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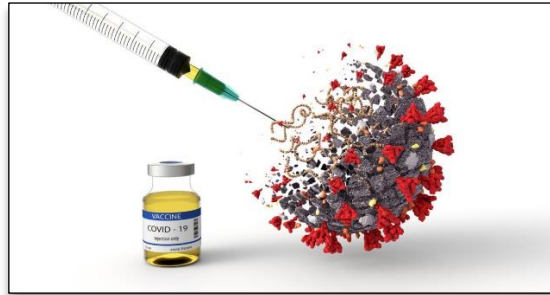
ORAL
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VACCINATION FOR PROTECTION AGAINST COVID-19



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INTRODUCTION

This past year has seen hundreds of vaccines in development worldwide in response to the growing coronavirus pandemic. In December 2020 several of these vaccines began to release results showing their efficacy and safety in phase 3 clinical trials, which are usually considered the final stage in a series of tests before companies can begin seeking regulatory approval.

Getting vaccinated is one of many steps one can take to protect oneself and others from COVID-19. Protection from COVID-19 is critically important because for some people it can cause severe illness or death.

Stopping a pandemic requires using all the tools available. Vaccines work with the body's immune system to prepare the body to fight the virus once a person is exposed to the virus. Other steps, like facial masks, washing of hands and social distancing help reduce the chance of being exposed to the virus or spreading it to others.

COVID-19 vaccination, together with following the general prevention recommendations, will offer the best protection from COVID-19 to oneself and others.

THE IMMUNE SYSTEM - THE BODY'S DEFENSE AGAINST INFECTION

To understand how COVID-19 vaccines work, it helps to first look at how our bodies fight illness.

When germs, such as the virus that causes COVID-19, invade our bodies, they attack and multiply. This invasion, called an infection, is what causes illness. Our immune system uses several tools to fight infection.

Blood contains red cells and white- or immune cells. The red blood cells carry oxygen to tissues and organs and the white- or immune blood cells fight infection. Different types of white blood cells fight infection in different ways:

- **Macrophages.** The macrophages are white blood cells that swallow up and digest germs and dead or dying cells. The macrophages leave behind parts of the invading germs called antigens. The body identifies antigens as dangerous and stimulates antibodies to attack them
- **B-lymphocytes.** B-lymphocytes are defensive white blood cells. They produce antibodies that attack the pieces of the virus left behind by the macrophages
- **T-lymphocytes.** T-lymphocytes are another type of defensive white blood cells. They attack cells in the body that have already been infected

The first time a person is infected with the virus that causes COVID-19, it can take several days or weeks for the body to make and use all the germ-fighting tools needed to get over the infection. After the infection, the person's immune system remembers what it learned about how to protect the body against that disease.

The body keeps a few T-lymphocytes, called memory cells, which go into action quickly if the body encounters the same virus again. When the familiar antigens are detected, B-lymphocytes produce

antibodies to attack them. Experts are still learning how long these memory cells protect a person against the virus that causes COVID-19

