**Immune System: True or False**

*Write true if the statement is true or false if the statement is false.*

\_\_\_\_\_ 1. The third line of defense is referred to as the immune response.

\_\_\_\_\_ 2. The lymphatic system produces leukocytes called lymphocytes.

\_\_\_\_\_ 3. Lymphocytes can destroy certain cancer cells.

\_\_\_\_\_ 4. Lymph is a fluid that leaks out of cells into spaces between capillaries.

\_\_\_\_\_ 5. The human body has as many as two billion lymphocytes.

\_\_\_\_\_ 6. Antigens trigger the immune system to react against the cells that carry them.

\_\_\_\_\_ 7. T cells mature in bone marrow, and B cells mature in the thymus.

\_\_\_\_\_ 8. B cells must be activated by an antigen before they can fight pathogens.

\_\_\_\_\_ 9. Antibodies are large, Y-shaped proteins that recognize and bind to antigens.

\_\_\_\_\_ 10. The cell-mediated immune response leads to the destruction of cells that are infected with viruses.

\_\_\_\_\_ 11. Helper T cells destroy virus-infected cells and some cancer cells.

\_\_\_\_\_ 12. Cytotoxic T cells suppress other T cells that mistakenly react against self antigens.

\_\_\_\_\_ 13. Memory B and T cells help protect the body from re-infection by pathogens.

\_\_\_\_\_ 14. Since antibodies are such important proteins, they can recognize many types of antigens.

\_\_\_\_\_ 15. Immunization is a form of passive immunity.

**Immune System: Critical Reading**

*Read these passages from the text and answer the questions that follow.*

**Lymphatic System**

The immune response mainly involves the lymphatic system. The **lymphatic system** is a major part of the immune system. It produces leukocytes called lymphocytes. **Lymphocytes** are the key cells involved in the immune response. They recognize and help destroy particular pathogens in body fluids and cells. They also destroy certain cancer cells.

**Structures of the Lymphatic System**

The structures of the lymphatic system include organs, lymph vessels, lymph, and lymph nodes. Organs of the lymphatic system are the bone marrow, thymus, spleen, and tonsils.

* Bone marrow is found inside many bones. It produces lymphocytes.
* The thymus is located in the upper chest behind the breast bone. It stores and matures lymphocytes.
* The spleen is in the upper abdomen. It filters pathogens and worn out red blood cells from the blood, and then lymphocytes in the spleen destroy them.
* The tonsils are located on either side of the pharynx in the throat. They trap pathogens, which are destroyed by lymphocytes in the tonsils.

**Lymphocytes**

The human body has as many as two trillion lymphocytes, and lymphocytes make up about 25% of all leukocytes. The majority of lymphocytes are found in the lymphatic system, where they are most likely to encounter pathogens. The rest are found in the blood. There are two major types of lymphocytes, called **B cells** and **T cells**. These cells get their names from the organs in which they mature. B cells mature in bone marrow, and T cells mature in the thymus. Both B and T cells recognize and respond to particular pathogens.

**Antigen Recognition**

B and T cells actually recognize and respond to antigens on pathogens. Antigens are molecules that the immune system recognizes as foreign to the body. Antigens are also found on cancer cells and the cells of transplanted organs. They trigger the immune system to react against the cells that carry them. This is why a transplanted organ may be rejected by the recipient’s immune system.

How do B and T cells recognize specific antigens? They have receptor molecules on their surface that bind only with particular antigens.

***Questions***

1. What are lymphocytes? What is their function?
2. List the organs of the lymphatic system. Describe the functions of two of these organs.
3. Define B cells and T cells.
4. What are antigens?
5. How do B and T cells recognize specific antigens?

