Name _____ **Per.** _____ **Date** _____

Section 13.3- Nonspecific and Specific Defenses
Regular Anatomy

Fill in the table about nonspecific defenses of the human body.

Name of Nonspecific Defense		How does this defense mechanism defend and protect the body?
1.	Barrier	
2.	Inflammatory Reaction	
3.	Natural Killer Cells	
4.	Protective Proteins Complement System	
	Interferon	

Complete the paragraph about the inflammatory reaction.

The inflammatory reaction begins when tissue is __1__ by physical or chemical agents or by __2__. When tissue becomes injured or infected, __3__ ____ secrete a chemical mediator, __4__, which causes the capillaries to __5__ and become more __6__. The increased __7__ flow to the injured area causes it to redden and become __8__. The increased permeability of the __9__ allows two things to escape into the tissues. The first is fluids. Excess fluids results in __10__. Swelling causes the sensation of __11__. The second are white blood cells called __12__. Large phagocytic cells that "eat" pathogens and dead tissue during inflammation are called __13__. As the injury begins to heal, dead tissue, dead bacteria, and living white blood cells may form __14__, a whitish material. Eventually, as the tissue repairs itself, the permeability of the capillaries will decrease and inflammation will cease.

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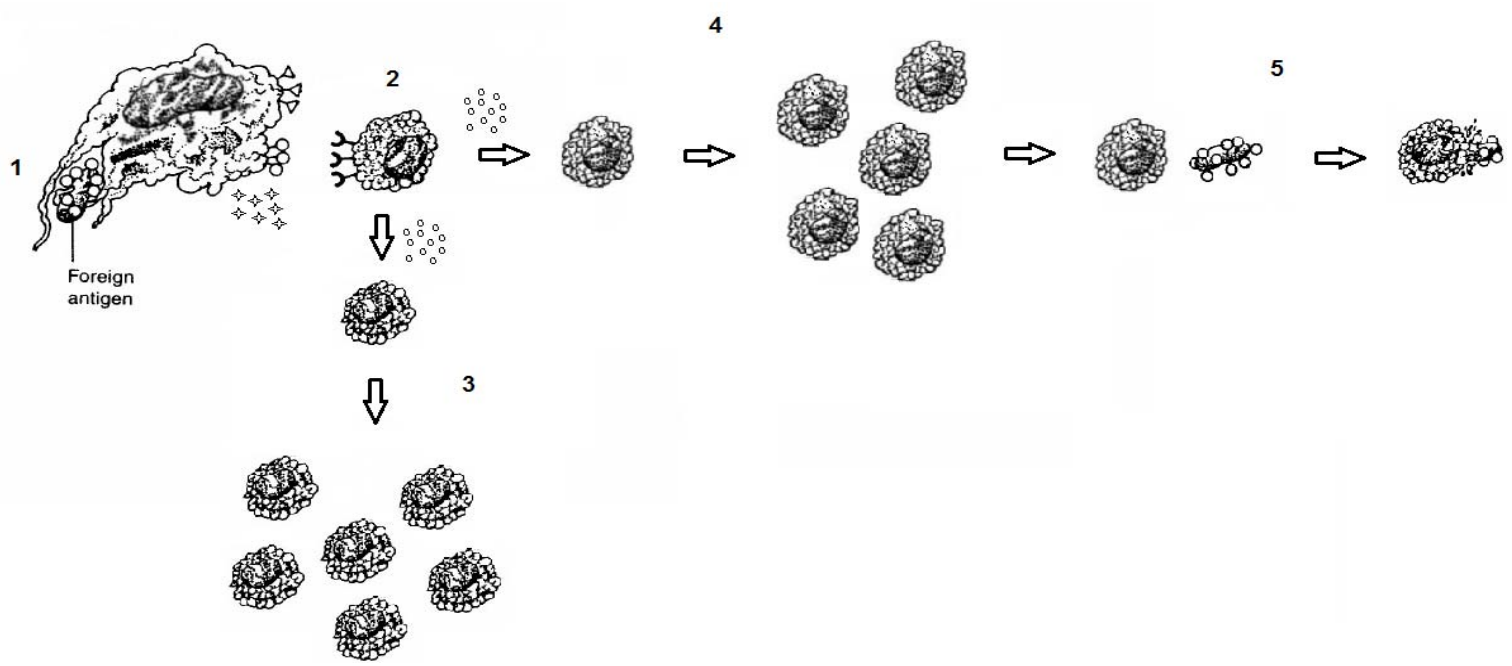
14. _____

15. Defense mechanisms are characterized as nonspecific defenses because they are effective against _____ types of infectious agents and sometimes cannot discriminate between "good" cells and "bad" cells.

Using different colors and the list below, color and label the different parts of cell-mediated immunity.



