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Your Health

Antibodies, HIV, and AIDS©

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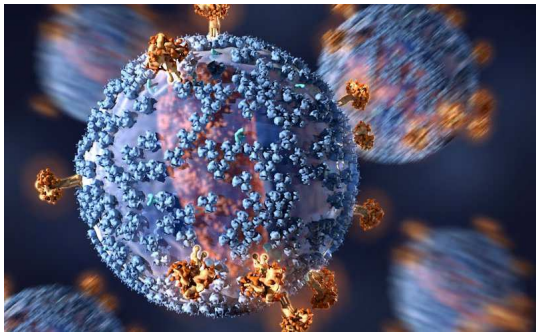

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Antibodies. You may have heard of them, perhaps not. Either way, you probably didn't know just how important they are or what it is they do inside the body. First we'll discuss what they do and how they work, before talking about their importance for your immune system.

So what exactly is an antibody? Put simply, like many things in the body, it's a protein. These proteins are part of the immune system and they are vital for keeping you alive. If we didn't have antibodies, we could get extremely ill, very quickly – even a common cold could kill you. A prime example of a virus that can stop antibody production by killing immune cells is HIV or AIDS.

HIV stands for Human Immunodeficiency Virus. If it's left untreated, it takes about 10 to 15 years for it to develop into AIDS, which stands for Acquired Immuno-Deficiency Syndrome. HIV is a virus that slowly attacks your immune system's white blood cells. Specifically, a cell called your T helper cell. These cells act to support your other white blood cells in killing harmful disease-causing pathogens – which means a bacterium, virus, or another microorganism that can cause disease.

HIV is especially bad as it kills these T helper cells by injecting its own genetic information into the cell's most important area called the nucleus, essentially the cell's 'brain'. This means that the T cell is now under the control of HIV and it will not only stop functioning as a cell that kills pathogens, but actually starts to create more HIV! This newly born HIV that's been made inside the T cell, will be released into the bloodstream to infect other T cells. A person is said to have AIDS,also known as late stage HIV, when their T cell count is less than 200 cells in 1 milliliter of blood. It is at this stage that one is most at risk of getting very sick from bacteria or viruses that we encounter during our day-to-day lives.

So how do antibodies work? Why is it bad that HIV can stop them being made? And why does a lack of them cause such a problem?

Antibodies are actually made by another white blood cell in the immune system called the B cell. The B cell has the ability to see exactly what a pathogen looks like and can

make antibodies specifically to fight it. When the B cell releases antibodies, they can catch and completely cover the invader – a bit like putting antibody sprinkles on a pathogen cupcake. What this means now is that other white blood cells can see the disease causing bacteria much more easily and can target it to be killed. Essentially antibodies can act like little flags on pathogens.

Now that we know what antibodies do and where they are made, how does HIV stop them being created if it only attacks T cells and not B cells? Well, in order for the B cell to start making antibodies, it needs to be activated by the T cell, which, as we described earlier, can be disabled by HIV. No T cells means no activation of B cells, which means no antibodies.

As you may have heard, HIV is now a very treatable condition. Before ending this week's article let’s touch on how researchers stop HIV from taking over the immune system.

Today’s main treatment for HIV is called Anti-Retroviral Therapy (ART for short). It isn’t a cure for HIV but it can help you live longer and reduce the risk of spreading it to others. It works by stopping HIV’s ability to create more of itself inside T cells, which reduces the amount of HIV in your body. Less HIV gives the body a chance to fight off infections and slow the progression to AIDS.

This week's advice: There is great promise for antibodies in the future; we are now designing a new treatment called immunotherapy where we can create specific antibodies to target cancer cells. Watch this space!

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