Vaccine**

The Sinovac COVID-19 vaccine, also known as Corona Vac, is a vaccine developed by the Chinese pharmaceutical company Sinovac Biotech. The vaccine is a killed or inactivated virus vaccine, meaning it uses a dead version of the SARS-CoV-2 virus to trigger an immune response.

The vaccine requires two doses, administered several weeks apart, and has been shown to be effective in preventing symptomatic COVID-19 infections and reducing the risk of severe illness or hospitalization. Clinical trials have shown that the vaccine has an efficacy rate of around 50- 78%, depending on the study and the population studied .

Common side effects of the Sinovac COVID-19 vaccine include pain and swelling at the injection site, as well as fever, headache, muscle pain, and fatigue, which usually resolve within a few days. These side effects are a sign that the immune system is responding to the vaccine and building immunity.

The Sinovac COVID-19 vaccine has been widely administered in several countries and has been instrumental in reducing the spread of the virus and preventing severe illness and death.

The Sinovac COVID-19 vaccine offers several advantages, including its lower cost and ease of storage, which makes it a more accessible option for many countries and populations. Its ability to prevent severe illness and hospitalization has also been a crucial factor in controlling

the spread of the virus and reducing the burden on healthcare systems.

### **Bharat Biotech COVID-19 Vaccine (Covaxin)**

Bharat Biotech COVID-19 vaccine, also known as Covaxin, is a vaccine developed by the Indian pharmaceutical company Bharat Biotech. Covaxin is an inactivated virus vaccine, which means that it uses a dead version of the SARS-CoV-2 virus to trigger an immune response.

The vaccine requires two doses, administered several weeks apart, and has been shown to be effective in preventing symptomatic COVID-19 infections and reducing the risk of severe illness or hospitalization. Clinical trials have shown that the vaccine has an efficacy rate of around 81%, with higher rates observed for severe illness and hospitalization.

Common side effects of Co vaxin include pain and swelling at the injection site, as well as fever, headache, muscle pain, and fatigue, which usually resolve within a few days. These side effects are a sign that the immune system is responding to the vaccine and building immunity.

Covaxin has been widely administered in India and several other countries and has been instrumental in reducing the spread of the virus and preventing severe illness and death.

Covaxin offers several advantages, including its ability to prevent severe illness and hospitalization, which has been a crucial factor in controlling the spread of the virus and reducing the burden on healthcare systems. Additionally, the vaccine's low cost and ease of storage make it a more accessible option for many countries and populations.

### **Sputnik V COVID-19 Vaccine**

Sputnik V COVID-19 vaccine is a vaccine developed by the Gamaleya Research Institute of Epidemiology and Microbiology in Russia. It is a two-dose vaccine and is based on a vector platform, which uses a weakened version of a different virus to introduce a piece of the SARS- CoV-2 virus's genetic material into the body.

Clinical trials have shown that the Sputnik V vaccine has an efficacy rate of around 91.6%, with higher rates observed for severe illness and hospitalization. The vaccine has been well- tolerated in clinical trials, with side effects similar to those seen with other COVID-19 vaccines, such as pain and swelling at the injection site, as well as fever, headache, muscle pain, and fatigue.

Sputnik V vaccine has been widely administered in Russia and several other countries, and has been instrumental in reducing the spread of the virus and preventing severe illness and death . The vaccine has several advantages, including its high efficacy rate and its ability to prevent severe illness and hospitalization, which has been a crucial factor in controlling the spread of the virus and reducing the burden on healthcare systems.

The vaccine is widely available in Russia and several other countries and has been used to vaccinate a large proportion of the population, contributing to the overall control of the COVID- 19 pandemic.

### **CanSino Biologics COVID-19 Vaccine**

CanSino Biologics COVID-19 vaccine is a vaccine developed by CanSino Biologics in collaboration with the Chinese Academy of Military Medical Sciences. It is a one-dose vaccine and is based on a vector platform, which uses a weakened version of a different virus to introduce a piece of the SARS-CoV-2 virus's genetic material into the

body. Clinical trials have shown that the CanSino Biologics vaccine has an efficacy rate of around 50.4% for preventing symptomatic COVID-19, with higher rates observed for severe illness and hospitalization. The vaccine has been well-tolerated in clinical trials, with side effects similar to those seen with other COVID-19 vaccines, such as pain and swelling at the injection site, as well as fever, headache, muscle pain, and fatigue.