- Antigen
- Cytotoxic T-cell
- Helper T-cell
- Interleukin-1 (cytokine)
- Interleukin-2 (cytokine)
- Macrophage
- Memory T-cell
- Pathogen

Complete the paragraph about cell-mediated immunity.

In Step 1 of cell-mediated immunity, a __1__ engulfs a __2__. The __3__ of the pathogen is prepared to be presented on the surface of the macrophage by first being bound to a human major histocompatibility complex (MHC) protein called ____ __4__ -____ ____ or HLA antigens, which are self proteins. In Step 2, the foreign antigen is presented on the surface of the macrophage. A ____ __5__-_____ with a specific antigen __6__, binds to the foreign antigen, causing the macrophage to release __7__-____, a cytokine. Interleukin-1, then stimulates the Helper T-cell to release __8__-_____, another cytokine. The release of Interleukin-2 stimulates T-cells to divide rapidly, increasing their numbers. This process is called __9__ _____. In Step 3, after T-cells have divided and increased in number, some T-cells become _____ __10__-_____, which are unactivated T-cells that wait for the next infection by the same antigen. In Step 4, there are other T-cells that become _____ __11__-_____ that attack pathogens with the specific antigen. A Cytotoxic T-cell contains a vacuole filled with __12__ molecules. In Step 5, a Cytotoxic T-cell encounters a pathogen with the specific antigen and releases perforin, which __13__ the __14__ _____ of the cell creating a __15__ that allows __16__ and salts to enter. The pathogen begins to swell and eventually __17__.

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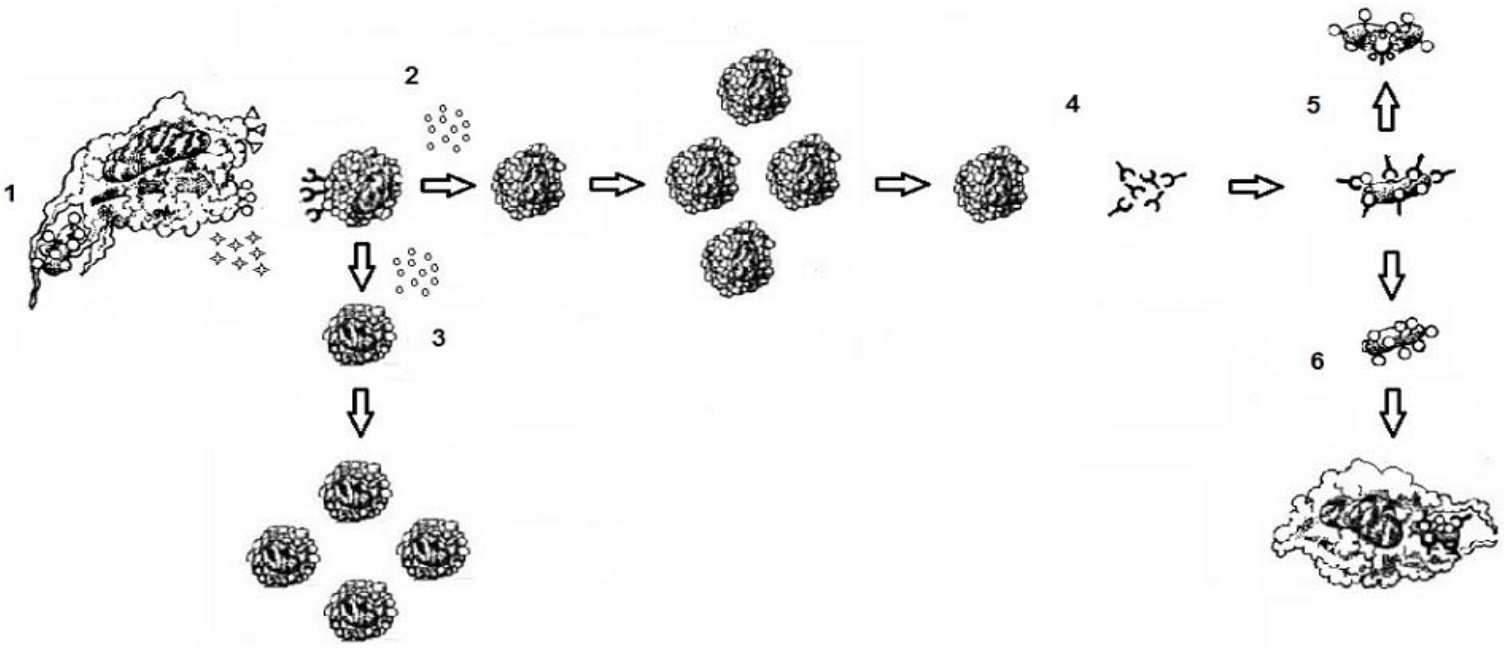
15. _____
16. _____
17. _____

Using different colors and the list below, color and label the different parts of antibody-mediated immunity.



