

Vaccines

by Sophia



WHAT'S COVERED

In this lesson, you will learn to understand how a vaccine can be used to prevent certain diseases. Specifically, this lesson will cover:

1. Vaccines

What is a **vaccine**, and how does it work? A vaccine is basically a dead pathogen or (more often), a set of unique chemical markers (antigens) isolated from a pathogen. These antigens are injected into a person. By doing that, an immune response is elicited that will produce antibodies and memory cells. If the person comes in contact with that virus in the future, the body is able to quickly respond and kill the virus before it causes any sort of illness.

The dead or dissected virus that's injected is an example of an **antigen**. Antigens are things that elicit an immune system response. A vaccine causes the body to produce **active immunity**. This means that it causes the body to produce antibodies against that specific antigen that has been injected.

➞ **EXAMPLE** If you get the flu vaccine, you're going to be producing antibodies against that flu virus. If you get the polio vaccine, your body produces antibodies against the polio virus. The vaccines are generally used against viruses. They are sometimes used against certain types of bacterial infections as well.

When you get a vaccine, a secondary **booster shot** may be required. It helps your body produce a secondary response, which forms more effector and memory cells. It provides a longer lasting protection against that.



TERMS TO KNOW

Vaccine

A therapy that involves injecting an attenuated pathogen (or more likely, a fragment of a pathogen) into a person to induce active immunity; vaccines prepare a person for when they are naturally exposed to specific pathogens by stimulating them to already have the proper antibodies and memory cells in their systems.

Antigen

A unique chemical marker found on the surface of pathogens that have the potential to stimulate an immune response; antigens are basically the identity marker of cells for the immune system to see.

Active Immunity

Also known as specific immunity, active immunity is carried out by T and B lymphocytes and reacts to specific antigens; active immunity also produces memory cells to target the same pathogen if we are ever exposed to it again.

Booster Shot

Not every vaccine has lifelong effects, so when antibody levels decline after a certain period of time, a booster shot is given to bring them back up again.

2. Effect in the Body

When a vaccine is injected into the body, the body's B cells will develop antibodies against this antigen. They prevent that antigen from functioning, and memory cells are produced. If you were to come in contact with the virus you were vaccinated against, your body would already know how to fight it.

IN CONTEXT

Chances are you have had a polio vaccine. When you were injected with this vaccine, the B cells in your body produced the antibodies to allow your body to fight this virus. If you ever do come in contact with the virus, your body has these defenses to fight polio before it can cause you to become ill. This is because the memory cells this vaccine caused your body to make can produce antibodies very quickly.



SUMMARY

A **vaccine** is a dead or dissected virus that will cause your body to elicit an immune response. This causes the body to produce antibodies and memory cells. When you reencounter this virus in the future, your body is able to fight it. Sometimes a booster shot is needed to give longer immunity. The **effect in the body**, the vaccine will cause your B cells to create the antibodies and memory cells needed for long-term protection.

Keep up the learning and have a great day!

Source: THIS WORK IS ADAPTED FROM SOPHIA AUTHOR AMANDA SODERLIND



TERMS TO KNOW

Active Immunity

Also known as specific immunity, active immunity is carried out by T & B lymphocytes and reacts to specific antigens of cells; active immunity also produces memory cells to target the same pathogen if we are ever exposed to it again.

Antigen

A unique chemical marker found on the surface of cells that have the potential to stimulate an immune response; antigens are basically the identity marker of cells for the immune system to see.

Booster Shot

Not every vaccine has lifelong effects; when antibody levels decline after a certain period of time, a booster shot is given to bring them back up again.

Vaccine

A therapy that involves injecting an attenuated pathogen (or more likely, a fragment of a pathogen) into a person to induce active immunity; vaccines prepare a person for when they are naturally exposed to specific pathogens by stimulating them to already have the proper antibodies and memory cells in their systems.