Welcome to this lesson on antibody mediated immune response, also known as humoral immunity. Today we will be discussing the processes that occur in this type of immune response. So antibody mediated immune response is a type of adaptive immunity, which is our body's third line of defense against pathogens.

So adaptive immunity is a very specific type of immunity where it doesn't elicit general cure-all responses. But the antigens that are working in this type of immunity are very, very, very specific. So in this type of immunity, we are fighting pathogens outside cells. So pathogens could be things like bacteria or viruses, for example. So it's fighting these pathogens outside of the cells in your blood or in your tissue fluids. And this is actually unfolding or taking place in our lymphatic system.

So basically, if I had to summarize what's happening in antibody mediated immune response in one sentence, basically what's happening is that B-cells in your lymph nodes are producing antibodies to antigens. That's kind of the overall idea of what's happening in this type of immune response. So let's take a look at an example. It's more complex than that, obviously.

So let's take a look at what is actually happening in this type of immune response. So antibody mediated immunity, or humoral immunity, deals mostly with B-cells. And B-cells are lymphocytes, so they're a type of white blood cell. So we have an example of a B-cell here. And they have these proteins on their surface.

On the surface of one B-cell, there are generally around 10,000 of these proteins. And these proteins are actually called membrane-bound antibodies. Membrane-bound antibodies. So these are very specific to the type of B-cell. You have different B-cells throughout your body, various different types, all which have different membrane-bound antibodies.

So like I said, there are many, many, many different types that are specific to different invaders. So it's kind of like a lock and key. So let's say you were to be invaded by a certain type of virus. So that specific type of virus can only be identified by a certain type of B-cell. So if this particular B-cell for example doesn't have the right proteins on its surface, other types of B cells will come in here. And they'll be bouncing off of this virus until finally one of them fits with this virus and then can actually attach.

So the different proteins on here are very specific to the B-cell. And they're very specific to the type of antigen that they can attach to. So let's say that this cell encounters this virus and it binds to it.

What's going to happen then is that that B-cell will become activated. And dendritic cells-- so kind of a side thing here. We're not going to go too in-depth with the role of T-cells in this process. But T-cells do play a role in this

process as well.

So basically what happened is that dendritic cells will cause T-cells to divide. And effector helper T-cells will really something called cytokines. And these cytokines will help stimulate division of the B-cells. So once this has attached to the virus, those T-cells will release cytokines, allowing the B-cells to divide. So these B-cells will divide and produce clones.

So that B-cell will divide over and over and over again. And it's going to produce these clones. Now, some of these clones are going to become memory B-cells. And these memory B-cells will be set aside for future attacks. So they're set aside for future attacks so that if you encounter this exact a virus again, you have these B-cells with the proper proteins on them, ready to fight.

And some of those clones will produce are effector B-cells, also known as plasma cells. And these plasma cells will make and release antibodies. So memory B-cells produce immunity to certain viruses that you've already encountered. And effector B-cells or plasma cells will release antibodies into the body.

So antibodies then, basically what antibodies do is that they target invaders, bond to them, and flag them for pickup by phagocytes. So then phagocytes will engulf them and get rid of them. Antibodies can also inhibit normal functioning. So if you think of this virus that has this antibody hanging off of it, it's inhibiting how that virus can function. So maybe it makes it harder for that virus to invade a cell, because it's got this extra thing hanging off of it here. So it can help slow down that virus and inhibit its normal functioning.

And also, each type of antibody binds only to one antigen. So like I said, the antibodies are very specific to the type of antigen. So it's not a general response. You don't have this antibody that can just attach to any type of antigen. It's very specific, like a lock and key.

So over here, just to kind illustrate that a little bit better, let's say we have this antibody that has this type of shape. So because it has this type of shape on it, it's only going to fit an antigen that will fit within that shape. So it's very specific to the type of antigen that it can attack.

So what we're going to do next is take a look at our five classes of antibodies. We actually have five classes of antibodies. And altogether we call these five classes of antibody immunoglobulins. So we have some of those five antibodies are secreted. And some of them are membrane-bound.

So as I mentioned earlier, these are called our membrane-bound antibodies because they're bound to the membrane of a cell. And secreted antibodies are antibodies that are released into the body. So the antibodies that these plasma cells make and release are secreted, because they're able to freely float throughout the body. So membrane-bound are bound to a membrane of a cell. Secreted are floating throughout the body.

So secreted antibodies are IgG and IgA. So IgG is the main antibody found in your blood. And IgA is a type of antibody that inhibits pathogens from binding to your body's cells. So it can be found in your tears, in milk, in mucus, and in saliva.

And our membrane-bound antibodies include IgE, which is anchored to various different types of white blood cells. And it plays a huge role in allergies and asthma. So that has a role in allergies and asthma. And then IgD and IGM are both B-cell receptors. Those are both B-cell receptors.

So this lesson has been an overview on antibody mediated immune response, also known as humoral immunity.