- ○ Antibodies
- ○ Antigen
- ○ Interleukin-1 (cytokine)
- ○ Interleukin-2 (cytokine)
- ○ Macrophage
- ○ Memory B-cell
- ○ Pathogen
- ○ Plasma cell

Complete the paragraph about antibody-mediated immunity.

In Step 1 of antibody-mediated immunity, a __1__ engulfs a __2__. The __3__ of the pathogen is prepared to be presented on the surface of the macrophage by first being bound to a human major histocompatibility complex (MHC) protein called ____ __4__ -____ ____ or HLA antigens, which are self proteins. In Step 2, the foreign antigen is presented on the surface of the macrophage. A ____ __5__-_____ with a specific antigen __6__, binds to the foreign antigen, causing the macrophage to release __7__-____, a cytokine. Interleukin-1, then stimulates the Helper T-cell to release __8__-_____, another cytokine. The release of Interleukin-2 stimulates B-cells to divide rapidly, increasing their numbers. This process is called __9__ _____. In Step 3, after B-cells have divided and increased in number, some B-cells become _____ __10__-_____, which are unactivated B-cells that wait for the next infection by the same antigen. In Step 4, there are other B-cells that become __11__ ____, which produce "Y-shaped" proteins called an __12__. At the ends of the antibodies are _____ -__13__ _____, which have a specific shape to bind to a specific __14__. In Step 5, antibodies bound to antigens, on a pathogen, can initiate the __15__ system, which consists of plasma proteins that can fight infection by: inflammation (increased swelling), lysis (cell breakdown), phagocytosis (cell "eaten"), or chemotaxis (cell death by chemicals). In Step 6, antibodies can bind to antigens forming an _____-__16__ _____, or immune complex. These complexes mark the pathogens or antigens for __17__.

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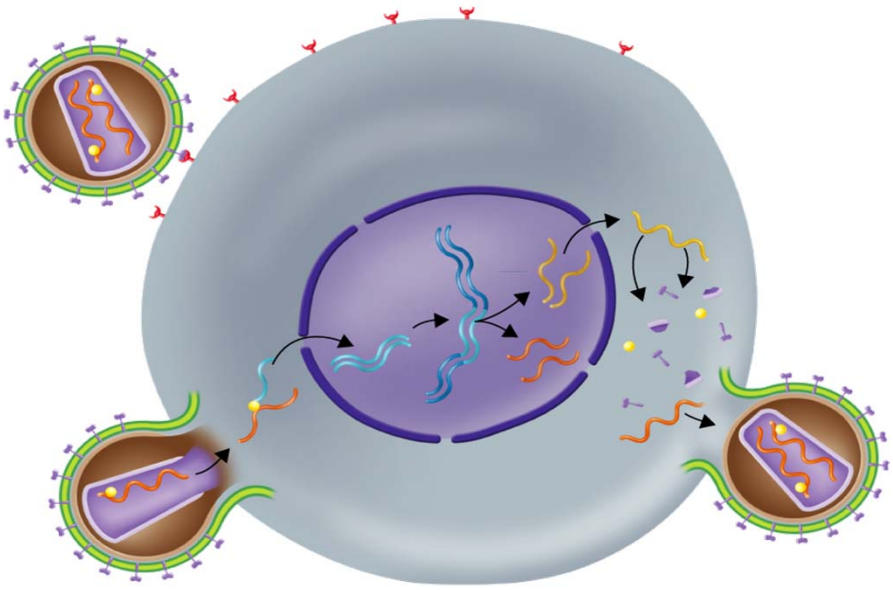
17. _____

Using the list below, label the parts of HIV infection.



- CD4 receptor
- Helper T-cell
- HIV
- Reverse transcriptase
- viral DNA
- viral mRNA
- viral RNA

Complete the paragraph about HIV infection.

AIDS stands for _____ __1__ _____. It is caused by a retrovirus called HIV, or _____ __2__ _____. AIDS is caused by an HIV entering a __3__ by attaching itself to a plasma protein called a __4__ _____. HIV is devastating to the human immune system because it specifically attacks _____ __5__-_____, which are the cells that stimulates __6__-_____ to produce __7__ and _____ __8__-_____ to destroy virus-infected cells. HIV is a retrovirus, which means that its genetic material is __9__ instead of __10__. Once inside the host cell, HIV uses a special enzyme called __11__ _____ to make a viral DNA copy of its genetic material. Viral DNA then integrates into the host's __12__, where it directs the production of more __13__ _____. Each strand of viral RNA brings about the synthesis of an outer protein coat called a __14__. Capsids assembel with viral RNA strands to form __15__, which bud off from the host cell.

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14. _____
15. _____