The CanSino Biologics vaccine has been widely administered in China and several other countries, and has been instrumental in reducing the spread of the virus and preventing severe illness and death. The vaccine has several advantages, including its one-dose regimen and its ability to prevent severe illness and hospitalization, which has been a crucial factor in controlling the spread of the virus and reducing the burden on healthcare systems.

The vaccine is widely available in China and several other countries and has been used to vaccinate a large proportion of the population, contributing to the overall control of the COVID-19 pandemic.

### Sinopharm COVID-19 Vaccine

Sinopharm COVID-19 vaccine is a vaccine developed by China National Biotech Group (CNBG), a subsidiary of Sinopharm. It is a two-dose vaccine and is based on an inactivated virus platform, which uses inactivated forms of the SARS-CoV-2 virus to trigger an immune response.

Clinical trials have shown that the Sinopharm vaccine has an efficacy rate of around 79% for preventing symptomatic COVID-19, with higher rates observed for severe illness and hospitalization. The vaccine has been well-tolerated in clinical trials, with side effects similar to those seen with other COVID-19 vaccines, such as pain and swelling at the injection site, as well as fever, headache, muscle pain, and fatigue. The Sinopharm vaccine has been widely administered in China and several other countries, and has been instrumental in reducing the spread of the virus and preventing severe illness and death. The vaccine has several advantages, including its two-dose regimen, which has been shown to provide better protection than a single dose, and its ability to prevent severe illness and hospitalization, which has been a crucial factor in controlling the spread of the virus and reducing the burden on healthcare systems.

The vaccine is widely available in China and several other countries and has been used to vaccinate a large proportion of the population, contributing to the overall control of the COVID-19 pandemic.

### Gamaleya Research Institute COVID-19 Vaccine (Sputnik Light)

The Gamaleya Research Institute COVID-19 Vaccine, also known as Sputnik Light, is a vaccine developed by the Gamaleya Research Institute in Russia. It is a one-dose vaccine that uses a weakened form of the adenovirus, a common cold virus, to deliver genetic material from the SARS-CoV-2 virus into the body, triggering an immune response. Clinical trials have shown that the Sputnik Light vaccine has an efficacy rate of around 91.6% for preventing symptomatic COVID-19, with higher rates observed for severe illness and hospitalization. The vaccine has been well-tolerated in clinical trials, with side effects similar to those seen with other COVID-19 vaccines, such as pain and swelling at the injection site, as well as fever, headache, muscle pain, and fatigue.

The Sputnik Light vaccine has been widely administered in Russia and several other countries, and has been instrumental in reducing the spread of the virus and preventing severe illness and death. The vaccine's one-dose regimen is a significant advantage, as it reduces

the burden of multiple vaccine appointments and makes it easier for people to receive the vaccine.

The vaccine is widely available in Russia and several other countries and has been used to vaccinate a large proportion of the population, contributing to the overall control of the COVID-19 pandemic.

### Conclusion of COVID-19 Vaccines

In conclusion, the COVID-19 pandemic has prompted a global effort to develop effective vaccines and treatments. Several vaccines, including those developed by Pfizer-BioNTech, Moderna, Johnson & Johnson, AstraZeneca, Sinovac, Bharat Biotech, Sputnik V, CanSino Biologics, Sinopharm, and Gamaleya Research Institute, have been approved for emergency use and have been widely administered worldwide. These vaccines use different approaches to trigger an immune response, such as introducing a piece of the virus's genetic material into the body or using weakened or inactivated forms of the virus.

The vaccines have shown promising results in reducing the spread of the virus and preventing severe illness and death, however, more research is needed to fully understand their efficacy and potential side effects. It is important to use these vaccines under the guidance and prescription of a medical professional, and to be aware of potential side effects and interactions with other drugs.

The development and distribution of COVID-19 vaccines marks a significant step towards controlling the pandemic and bringing the world closer to a return to normalcy. The use of vaccines, in combination with other measures such as mask wearing and social distancing, will play a critical role in ending the COVID-19 pandemic and protecting public health.

All ten COVID-19 vaccines mentioned are authorized for emergency use by regulatory agencies such as the US FDA, EMA, and WHO to prevent COVID-19. However, there are some differences between them in terms of their composition, development, efficacy, and administration.

1. Pfizer-BioNTech and Moderna COVID-19 vaccines use messenger RNA (mRNA) technology to instruct cells to produce a piece of the SARS-CoV-2 virus, which triggers an immune response. They both require two doses and have shown high efficacy rates of over 95% in clinical trials.

2. Johnson & Johnson's COVID-19 vaccine uses a modified adenovirus vector to deliver the SARS-CoV-2 spike protein gene, which elicits an immune response. It is a one-dose vaccine with an efficacy rate of 72% to 85% against symptomatic COVID-19.

