First Line of Defense Mechanism



IMMUNE SYSTEM

Form 4

QUESTIONS and ANSWERS with EXAM PRACTICES BIOLOGY



First Line of Defense Mechanism

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Chapter -Four

Immune System

Topic: First Line of Defense Mechanisms

Questions and Answers with Exam Practices

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Part One: Questions and Answers

1. **Define the terms**
   a. Immunity system
   b. Immunology
   c. Immunity
   d. Immune response
   e. Antigen

Answers

a. Immunity system is a group of organs, cells and chemicals working together to defend the body against diseases

b. Immunology is the study of the physiological defense by which the body destroys or neutralizes foreign matter, both living and nonliving things.

c. Immunity

- Immunity is the body's resistance against diseases.
- Immunity is the body's defense against diseases.
- Immunity is the ability of the body to defend against diseases.

d. Immune response is how the body recognizes and defends against harmful or foreign substances such as antigen.

e. Antigen

- Antigen is a molecule that provokes a specific immune response.
- Antigen is a protein or other molecule found on cell surface that is recognized as non-self by the immune system.
- Antigen is a non-self substance that can provoke an immune response.





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2. **State any two functions of the immune system**
   a. Protects against infections caused by microbes
   b. Destroys cancer cells that arise in the body
   c. Removal of worn out and dead cells
   d. To recognize and neutralized harmful substances
3. **What are the two main branches or categories of immune system?**
   Immune system can be classified into two branches, which are
   a. Non-specific immunity (innate immunity)
   b. Specific immunity (adaptive or acquired immunity)
4. **What is the role of non-specific immune system?**
   - Nonspecific (innate) immune system prevents pathogens from entering the body through physical and chemical barriers.
5. **What is the role of specific immune system?**
   - Specific (acquired) immune system recognizes and protects specific pathogen or foreign substance.
   - Specific immune system remembers the second invasion of a pathogen by developing **memory cells.**
   - Specific immune system involves the production of **antibodies**
6. **What is the difference between specific and non-specific defense mechanisms?**
   - Non-specific immune defense is the protection against pathogens or foreign substances without having to recognize their specific identities.
   - Specific immune defense is the protection against specific pathogen or foreign substance.

Difference between specific and non-specific immune defense	
Non-specific immune defenses	**Specific immune defenses**
Present at birth	Develop after birth or through vaccination
Does not involve specific recognition of pathogens	Involves specific recognition of pathogen
Faster response	Slower response
Has no memory (does not develop memory)	Has memory (develops memory)
Inherited	Not inherited





7. **What are the major characteristics of specific immune system?**
   - Characteristics of specific (adaptive) immune system are;
     a. **Specificity** – ability to target specific pathogens
     b. **Memory –** ability to remember and quickly respond to a pathogen which has previously been exposed.

8. **What are the three lines of defense against infection?**
   a. First line of defense
   b. Second line of defense
   c. Third line of defense

9. **Distinguish between first line and second line of defense mechanisms.**
   (Explain the difference between the first line and second line of defenses)

   - **First line of defense** involves physical and chemical barriers which defend the body from infections and prevent pathogens from entering the body.
   - **Second line of defense** is a group of phagocytes and chemicals which defend the body if pathogens manage to pass through the first line of defense.

10. **What are the similarities between first line and second line of defense mechanisms?**
    - They are non-specific defense mechanisms
    - They do not involve specific recognition of pathogens.
    - They do not develop memory

11. **What are the components of the first line of defense mechanism?**

    - First line of non-specific defense mechanism consists of:
      a. Skin and mucous membranes
      b. Sweat
      c. Sebum
      d. Stomach acid (hydrochloric acid)
      e. Gastric juice
      f. Saliva
      g. Nasal hair
      h. Mucus
      i. Cilia
      j. Urine
      k. Tear
      l. Digestive enzymes
      m. Blood clotting
      n. Lysozyme
      o. Vaginal secretions





12. Which parts provide physical barrier in first line of defense?

- Physical barrier in first line of defense mechanisms are including,
  a. **Skin** – dead cells of the skin epidermis block entry of pathogen into the body**.**
  b. **The mucous membranes** – produce **mucus** which traps microbes.
  c. **Nasal hair** – hair in the nose filter air containing microbes, dust and pollutants.
  d. **Cilia** – cilia which lines the upper respiratory tract propels or moves the inhaled dust and microbes trapped by the mucus to the throat.

