

# Worksheet for Assessment of Immune Functions

## Answer Key

### 1. Describe the three functions of the immune system.

- a. **Defense** from invasion of microorganisms and inhibit development of infection.
- b. **Homeostasis** - damaged cells are digested and removed from the body.
- c. **Surveillance** – mutations are normally recognized as foreign cells and destroyed by immune system.

### 2. What is an antigen? What does it do?

Substances the body recognizes as foreign that produce an immune response.

### 3. What are antibodies? What do they do?

Immune globulins produced by lymphocytes in response to antigens. They attach to antigens and attract cells to destroy the pathogen.

### 4. Describe the three lines of defense. Give an example for each line of defense

- a. First line of defense is the **barriers** (physical, biochemical, and mechanical) Ex. Skin, cough, saliva
- b. Second line of defense is the **inflammatory response** which uses interferon, complement and phagocytosis to engulf or destroy microorganisms. Ex. If you cut your finger the wound and area around the wound swell and leak fluids
- c. **Adaptive immune response**, – occurs by natural or artificial exposure to an infection vaccine, or antigen. Ex-natural: if a person has measles in childhood, they will not have measles again because the memory cells have the antibody for it. Ex. Artificial: a person receives a vaccine, and the body creates immunity due to memory cells created from exposure to vaccine

### 5. Describe innate immune system

**Innate immune system** is present at birth, its fast acting, nonspecific, and mostly made of neutrophils and monocytes. The innate immune system is the first part of the body to detect invaders such as viruses, bacteria, parasites, and toxins, or to sense wounds or trauma. Upon detection of these agents or events, the innate immune system activates cells to attack and destroy the outsider, or to initiate repair, while also informing and modulating the *adaptive* immune response that follows this first line of defense.

**Adaptive immune cells** are the second and specific line of defense, and they are called to action by the innate immune system. After recognizing the invader, the cells can multiply and combat it, leading to recovery from disease and protection against its return.

### 6. What is the difference between active and passive immunity?

- a. **Active (natural) immunity** includes invasion of foreign substance and forms long-lasting immunity. Active immunity is attained by exposure to a pathogen. Artificial active immunity, a person can build resistance to a disease following an immunization
- b. **Passive** receives antigen instead of creating their own and has short immunity in the body. example, passive immunity occurs when a baby receives a mother's antibodies through the placenta or breast milk. It can also occur when a person receives an injection of antibodies to protect against the effects of a toxin such as snake venom.

**7. What are T-cells and their function?**

Cellular-mediated response – activated to defend against intracellular microorganisms.

**8. What are B-cells and their function?**

Humoral mediated immunity (B cells) occurs in reaction to an antigenic challenge (anaphylactic shock or transfusion reactions)

**9. What is the difference between Natural and artificial immunity?**

- a. **Natural immunity** is when the body makes antibodies from the antigens itself from an actual infection.
- b. **Artificial** is when the body gets introduced to an antigen to create an antibody. Vaccine-induced immunity is acquired through the introduction of a killed or weakened form of the disease organism through vaccination.

**10. What is the difference between active and passive immunity?**

- a. **Active immunity** the body forms long lasting immunity when you are exposed to something that causes your immune system to develop antibodies.
- b. **Passive immunity** the immunity has a when you are directly given antibodies and your body does not have to work to develop them. A person may need to have another dose of antibodies such as a booster or an annual vaccination like flu shot

**11. Give examples of the types of immunity described in questions 9 & 10.**

- a. Natural - chicken pox, measles, mumps
- b. Passive (natural) = maternal immunoglobulins passed from mother to baby
- c. Active (artificial) = vaccine for measles, mumps, chicken pox
- d. Passive (artificial) = injection of hep. B immune globulins or snake antivenom

**12. What is immunosenescence?**

The gradual deterioration of the immune system brought on by the natural aging process. It involves both host capability to respond to infection and the development of long-term immune memory especially by vaccination.

**13. Describe three age-related changes to the immune system in the older adult.**

- a. Decreased ability to respond to invading organisms.
- b. Decreased production and function of T and B lymphocytes.
- c. Decreased ability of antibodies to distinguish self from non self.

**14. How does nutrition impact immune function?**

A deficiency in vitamins, trace elements, and fatty acids can lead to a suppressed immune system. Protein depletion can lead to atrophy of lymphoid tissues, depression of antibody response, a reduction in number of circulating T cells and impaired phagocytic function. All of this can lead to an increased susceptibility to infections.