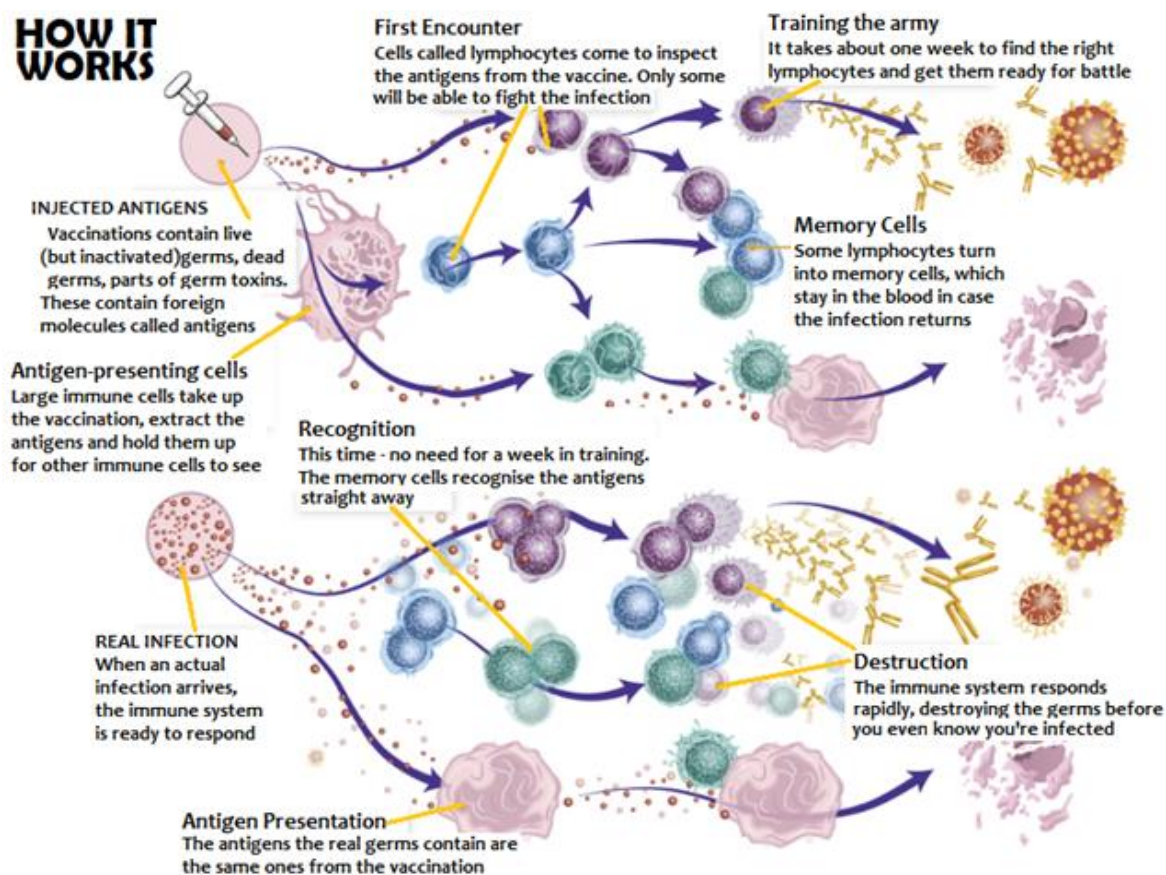


Illustration by Ed Crooke

<https://www.howitworksdaily.com/the-human-body-how-vaccines-work/>

HOW DO COVID-19 VACCINES WORK?

COVID-19 vaccines help our bodies develop immunity to the virus that causes COVID-19 without us having to get the illness. Different types of vaccines work in different ways to offer protection, but with all types of vaccines, the body is left with a supply of “memory” T-lymphocytes as well as B-lymphocytes that will remember how to fight that virus in the future.

It typically takes a few weeks for the body to produce T-lymphocytes and B-lymphocytes after vaccination. Therefore, it is possible that a person could be infected with the virus that causes COVID-19 just before or just after vaccination and then get sick because the vaccine did not have enough time to provide protection.

Sometimes after vaccination, the process of building immunity can cause symptoms, such as fever. These symptoms are normal and are a sign that the body is building immunity.