13. Which parts provide chemical barrier in first line of non-specific defense?

- Chemical barriers in first line of defense mechanisms are including,
  a. Sweat
  b. Sebum
  c. Gastric juice in the stomach
  d. Stomach acid (hydrochloric acid)
  e. Digestive enzymes
  f. Saliva
  g. Lysozyme

14. What is the role of the skin in defense mechanism?

Possible Answers:

- The skin provides a protective barrier to microbes.
- The skin blocks microbes from entering the body.
- The skin has dead cells in the epidermis provide physical barrier to microbes entering the body.
- The skin provides physical and chemical barriers against the invading pathogens.

15. What are the components in the first line of non-specific defense mechanism that contain lysozyme for destroying bacterial cell wall?

- The following parts in first line of defense contain **lysozyme** (an enzyme) which digest bacterial cell wall;
  a. Saliva
  b. Tear
  c. Sweat
  d. Sebum





16. **What are the components in the first line of non-specific defense mechanism with low pH to inhibit or slow down bacterial growth**
    - The following parts in first line of defense have **low pH** to inhibit or slow down bacterial growth
        a. Stomach acid
        b. Gastric juice
        c. Sweat
        d. Urine
        e. Vagina
17. **What are the roles of the below terms in the first line of non-specific defense mechanism**
    a. Saliva
    b. Stomach acid (hydrochloric acid)
    c. Blood clotting
    d. Sebum
    e. Sweat
    f. Lysozyme

    Answers:
    a. Role of **saliva** in defense
        - Saliva contains the enzyme **lysozyme** which destroys bacterial cell wall
        - Saliva washes microbes from the teeth and mouth
    b. Role of **stomach acid** (hydrochloric acid) in defense
        - Destroys or kills microbes in the swallowed food
    c. Role of **blood clotting** in defense
        - Blood clotting prevents entry of pathogens into the body by sealing the wound rapidly
    d. Role of **sebum** in defense
        - Sebum inhibits and slows down the growth of certain pathogens on the skin.
    e. Role of **sweat** in defense
        - Sweat contains the enzyme **lysozyme** which digests bacterial cell wall.
    f. Role of **lysozyme** in defense
        - Lysozyme is an enzyme which breaks down bacterial cell wall and kills bacteria.



18. What are the roles of the below terms in the first line of non-specific defense mechanism

a. Tears
b. Urine
c. Nasal hair
d. Mucus
e. Cilia
f. Vaginal secretions

Answers:

a) Role of **tears** in defense
- Tears contain the enzyme **lysozyme** which kills certain pathogens.
- Tears wash away irritating away irritating substances and microbes from the eyes.

b) Role of **urine** in defense
- Low pH of urine slow down microbial growth in the urinary system.
- Urine washes microbes from urethra

c) Role of **nasal hair** in defense
- Nasal hair in the nose filters air containing microbes, dust and pollutants.

d) Role of **mucus** in defense
- Mucus secreted by the mucous membranes trap microbes

e) Role of **cilia** in defense
- Cilia which lines the upper respiratory tract propels or moves the inhaled dust and microbes trapped by the mucus to the throat.

f) Role of **vaginal secretions** in defense
- Low pH in the vagina slow down bacterial growth
- Vaginal secretions wash microbes away from female reproductive tract.



END - FIRST LINE OF DEFENSE MECHANISM