

Welcome to this lesson today on vaccines. Today we are going to be taking a look at how vaccines are used to produce an immune response against certain types of viruses or diseases. So we're going to start out by describing what a vaccine is and how it works.

So a vaccine is basically a dead or weakened virus that is injected into a person. And by doing that, it elicits an immune response. And this type of immune response will produce antibodies and memory cells, so that 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.

So the dead or weakened virus that's injected is an example of an antigen. Antigen. So antigens are things that elicit an immune system response. So basically, by injecting this virus into a person, it's producing active immunity. It causes the body to produce active immunity.

And what this means is that it causes the body to produce antibodies against that antigen, that specific antigen. So vaccines are specific to the type of virus that is injected. So for 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. So the antibodies produced are specific to the virus that has been injected in that vaccine.

And it says here that vaccines are only used for protection against viruses. I should clear that a little bit. They're generally used against viruses. But they are sometimes used against certain types of bacterial infections as well. But most of the time, vaccines are used for protection against viruses.

And sometimes when you get a vaccine, a secondary booster shot may be required. And basically, what this secondary booster shot is is you get the first vaccine. And then you have to go back a certain time later to get this second vaccine. So that's the booster shot. And what that does is it helps your body produce a secondary response, which forms more effector and more memory cells. So this provides a longer lasting protection against that.

So let's take a look at how vaccines can be used. So we're going to pretend that this is a person's arm right here. So we're going to use polio as our example. So this will be an example right here of a polio virus.

Now, as I mentioned, in vaccines we're using a dead or weakened version of the virus. So we will say this is our antigen. And we're going to say it's a polio virus. And remember, it's dead or weakened.

So what will happen is that that will be injected into the body. what will happen then is that the body's B-cells-- so B-cells are a type of cell involved in immunity, or involved in immune system responses in your body. So your

body's B-cells will develop antibodies against this antigen.

So once that antigen is in our body-- here's our dead or weakened polio virus. Once they're in our body, our B-cells will work to produce antibodies against that antigen. So this in blue here are our antibodies. So those antibodies produced by the B-cells. And what they do is they prevent that antigen from functioning. So these antibodies will prevent our antigen from functioning.

So what happens then is that memory cells are also produced. So if you were to come in contact let's say with the polio virus in the future, your body already has these defenses to fight polio before it can cause your body to become ill. So if you're infected by that polio virus, your body is already prepared to attack, because it already has these weapons against that disease. And those weapons are readily available. So if you were to come in contact with the polio virus, your body already knows how to fight it off, because it has these memory cells and can produce these antibodies very quickly, because you've already had the vaccine against it and your body knows how to properly respond. So vaccines provide immunity or resistance to diseases that you might come in contact with.

So this lesson has been an overview on how vaccines work.