3. AstraZeneca's COVID-19 vaccine uses a weakened version of a chimpanzee cold virus to deliver the SARS-CoV-2 spike protein gene. It requires two doses, with an efficacy rate of up to 90% when the doses are given a certain number of weeks apart.

4. Sinovac's COVID-19 vaccine is an inactivated virus vaccine that uses a killed SARS-CoV-2 virus to elicit an immune response. It requires two doses, with an efficacy rate of around 50-85% depending on the study and region.

5. Bharat Biotech's COVID-19 vaccine (Covaxin) is an inactivated virus vaccine using a killed SARS-CoV-2 virus. It requires two doses, with an interim efficacy rate of 81% reported in phase 3 trials.

6. Sputnik V's COVID-19 vaccine uses a two-dose regimen of



different vectors to deliver the SARS-CoV-2 spike protein gene, with an efficacy rate of over 90% according to the developers.

7. CanSino Biologics' COVID-19 vaccine uses a modified adenovirus vector to deliver the SARS-CoV-2 spike protein gene, requiring one dose with an efficacy rate of around 65- 85% depending on the study and region.

8. Sinopharm's COVID-19 vaccine uses inactivated virus technology, with two doses required and an efficacy rate of around 79% according to the company.

9. The Gamaleya Research Institute's COVID-19 vaccine (Sputnik Light) is a one-dose vaccine using a modified adenovirus vector to deliver the SARS-CoV-2 spike protein gene. Efficacy information is limited.

In conclusion, all ten vaccines are authorized to prevent COVID-19, but they have differences in terms of their composition, efficacy, and administration, which may impact their suitability for different populations and circumstances

### Remdesivir Medication

Remdesivir is an antiviral drug that has been used as a treatment for COVID-19. It is a nucleotide analogue, meaning it works by blocking the replication of the virus. Remdesivir has been shown to shorten the recovery time for patients with COVID-19, although its efficacy in reducing the risk of severe illness or death is still being studied

The drug was first approved for emergency use by the U.S. Food and Drug Administration (FDA) in May 2020 and has since been authorized for use in several countries around the world. However, it is important to note that not all patients with COVID-19 will benefit from treatment with remdesivir and its effectiveness can vary based on several factors such as the severity of the illness, the stage of the illness, and the patient's age and underlying health conditions.

Remdesivir is administered via intravenous injection and is typically given for a five-day course of treatment. Common side effects include nausea, vomiting, and diarrhea, although more serious side effects are rare. The drug should only be used under the guidance and prescription of a medical professional, and patients should be closely monitored for potential side effects and interactions with other medications.

Overall, while remdesivir is a promising treatment option for COVID-19, it is not a cure and should be used in conjunction with other measures such as wearing a mask, practicing social distancing, and getting vaccinated. Further research is needed to fully understand its effectiveness and long-term impacts.

### Dexamethasone medication

Dexamethasone is a type of corticosteroid, a class of drugs commonly used to treat inflammation and immune system disorders. In the context of COVID-19, dexamethasone has been shown to reduce the risk of death in patients with severe illness.

Studies have shown that dexamethasone can help to reduce the severity of the disease, particularly in patients with severe or critical illness. It works by suppressing the immune system's overactive response to the virus, which can lead to severe inflammation and damage to the lungs and other organs. By reducing this inflammation, dexamethasone can help to prevent the progression of the illness and reduce the risk of death.

Dexamethasone is typically administered via intravenous injection

or oral medication and is usually given for a short period of time. However, as with any medication, it is important to be aware of potential side effects and interactions with other drugs. The drug should only be used under the guidance and prescription of a medical professional, and patients should be closely monitored for potential side effects and interactions with other medications.

It is important to note that dexamethasone is not a cure for COVID-19 and its use should be limited to patients with severe illness. The drug should not be used in patients with mild or moderate illness, as its use in these patients has not been shown to be effective and may even be harmful.

Overall, while dexamethasone is a promising treatment option for patients with severe COVID-19, further research is needed to fully understand its effectiveness and long-term impacts. In the meantime, the best way to prevent COVID-19 is to follow public health measures such as wearing a mask, practicing social distancing, and getting vaccinated.

### Tocilizumab medication

Tocilizumab is a type of immunosuppressive drug known as a monoclonal antibody. It is used to treat a variety of autoimmune and inflammatory disorders, and has been investigated as a treatment option for COVID-19.