**Immune System: Multiple Choice**

1. The immune response
   1. is specific to a particular pathogen.
   2. is the third line of defense.
   3. allows the immune system to “remember” the pathogen after the infection is over.
   4. all of the above
2. The immune response mainly involves the
   1. lymphatic system.
   2. spleen and tonsils.
   3. blood cells.
   4. antibodies and lymphocytes.
3. Organs of the lymphatic system include
   1. the spleen, which filters and destroys lymphocytes.
   2. the thymus, which stores and matures antibodies.
   3. bone marrow, which produces lymphocytes.
   4. all of the above.
4. Which statement concerning lymphocytes is correct?
   1. B cells mature in bone marrow, and T cells mature in the thymus, and both B and T cells recognize and respond to particular pathogens.
   2. B cells mature in bone marrow, and T cells mature in the thymus, and both B and T cells recognize and respond to particular lymphocytes.
   3. B cells mature in bone, and T cells mature in the thymus, and both B and T cells recognize and respond to particular pathogens.
   4. B cells mature in bone, and T cells mature in the thymus, and both B and T cells recognize and respond to particular lymphocytes.
5. The humoral immune response
   1. involves mainly T cells and takes place in blood and lymph.
   2. involves mainly B cells and takes place in blood and lymph.
   3. involves mainly antibodies and takes place in blood and lymph.
   4. involves mainly antigens and takes place in blood and lymph.
6. Antibodies are
   1. large, Y-shaped proteins that recognize and bind to antigens.
   2. large, X-shaped proteins that recognize and bind to antigens.
   3. large, Y-shaped proteins that recognize and bind to lymphocytes.
   4. large, X-shaped proteins that recognize and bind to lymphocytes.
7. The cell-mediated immune response
   1. involves mainly B cells and leads to the destruction of cells that are infected with lymphocytes.
   2. involves mainly T cells and leads to the destruction of cells that are infected with lymphocytes.
   3. involves mainly B cells and leads to the destruction of cells that are infected with viruses.
   4. involves mainly T cells and leads to the destruction of cells that are infected with viruses.
8. Active immunity
   1. can last a lifetime.
   2. can result from an immunization.
   3. results when an immune response to a pathogen produces memory cells.
   4. all of the above

**Immune System: Vocabulary I**

*Match the vocabulary word with the proper definition.*

**Definitions**

\_\_\_\_\_ 1. involves mainly T cells and leads to the destruction of cells that are infected with viruses

\_\_\_\_\_ 2. involves mainly B cells and takes place in blood and lymph

\_\_\_\_\_ 3. being able to resist a pathogen that infected the body in the past

\_\_\_\_\_ 4. the deliberate exposure of a person to a pathogen in order to provoke an immune response

\_\_\_\_\_ 5. part of the immune system that produces lymphocytes

\_\_\_\_\_ 6. results when antibodies are transferred to a person who has never been exposed to the pathogen

\_\_\_\_\_ 7. the third line of defense

\_\_\_\_\_ 8. lymphocyte that matures in bone marrow

\_\_\_\_\_ 9. lymphocyte that matures in the thymus

\_\_\_\_\_ 10. results when an immune response to a pathogen produces memory cells

\_\_\_\_\_ 11. long-living plasma cells

\_\_\_\_\_ 12. the fluid that leaks out of capillaries into spaces between cells

\_\_\_\_\_ 13. the key cells involved in the immune response

\_\_\_\_\_ 14. Y-shaped proteins that recognize and bind to antigens

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Active immunity | cell-mediated immune response | humoral immune response | immune response | immunity |
| Antibody | immunization | lymphatic system | lymphocyte | memory cell |
| B cell | lymph | passive immunity | T cell­­ |  |

**Immune System: Vocabulary II**

*Fill in the blank with the appropriate term.*

1. The \_\_\_\_\_\_\_\_\_\_\_\_ line of defense is referred to as the immune response.

2. \_\_\_\_\_\_\_\_\_\_\_\_ are large, Y-shaped proteins that recognize and bind to antigens.

3. The lymphatic system produces leukocytes called \_\_\_\_\_\_\_\_\_\_\_\_.

4. \_\_\_\_\_\_\_\_\_\_\_\_ cells and \_\_\_\_\_\_\_\_\_\_\_\_ cells are the two major types of lymphocytes.

5. Lymphocytes recognize and help destroy \_\_\_\_\_\_\_\_\_\_\_\_ in body fluids and cells.

6. Memory B and T cells help protect the body from re-infection by pathogens that have infected the body in the past, a protection called \_\_\_\_\_\_\_\_\_\_\_\_.

7. The human body has as many as \_\_\_\_\_\_\_\_\_\_\_\_ trillion lymphocytes.

8. The \_\_\_\_\_\_\_\_\_\_\_\_ immune response involves mainly T cells.

9. The cell-mediated immune response leads to the destruction of cells that are infected with \_\_\_\_\_\_\_\_\_\_\_\_.

10. B and T cells recognize and respond to \_\_\_\_\_\_\_\_\_\_\_\_ on pathogens.

11. Active immunity can result from \_\_\_\_\_\_\_\_\_\_\_\_.

12. \_\_\_\_\_\_\_\_\_\_\_\_ cells are activated B cells that secrete antibodies.

13. \_\_\_\_\_\_\_\_\_\_\_\_ cells help launch a rapid response against the pathogen if it invades the body again in the future.

14. Organs of the lymphatic system are the bone marrow, thymus, spleen, and \_\_\_\_\_\_\_\_\_\_\_\_.

**Immune System: Critical Writing**

*Thoroughly answer the question below. Use appropriate academic vocabulary and clear and complete sentences.*

**Define immunity, and distinguish between active and passive immunity**

