The Immune System: Common Characteristics of B and T Lymphocytes

1. Shared features of B and T lymphocyte function include:

   • _____

   • _____

   • _____

   • _____

2. Lymphocytes must distinguish between normally occurring internal antigens called _____ and those external to the body. The ability to distinguish between the pathogens depends on the _____ of the lymphocyte antigen receptors.

3. Specificity of B and T cells depends on their ability to recognize _____ _____. They have the ability to do this because their surface is covered with 10,000 to 100,000 _____ receptors. All of these receptors on a specific B cell are identical; thus, the cells bind optimally with only one _____.

4. The antigen receptor on a B cell is an immunoglobulin, which is Y-shaped and basically a membrane bound _____.

5. The T cell receptor recognizes antigen fragments housed in cell membrane proteins called "_____" (_____) proteins.

6. The immune system can develop receptors for a specific antigen before that antigen enters the body. Lymphocytes make a wide variety of receptors, and when an antigen binds and activates one of these receptors, the cell divides, making many _____. This process is called_____.

7. Our bodies make approximately _____different types of lymphocyte antigen receptors. With only 25,000 different genes in our body, how can so many antigen receptors be made?

   • _____

8. Receptors have two regions. The _____region is the same for all antigen receptors, while the _____region is specific for an antigen.

9. The _____ and _____ are primary lymphoid organs because the B and T cells originate and/or mature in these organs. To become immunocompetent, B and T cells must accomplish two things:

   • _____

   • _____

10. Immature T cells migrate to the thymus. In the outermost cortex they form new _____. They then migrate to the _____ to test these new receptors.

11. T cells recognize antigens by binding to _____ proteins on an antigen presenting cell such as a dendritic cell. This process is known as _____ selection. If T cells fail to recognize this protein, they die by a process known as _____.

12. If a T cell recognizes this protein (the one mentioned above), it is then tested for recognition of _____ the body's own antigens. This process is known as _____ selection. Immature T cells that do not recognize the body's own antigens are called _____ and allowed to mature.

13. If lymphocytes attack the body's own cells, this will result in a/an _____ disease.

14. Below is a list of diseases that result when the immune system attacks the body's own cells. State what cells the immune system is attacking in each disease.

   • Grave's Disease: _____

   • Type I diabetes: _____

   • Multiple sclerosis: _____

   • Hemolytic anemia: _____

15. These diseases may occur as a result of what three events mentioned in this Topic?

   • _____

   • _____

   _____

   • _____

_____

16. _____ lymphocytes are lymphocytes that have not encountered their one specific antigen. What is the best method for the lymphocyte to find its antigen?

    • _____

17. The T cell becomes activated when it encounters its antigen. The T cell then undergoes repeated cell division known as _____. During this process, two basic types of cells are produced:

    • _____ cells, which attack the antigen-presenting cell

    • _____ cells, which remain to be reactivated if the antigen is ever encountered again

18. When an antigen activates a B cell, the cloned _____ (effector cells) secrete antibodies in about 7 days. This is known as the _____ immune response.

19. When exposed to the same antigen again, the _____B cells generate a _____ immune response. This response is generated (faster or slower) and produces a _____ number of effector cells.

20. The purpose of _____ is to generate memory cells, thus protecting us without the risk of getting sick.