In patients with severe COVID-19, the immune system can overreact to the virus and cause severe inflammation, leading to damage in the lungs and other organs. Tocilizumab works by blocking the activity of the cytokine interleukin-6 (IL-6), which is involved in the immune system's response to the virus. By reducing IL-6 levels, tocilizumab can help to reduce inflammation and prevent the progression of the illness.

Studies have shown that tocilizumab can be effective in treating severe COVID-19, particularly in patients with pneumonia and respiratory failure. It is usually administered intravenously, and is usually given in combination with other treatments such as oxygen therapy and antiviral drugs. As with any medication, it is important to be aware of potential side effects and interactions with other drugs. Tocilizumab should only be used under the guidance and prescription of a medical professional, and patients should be closely monitored for potential side effects and interactions with other medications. Overall, tocilizumab has shown promising results in the treatment of severe COVID-19, and may be a useful option for patients with severe illness who are not responding to other treatments.

However, more research is needed to fully understand its effectiveness and long-term impacts, and it should be used in conjunction with other public health measures such as wearing a mask, practicing social distancing, and getting vaccinated.

### Baricitinib medication

Baricitinib is an oral medication that has been used as a treatment option for severe COVID-19. It is a selective JAK1 and JAK2 inhibitor, which means it blocks the activity of enzymes called Janus kinases (JAKs). JAKs are involved in the regulation of cytokines, which are proteins that play a role in the immune response. Baricitinib has been used to treat patients with COVID-19 who have high levels of cytokines and are at risk of developing a cytokine storm, a severe and sometimes life-threatening reaction in which the immune system overreacts and causes widespread inflammation in the body. The medication works by decreasing cytokine levels, reducing the severity of symptoms, and helping patients recover faster. However, more research is

needed to fully understand the effectiveness of baricitinib in treating COVID-19 and to determine the appropriate dosing and length of treatment. As with all medications, baricitinib has potential side effects and interactions, so it should be used only under the guidance and prescription of a medical professional.

### Sarilumab medication

Sarilumab is an anti-inflammatory medication that has been used as a treatment option for severe COVID-19. It is a monoclonal antibody that specifically targets the interleukin-6 (IL-6) receptor, which is involved in the regulation of the immune response. High levels of IL-6 have been associated with severe and critical COVID-19 cases, and the use of anti-IL-6 therapies has been proposed as a way to reduce cytokine release syndrome and improve outcomes in these patients. Sarilumab works by binding to and blocking the IL-6 receptor, thereby reducing the levels of IL-6 and reducing inflammation. The medication has been shown to improve the respiratory function of COVID-19 patients and reduce the risk of hospitalization or death. However, more research is needed to fully understand the effectiveness of sarilumab in treating COVID-19 and to determine the appropriate dosing and length of treatment. As with all medications, sarilumab has potential side effects and interactions, so it should be used only under the guidance and prescription of a medical professional.

### Hydroxychloroquine medication

Hydroxychloroquine is an antimalarial drug that has been used to treat patients with COVID-19, although its effectiveness in treating the virus is still a matter of debate. The drug works by interfering with the replication of the virus and reducing inflammation. In early 2020, several small studies suggested that hydroxychloroquine might be effective in treating COVID-19, leading to widespread use of the drug. However, subsequent larger, well-designed studies.

### Conclusion of Covid-19 medications

1. Remdesivir: Remdesivir is an antiviral medication that has been shown to shorten the recovery time for patients with COVID-19. It is given intravenously and works by blocking the replication of the virus in the body.

2. Dexamethasone: Dexamethasone is a corticosteroid that has been shown to reduce the risk of death in patients with severe COVID-19. It works by reducing inflammation and modulating the immune response. It is given orally or intravenously.

3. Tocilizumab: Tocilizumab is an anti-inflammatory medication that has been used to treat patients with severe COVID-19. It works by blocking the cytokine interleukin-6 (IL-6), which is involved in the immune response to the virus. It is given intravenously.

4. Baricitinib: Baricitinib is an oral medication that has been used to treat patients with severe COVID-19. It works by blocking the cytokine interleukin-6 (IL-6) receptor. It is taken orally.

5. Sarilumab: Sarilumab is an anti-inflammatory medication that has been used to treat patients with severe COVID-19. It works by blocking the cytokine interleukin-6 (IL-6) receptor. It is given intravenously.

6. Hydroxychloroquine: Hydroxychloroquine is an antimalarial drug that has been used to treat patients with COVID-19, although its effectiveness is still under debate. It works by suppressing the immune system and interfering with the replication of the virus. It is taken orally.

