

The Immune System

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2004

The immune system is a very important part of everyone's body. It is the part in you that fights off bacteria, fungi, and viruses. Without an immune system, you would be dead!

I've been saying immune system. What I really should be saying is immune systems. There are TWO immune systems in your body. One of them is called the "innate" immune system; the other is called the "adaptive" or "acquired" immune system because you are not born with it. The innate immune system is the first one to act when a virus or bacterium enters your body. If a bug successfully gets through the innate immune system (which usually doesn't happen), the adaptive immune system takes over.

The innate immune system's first defense so that bugs don't get into your body is skin; the second defense is mucus in your lungs and stomach. These two things help filter out some viruses and bacteria.

The innate immune system recognizes a lot of the bugs that enter your body. If the germ passes through your skin and mucus, the cells take over and do the best they can to recognize the bug and kill it. Cells know where to go to kill the bug because that's where there are already damaged cells from germs killing them. When the cells get to where the viruses or bacteria are, they "stick" to them, and basically engulf and "eat" the bug.

If the germ gets past the innate immune system, the adaptive immune system takes over. It knows that the disease has gotten past the innate immune system because it is given a warning from the innate immune system that bugs are coming! If the adaptive immune system DOES get a warning from the innate immune system, it starts telling cells called "stem cells" to change into bug-fighting cells. The stem cells can basically turn into anything. These stem cells turn into leukocyte cells. These leukocyte cells go off to kill the bugs. The ones that can kill off the enemy well make millions more of themselves, and the best of those make more of themselves. The leukocytes that can't kill the germs well die off.

After the leukocytes kill all of the bugs, there are still a few cells left called memory cells that remember how to kill off the bug, and can do it really quickly if the bug shows up again.

There are two kinds of cells that help fight the enemy. B-cells fight the enemy if it's in your blood stream. T-cells fight off the terms that have already gotten into your cells.

There are some cases where your immune system can go crazy and either start REALLY overreacting to some bacterium, or start attacking itself by accident because it thinks its body tissue or some other part of the body is an intruder. One example of how your immune system can react is by REALLY REALLY overreacting to a bacterium that gets into your body, and instead of killing the bacteria, kills itself. This disease is called sepsis. Some scientists think that another disease where your immune system attacks itself by accident is multiple sclerosis (MS). The body thinks your nerves look like a virus, so the immune system gets confused and starts attacking. There are many other diseases like arthritis where the body seems a part of itself and thinks it's foreign and needs to be killed. Figuring out cures to these diseases is one of the great challenges for modern medicine.

Both the immune systems discussed above work together to ensure that no bugs get into your system, so that your body is safe. If you ever want to thank whatever kills those bugs, thank the immune systems!