

Answers from CK-12 Life Science For Middle School Teacher's Edition

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Day 73

1. The skin forms a physical barrier between the body and the outside environment that keeps out most pathogens. The outer layer of the skin forms a tough, waterproof covering that is very difficult for pathogens to penetrate.
2. Fluids released by your body—including mucus, tears, saliva, and sweat—contain enzymes called lysozymes. These chemicals break down the cell walls of bacteria and kill them. Hydrochloric acid in the stomach is another chemical barrier. It kills most pathogens that enter the stomach in food or water. Urine is also acidic, so few pathogens are able to grow in it, providing a chemical barrier in the urinary system.
3. Phagocytosis is the process in which white blood cells called phagocytes engulf and destroy pathogens and dead cells. It occurs when damage to tissue results in the release of chemicals that attract white blood cells to the area of damage. The white blood cells leak out of blood vessels and into the damaged tissue, where they start “eating” pathogens and dead cells.
4. Redness, warmth, and pain are indications of inflammation. Inflammation occurs when tissue has been damaged and pathogens have entered the body. Therefore, they indicate that the scrape has become infected.
5. A fever is a higher-than-normal body temperature. Many pathogens cannot multiply as rapidly when the body's temperature is higher than normal, so a fever helps keep an infection in check. A fever also causes the immune system to make more white blood cells to fight the infection.

Day 74

1. An immune response is the immune system's reaction to a specific pathogen.
2. Sample answer: Three immune system organs are bone marrow, the thymus gland, and the spleen. Bone marrow produces lymphocytes, which are the white blood cells involved in an immune response. The thymus gland stores lymphocytes called T cells while they mature. The spleen filters pathogens from the blood.
3. A patient who tests positive for antibodies to the antigens of a particular pathogen must have been infected with that pathogen at some point in time.
4. B cells respond to pathogens in the blood and lymph by making antibodies. Antibodies bind with antigens on pathogens, thus signaling their destruction by phagocytosis. T cells respond to infected, damaged, or cancerous cells by producing toxins. The toxins make tiny holes in the cell membranes, causing the cells to burst and die, along with any pathogens they contain.
5. Vaccinations deliberately expose you to pathogens so you will develop immunity to them. The pathogens are usually injected under the skin, but only part of the pathogens are injected, or else weakened or dead pathogens are used. This is enough to cause an immune response without causing the disease. If you are ever exposed to the actual pathogens in the future, your immune system will be able to kill them before they can make you sick.