Name: Class: Date:

THE BODY'S DEFENSES

The body has three lines of defense against pathogens. In the **first line of defense,** the body has **barriers** that prevent pathogens from entering your body's cells in the first place. These barriers act to trap and kill most pathogens and include the surfaces of the skin, breathing passages, mouth, eye and stomach chemicals and others.

Skin forms a physical and chemical barrier against pathogens. Mucus and cilia in your breathing passages trap and remove most pathogens. A sneeze or a cough can also remove any pathogen stuck in the ciliated passageways. Most pathogens that you swallow are destroyed by chemicals in your saliva or by stomach acid.

Pathogens that do get into your body can trigger the **second line of defense,** known as the **inflammatory response.** In the inflammatory response, fluid and white blood cells leak from blood vessels into nearby tissues that have become infected. The white blood cells then fight the pathogens. The white blood cells involved in the inflammatory response are called **phagocytes.** A phagocyte is a very large cell that engulfs and destroys pathogens by breaking them down. During the inflammatory response, the affected area becomes red, swollen, and warm. The inflammatory response may also cause a general fever.

The **third line of defense** is known as the **immune response.** The cells of the immune system are able to distinguish between different kinds of pathogens. The immune system cells then react to each kind of pathogen with a defense target **specifically** at that pathogen. White blood cells that target specific pathogens are called **lymphocytes.**

There are two major types of lymphocytes: **T-cells** and **B-cells.** A major function of T-cells is to identify pathogens by their antigens. **Antigens** are molecules on the surface of pathogens that the immune system recognizes as being part of your body or as coming from outside of your body. B-cells produce chemicals called antibodies. **Antibodies** bind to the antigens on a pathogen, inactivate the pathogen, and mark them for destruction by other immune cells. Each kind of B-cell produces an antibody that bind to only one kind of antigen.

Acquired immune deficiency syndrome, or **AIDS,** is a disease caused by a virus that attacks the immune system. The **human immunodeficiency virus,** or **HIV,** is the only kind of virus known to attack the immune system directly and **destroy T-cells.** This causes the body to lose its ability to fight other diseases. HIV can only spread from one person to another if body fluids from an infected person come in contact with those of an uninfected person.

REVIEW QUESTIONS - THE BODY'S DEFENSES

1. Describe the body's **first line of defense** against pathogens. _____
_____
_____
_____

2. Complete the table to show the three different ways the body keeps out pathogens:

	How It Works
Skin	
Breathing passages	
Mouth	
Stomach	

3. The **second line of defense** in the body is called the _____

4. Describe what happens in this response:_____
_____
_____
_____

5. What are some symptoms the body experiences during this response? _____
_____
_____

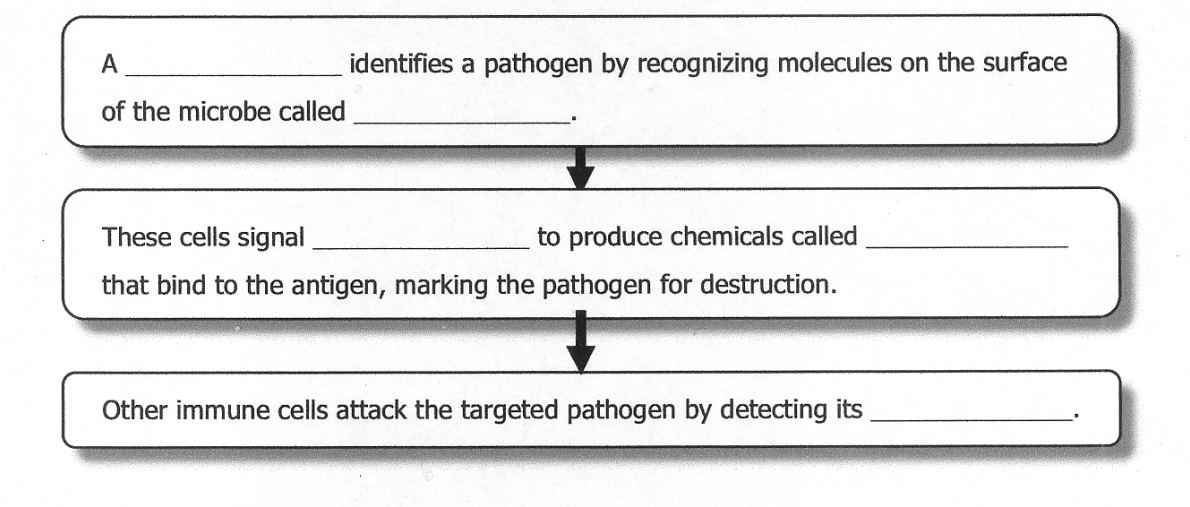
6. The kind of white blood cells that take part in the inflammatory response are called
_____ , which_____ pathogens and destroy them.

7. The **third line of defense** in the body is called the_____

8. What are the two major kinds of **lymphocytes** involved in this response?

a. _____ b. _____

9. Complete the flowchart below to show what happens during the immune response:



10. Describe what an **antigen** is, in greater detail: _____

_____

_____

11. What causes **acquired immunodeficiency syndrome,** or AIDS? _____

_____

12. Once HIV enters the body, it kills _____ by invading them, reproducing inside them, and destroying them when they exit.

13. What eventually happens to a person who develops AIDS? _____

_____

_____

14. Circle the letter of each sentence that is true about how HIV is spread:

a. HIV may spread from an infected woman to her baby through breast milk.
b. HIV is not spread by sexual contact.
c. HIV is spread by shaking hands.
d. HIV is not spread by using a toilet seat after it has been used by someone with HIV.