What is the Immune System?

Worksheet

The immune system is the collection of cells and organs that protects the body from disease-causing microbes. It responds through innate immunity (immediate, non-specific defenses like skin and white blood cells) and adaptive immunity (slower, pathogen-specific defenses using B cells and T cells that build lasting memory).

Questions

1. Which immune response acts first after infection?

A) Adaptive immunity
B) Innate immunity
C) Antibody production
D) Memory cell activation

2. Which cell type produces antibodies?

A) Neutrophils
B) Red blood cells
C) B cells
D) Platelets

3. Why does a second infection with the same pathogen often cause no symptoms?

A) The pathogen mutates away
B) Memory cells respond faster and stronger
C) Innate immunity blocks it completely
D) Antibodies from birth still work

4. What is an antigen?

A) A type of antibody
B) A molecule that triggers an immune response
C) A white blood cell
D) A vaccine ingredient only

5. You cut your finger and bacteria enter the wound. Trace the first line of defense.

6. A child catches chickenpox for the first time. Why do symptoms take about a week to fully resolve?

7. The same person is exposed to chickenpox again 10 years later. Why don't they get sick?

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

9. Define: What do B cells produce?

10. Define: What is the role of T cells?

Answer Key

1. B) Innate immunity - Innate immunity (skin, phagocytes, inflammation) responds within minutes to hours, before adaptive immunity kicks in.

2. C) B cells - B cells differentiate into plasma cells that secrete antigen-specific antibodies.

3. B) Memory cells respond faster and stronger - Memory B and T cells recognize the pathogen instantly and mount a faster, larger response.

4. B) A molecule that triggers an immune response - An antigen is any molecule (often on a pathogen's surface) that the immune system recognizes as foreign.

5. Skin barrier is broken, so bacteria enter tissue Mast cells release histamine, causing redness and swelling (inflammation) Neutrophils arrive within hours and phagocytose (engulf) the bacteria If bacteria persist, macrophages present antigens to trigger the adaptive response

6. Virus is new to the body, so no memory cells exist yet Innate immunity slows the virus but cannot clear it alone B cells need several days to proliferate and produce antibodies specific to the virus T cells destroy infected cells while antibodies neutralize free virus, clearing the infection by day 7-10

7. Memory B and T cells from the first infection remain in the body On re-exposure, memory cells recognize the virus antigens immediately Antibody production ramps up within hours instead of days The virus is cleared before it can cause noticeable symptoms - this is immunological memory

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

9. Antibodies - proteins that bind specifically to an antigen and mark it for destruction.

10. Helper T cells activate other immune cells; cytotoxic T cells directly kill infected cells.