

Study Guide — PBS Unit 3: Outbreaks and Emergencies (Mid-Unit Test)

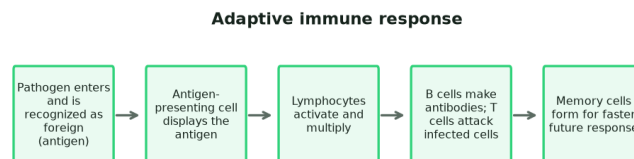
Principles of Biomedical Science · Unit 3 — Outbreaks and Emergencies · Modeled on the PLTW Guided Review format

Vocabulary to know cold

Term	Definition
Antigen	A foreign molecule (often on a pathogen's surface) that triggers an immune response.
Antibody	A protein made by B cells that binds a specific antigen to neutralize it.
Innate immunity	The body's immediate, nonspecific first-line defense (skin, inflammation, phagocytes) with no memory.
Adaptive immunity	Specific defense by lymphocytes that develops memory after exposure.
Lymphocyte	A white blood cell (B cell or T cell) central to the adaptive immune response.
Lymph node	A small lymphatic organ where immune cells gather and filter lymph; swells during infection.
Inflammation	A protective response marked by redness, heat, swelling, and pain from increased blood flow.
Alveoli	Tiny air sacs in the lungs where oxygen and carbon dioxide are exchanged.
immun/o	Combining form meaning immune or protection (e.g., immunology).
lymph/o	Combining form meaning lymph/lymphatic tissue (e.g., lymphocyte).
-osis	Suffix meaning an abnormal condition (e.g., tuberculosis).
-pnea	Suffix meaning breathing (e.g., tachypnea = fast breathing).

Worked examples (follow the reasoning)

Example 1. Order the basic steps of an adaptive immune response to a new pathogen.



- A pathogen breaches innate barriers and its antigens are detected.
- An antigen-presenting cell shows the antigen to lymphocytes.
- Matching lymphocytes activate and proliferate.
- B cells produce antibodies and cytotoxic T cells destroy infected cells.
- Memory cells remain to speed up the response next time.

Answer: Recognize antigen, present it, activate/multiply lymphocytes, produce antibodies/kill infected cells, form memory cells.

Example 2. Translate the medical term 'tachypnea' and state whether a rate of 26 breaths/min in an adult qualifies.

- Break the word: tachy- = fast; -pnea = breathing.
- Tachypnea = abnormally fast breathing.
- Recall the normal adult respiration range: about 12-20 breaths/min.
- Compare 26 to the range.

Answer: Tachypnea = fast breathing; 26 breaths/min is above the normal 12-20 range, so it qualifies as tachypnea.

Practice questions (with reasoning)

1. Which prefix means 'against' as in a drug that works against bacteria?

- A. anti-
- B. brady-
- C. hyper-
- D. sub-

Answer: A. Anti- means against (antibiotic = against life/bacteria; antibody = against an antigen).

2. A patient's lymph nodes are swollen during a sore throat. The medical term for diseased/enlarged lymph nodes is:

- A. lymphadenopathy
- B. lymphedema
- C. leukopenia
- D. alveolitis

Answer: A. Lymph/o + aden/o + -pathy = lymphadenopathy, disease (enlargement) of the lymph nodes.

3. Which is part of innate (nonspecific) immunity?

- A. Memory B cells
- B. Intact skin acting as a barrier
- C. Antibody production specific to one antigen
- D. T-cell receptor matching

Answer: B. Intact skin is a nonspecific first-line barrier, a feature of innate immunity.

4. The alveoli are the site of:

- A. urine formation
- B. gas exchange
- C. bile storage
- D. bone production

Answer: B. Alveoli are where oxygen enters the blood and carbon dioxide leaves it.