What are the Components of the Immune System?

Worksheet

The immune system's main components are innate immunity (physical barriers, phagocytes, natural killer cells, complement) providing fast non-specific defense, and adaptive immunity (B cells and T cells) providing slower but highly specific, long-lasting defense with memory.

Questions

1. Which of these is a component of innate immunity?

A) B lymphocytes
B) Antibodies
C) Natural killer cells
D) Memory T cells

2. Where do T cells mature before becoming functional?

A) Bone marrow
B) Thymus
C) Spleen
D) Liver

3. What is the main advantage of adaptive immunity over innate immunity?

A) It acts within minutes
B) It has immunological memory
C) It requires no cells
D) It only targets bacteria

4. Which cells present antigens to helper T cells to activate the adaptive response?

A) Red blood cells
B) Macrophages (antigen-presenting cells)
C) Platelets
D) Muscle cells

5. A splinter in the skin causes local redness, swelling, warmth and pus within hours. Which branch of immunity responds first, and what does it do?

6. A person who had chickenpox as a child almost never gets it again, even decades later. Which immune components explain this lifelong protection?

7. Explain how a macrophage helps 'bridge' innate and adaptive immunity after engulfing a bacterium.

8. Define: Two main branches of the immune system

9. Define: Primary lymphoid organs

10. Define: Secondary lymphoid organs

Answer Key

1. C) Natural killer cells - Natural killer cells are innate immune cells that attack infected or abnormal cells without prior sensitization.

2. B) Thymus - T cells originate in bone marrow but mature in the thymus, which gives them their name.

3. B) It has immunological memory - Adaptive immunity is slower to activate but forms memory cells, enabling faster, stronger responses on re-exposure.

4. B) Macrophages (antigen-presenting cells) - Macrophages and other antigen-presenting cells display processed antigens on MHC II to activate helper T cells.

5. This is the innate immune response Damaged tissue releases signals that trigger inflammation Neutrophils and macrophages migrate to the site and phagocytose bacteria Pus is a mix of dead cells, bacteria and immune cells - no pathogen-specific memory is formed

6. This is due to adaptive immunity's memory function During the first infection, B cells produced antibodies against the virus Some activated B and T cells became long-lived memory cells On re-exposure, memory cells respond faster and stronger, usually preventing symptoms

7. The macrophage first phagocytoses (innate) and digests the bacterium It then displays bacterial fragments (antigens) on MHC class II molecules on its surface Helper T cells (adaptive) recognize this antigen presentation This activates helper T cells, which then help activate B cells and cytotoxic T cells

8. Innate immunity (non-specific, immediate) and adaptive immunity (specific, has memory).

9. Bone marrow (where immune cells form) and the thymus (where T cells mature).

10. Spleen, lymph nodes and tonsils, where immune responses are activated.