

Advanced High School Immunology Assessment

Immunology · Practice Test · 20 Questions

1. Which specific cell type is responsible for the production of immunoglobulins after activation by a T-helper cell?

- A) Cytotoxic T-lymphocytes
- B) Plasma B-cells
- C) Natural Killer cells
- D) Dendritic cells

2. What is the primary function of the Major Histocompatibility Complex (MHC) class II molecules?

- A) Presenting endogenous antigens to CD8+ T-cells
- B) Presenting exogenous antigens to CD4+ T-cells
- C) Binding to antibodies to facilitate phagocytosis
- D) Directly lysing infected host cells

3. Which cytokine is primarily secreted by T-helper 1 (Th1) cells to activate macrophages?

- A) Interferon-gamma (IFN- γ)
- B) Interleukin-4 (IL-4)
- C) Interleukin-10 (IL-10)
- D) Transforming growth factor-beta (TGF- β)

4. Which immunoglobulin isotype is most abundant in human serum and is capable of crossing the placenta?

- A) IgA
- B) IgE
- C) IgM
- D) IgG

5. What is the mechanism by which Natural Killer (NK) cells identify and destroy virally infected cells?

- A) Recognition of specific viral peptides on MHC II
- B) Detection of decreased or absent MHC class I expression
- C) Direct binding to viral surface proteins via BCRs
- D) Secretion of histamine to induce inflammation

6. Which process describes the selective survival of B-cells that produce antibodies with the highest affinity for a specific antigen?

- A) V(D)J recombination
- B) Affinity maturation
- C) Clonal deletion
- D) Class-switch recombination

7. What is the primary role of the complement system component C3b?

- A) Formation of the membrane attack complex
- B) Opsonization of pathogens
- C) Activation of mast cell degranulation
- D) Chemotaxis of eosinophils

8. Which gene rearrangement process is responsible for the immense diversity of the B-cell receptor repertoire?

- A) RNA splicing
- B) V(D)J recombination
- C) Transposition
- D) DNA methylation

9. What is the defining characteristic of the primary immune response compared to the secondary response?

- A) Shorter lag phase
- B) Higher peak concentration of IgG
- C) Dominance of IgM production
- D) Activation of memory T-cells

10. Where do T-lymphocytes undergo the process of positive and negative selection to ensure self-tolerance?

- A) Bone marrow
- B) Spleen
- C) Thymus
- D) Lymph nodes

11. Which cell type is the principal bridge between the innate and adaptive immune systems via antigen presentation?

- A) Neutrophil
- B) Dendritic cell
- C) Erythrocyte
- D) Basophil

12. Which domain of an antibody molecule determines its unique antigen-binding specificity?

- A) Fc region
- B) Constant region
- C) Variable region
- D) Hinge region

13. What is the direct effector function of perforin released by cytotoxic T-cells?

- A) Inducing apoptosis via caspase activation
- B) Creating pores in the target cell membrane
- C) Neutralizing viral surface receptors
- D) Inhibiting bacterial protein synthesis

14. Which condition results from the failure of the immune system to distinguish between self and non-self antigens?

- A) Immunodeficiency
- B) Autoimmunity
- C) Hypersensitivity
- D) Anaphylaxis

15. What is the role of regulatory T-cells (Tregs) in the immune response?

- A) Stimulating B-cell proliferation
- B) Suppressing excessive immune responses to maintain tolerance
- C) Directly killing tumor cells
- D) Releasing histamine

16. Which antibody isotype is predominantly found in mucosal secretions such as saliva and breast milk?

- A) IgD
- B) IgA
- C) IgM
- D) IgG

17. What event triggers the release of histamine from mast cells during a Type I hypersensitivity reaction?

- A) Binding of IgE to the Fc receptor on mast cells
- B) Direct activation by bacterial endotoxins
- C) Complement fixation by IgG
- D) Activation of T-helper 17 cells

18. Which molecule is required for the maturation of T-cells and acts as a co-receptor with the T-cell receptor (TCR)?

- A) CD3
- B) CD4 or CD8
- C) Ig-alpha and Ig-beta
- D) MHC class I

19. What is the primary purpose of the inflammatory response in innate immunity?

- A) To neutralize toxins directly
- B) To increase vascular permeability and recruit leukocytes
- C) To produce long-lived memory cells
- D) To decrease body temperature

20. Which segment of the V(D)J recombination process is responsible for the greatest contribution to junctional diversity?

- A) Combinatorial diversity
- B) Addition of N-nucleotides by TdT
- C) Random pairing of heavy and light chains
- D) Somatic hypermutation