What is the Immune System?

Worksheet

The immune system defends the body through innate immunity (fast, non-specific defenses like skin, phagocytes and inflammation) and adaptive immunity (slower but highly specific defenses using B cells and T cells that leave behind lasting memory).

Questions

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

A) Highly specific to one pathogen
B) Creates long-lasting immunological memory
C) Non-specific, rapid response present from birth
D) Requires prior exposure to work

2. What is the main function of memory B cells?

A) To directly engulf pathogens
B) To trigger the inflammatory response
C) To enable a faster, stronger response upon re-exposure to the same antigen
D) To form the physical skin barrier

3. Which cells are primarily responsible for producing antibodies?

A) T cells
B) B cells (plasma cells)
C) Macrophages
D) Neutrophils

4. Which of the following is part of the innate, not the adaptive, immune system?

A) Memory T cells
B) Antibodies produced against a specific virus
C) Skin and mucous membranes
D) Immunity gained from a past vaccine

5. A splinter breaks the skin and bacteria enter the wound. Which immune defenses respond, and in what order?

6. A person catches chickenpox once as a child and almost never gets it again, even after later exposure. Explain why.

7. Explain, step by step, how a vaccine protects against a disease without causing it.

8. Define: What are the two main branches of the immune system?

9. Define: What are antibodies?

10. Define: What is immunological memory?

Answer Key

1. C) Non-specific, rapid response present from birth - Innate immunity is non-specific and ready to respond immediately, without needing prior exposure or leaving lasting memory.

2. C) To enable a faster, stronger response upon re-exposure to the same antigen - Memory B cells persist after an infection and allow a rapid secondary antibody response if the same pathogen appears again.

3. B) B cells (plasma cells) - B cells, once activated, differentiate into plasma cells that manufacture and secrete large quantities of antibodies.

4. C) Skin and mucous membranes - Skin and mucous membranes are non-specific physical barriers present from birth - a core feature of innate immunity.

5. The physical barrier (skin) is breached, allowing bacteria in Innate response kicks in first: phagocytes (macrophages, neutrophils) rush to the site and inflammation occurs (redness, swelling, heat, pain) If the infection persists, dendritic cells present bacterial antigens to T cells, activating the slower adaptive immune response

6. During the first infection, B cells produce antibodies and some become long-lived memory B and T cells Memory cells can persist for years to decades On a second exposure, memory cells trigger a much faster, stronger antibody response (secondary immune response) that clears the virus before symptoms can develop

7. A vaccine introduces a weakened or inactivated antigen (or, for mRNA vaccines, instructions to make a harmless piece of the pathogen) - not a live, disease-causing pathogen The immune system mounts a primary response, producing antibodies and forming memory B and T cells On later exposure to the real pathogen, memory cells trigger a rapid secondary response that clears the infection before illness develops

8. Innate immunity (fast, non-specific) and adaptive immunity (slower, highly specific, with memory).

9. Y-shaped proteins made by B cells (plasma cells) that bind to specific antigens to neutralize or mark pathogens for destruction.

10. The ability of memory B and T cells, formed after first exposure to a pathogen, to trigger a much faster and stronger response on re-exposure.