TYPES OF VACCINES

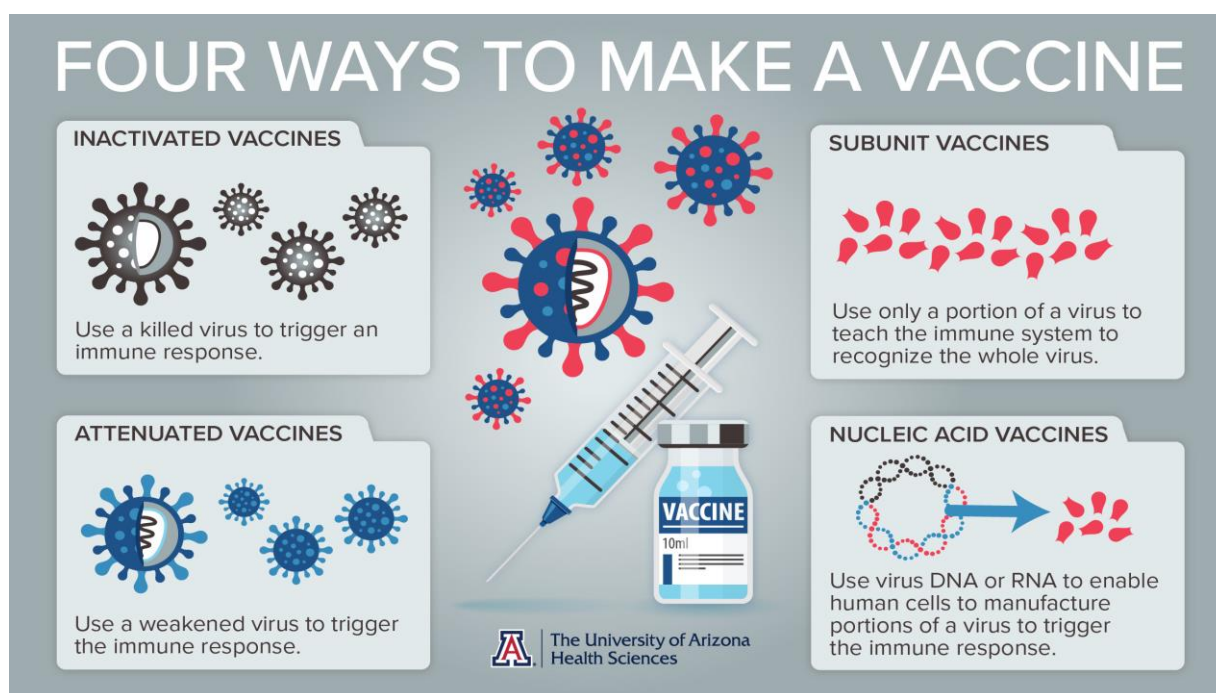
Currently, there are three main types of COVID-19 vaccines that are, or soon will be, undergoing large-scale (Phase 3) clinical trials internationally. The part of the virus, known as the spike protein, is the basis of current COVID-19 vaccines, which seek to generate an immune response against it. Below is a description of how each type of vaccine prompts the body to recognize and protect it against the virus that causes COVID-19. None of these vaccines can give a person COVID-19.

- **mRNA Vaccines** (Referred to as Nucleic Acid Vaccines in the illustration on p3). These vaccines contain material from the virus that causes COVID-19 that gives our cells instructions on how to create a harmless protein that is unique to the virus. After these cells made copies of the protein, they destroy the genetic material from the vaccine. Human bodies recognize that the protein should not be there and build T-lymphocytes and B-lymphocytes that will remember how to fight the virus that causes COVID-19 if the body is infected in the future

- **Vector Vaccines** (Referred to as Attenuated Vaccines in the illustration below). These vaccines contain a weakened version of a live virus - a different virus than the one that causes COVID-19 - that has genetic material from the virus that causes COVID-19 inserted in it (this is called a viral vector). Once the viral vector is inside our cells, the genetic material gives cells instructions to make a protein that is unique to the virus that causes COVID-19. Using these instructions, the cells make copies of the protein. This prompts the body to build T-lymphocytes and B-lymphocytes that will remember how to fight that virus once a

person is infected in the future with the COVID-19 virus

- **Protein Subunit Vaccines** (Referred to as Subunit Vaccines in the illustration below). These vaccines include harmless pieces (proteins) of the virus that cause COVID-19 instead of the entire germ. Once vaccinated, the immune system recognizes that the proteins do not belong in the body and begins making T-lymphocytes and antibodies. If a person is ever infected in the future, the memory cells will recognize and fight the virus



<https://www.pharmacy.arizona.edu/news/2020/what-it-takes-create-vaccine>

HOW WILL SOUTH AFRICA CHOOSE A COVID-19 VACCINE?

The country will be guided by the following criteria:

- Does a supplier have stock available?
- Is the vaccine safe, effective and of good quality?
- How easy is it to use and how many doses are required?
- Can it be easily stored and distributed?
- Does the supplier have capacity to produce the volumes needed for South Africa's rollout?
- How much does it cost?

HOW WILL SOUTH AFRICA ENSURE THAT A VACCINE IS SAFE AND EFFECTIVE?

Manufacturers must submit their documents and data for their vaccine candidate to the South African Health Products Regulatory Authority (SAHPRA) for approval.

The regulatory body has put in place steps to help expedite the approval process once these documents have been received.

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CONCLUSION

Vaccination existed long before COVID-19 and the vaccines are an important part of stopping the spread of COVID-19 in the country. If enough people can be vaccinated herd immunity will help to protect those who have not been vaccinated or who have not been previously infected by limiting how much the virus can spread within a population.

REFERENCES

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