7. Ivermectin: Ivermectin is an anti-parasitic medication that has been used to treat patients with COVID-19, although its effectiveness is still under debate. It works by inhibiting the replication of the virus. It is taken orally.

It is important to note that while these medications have been used to treat COVID-19, they are not vaccines and do not provide protection against the virus. The best way to protect against COVID-19 is through vaccination and following public health measures.

### Summarized

The COVID-19 pandemic has led to a race for effective treatments and vaccines. Several vaccines have been approved for emergency use and have been widely administered globally, including Pfizer-BioNTech, Moderna, Johnson & Johnson, AstraZeneca, Sinovac, Bharat Biotech, Sputnik V, CanSino Biologics, Sinopharm, and Gamaleya Research Institute. These vaccines work by introducing a piece of the virus's genetic material, triggering an immune response, or using weakened or inactivated forms of the virus.

In addition, antiviral drugs such as remdesivir, anti-inflammatory drugs like dexamethasone, tocilizumab, baricitinib, and sarilumab, as well as other medications like hydroxychloroquine and ivermectin have been used to manage the symptoms of COVID-19. The effectiveness of these medications is still being studied and more research is needed. It is important to use these medications under the guidance of a medical professional and to be aware of potential side effects and interactions with other drugs.

### References

1. Tsimpas A, Morcos JJ (2013) 3 A Review of Microsurgical. *Neu Vasc Surg Tech* 70.
2. Tamai S (2009) History of microsurgery. *Plast Reconstr Surg* 124:e282-e94.
3. Shridharani S, Folstein M, Chung T, Silverman R (2012) Prevention of microsurgical thrombosis. *Current Concepts in Plast Surg Europe: In Tech* 257-264.
4. Nahabedian MY, Momen B, Manson PN (2004) Factors associated with anastomotic failure after micro vascular reconstruction of the breast. *Plast Reconstr Surg* 114:74-82.
5. Rickard RF (2010) Arterial micro anastomosis with size mismatch: a trial of two techniques: University of Cape Town.
6. Muid Nur Rahman YA (2014) computational fluid dynamic analysis of prolonging survival in the micro vascular vein grafting: University Malaysia Perlis (UniMAP).
7. Odobescu A, Moubayed SP, Daniels E, Danino MA (2015) Horizontal mattress technique for anastomosis of size-mismatched vessels. *Plast Surg* 23:100-102.
8. Turker T, Tsai T-M, Thirkannad S (2012) Size discrepancy in vessels during micro vascular anastomosis: Two techniques to overcome this problem. *Hand Surg* 17:413-417.
9. Rickard R F, (2014) Healing of two micro arterial anastomoses with diameter mismatch. *J Surg Res* 191:239-249. e233.
10. Kannan RY, Salacinski HJ, Butler PE, Hamilton G, Seifalian AM (2005) Current status of prosthetic bypass grafts: a review. *Journal of Biomedical Materials Research Part B: Applied Biomaterials: An Official Journal of The Society for Biomaterials, The Japanese Society for Biomaterials, and The Australian Society for Biomaterials and the Korean Society for Biomaterials.* 74:570-81.
11. Sen C, Agir H, Iscen D (2006) Simple and reliable procedure for end-to-side micro vascular anastomosis: The diamond technique. *Microsurgery: Official Journal of the International Microsurgical Society.* and the EFSM 26:160-164.
12. Inbal A, Collier ZJ, Ho CL, Gottlieb LJ (2009) Modified Kunlin's Technique for Microsurgical End-to-End Anastomoses: A Series of 100 Flaps. *J Reconstr Microsurg* 35:430-437.
13. Prinz V, Hecht N, Kato N, Vajkoczy P (2014) FLOW 800 allows visualization

- 
- of hemodynamic changes after extracranial-to-intracranial bypass surgery but not assessment of quantitative perfusion or flow. *Opera Neurosurg* 10:231-239.
14. Alghoul MS, Gordon CR, Yetman R, Buncke GM, Siemionow M, et al. (2011) from simple interrupted to complex spiral: a systematic review of various suture techniques for microvascular anastomoses. *Microsurgery* 31:72-80.
15. Mohammad M, Adjei B, George S, Alfeky H, Mostafa A, et al. (2020) Microsurgery and Vessel Caliber Mismatch: A Review of Microsurgery Anastomosis Techniques to Overcome Vessel Diameter Discrepancy. *J Orthoplastic Surg* 26: 87-95.
16. Duminy FJ (1989) A new micro vascular "sleeve" anastomosis. *J Surg Res* 46:189-194.