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**TOPIC: IMMUNOLOGY**

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**QUESTION 1**

Explain the role of the immune system

**ANSWER**

The immune system is a host defense system comprising of many biological structures and processes within an organism that protects against diseases. It detects a wide variety of agents / foreign matter known as pathogens (viruses, fungi, bacteria, parasitic worms etc.) that might cause damage or homeostatic imbalance. The success of the immune system depends on its ability to discriminate between foreign (non self) and host (self) cells.

**QUESTION 2**

Describe the two types of immunity

**ANSWER**

The two types of immunity includes; the Innate Immunity, and the Adaptive Immunity.

1. **Innate Immunity (native immunity):** The innate immunity is the first immunological process for fighting against an intruding pathogen. It is rapid and initiated within minutes or hours after aggression that has no immunologic memory.

Innate immunity comprises of four types of defensive barriers namely;

* Anatomic (skin and mucous membrane)
* Physiologic (temperature, low PH and chemical mediators)
* Endocytic and Phagocytic
* Inflammatory

**Function of innate immunity**

The innate immunity function is the rapid recruitment of immune cells to sites of infection and inflammation through the production of cytokines and chemokine (proteins involved in cell-cell communication). Numerous cells are involved in the innate immunity such as phagocytes (macrophages and neutrophils), dendritic cells, mast cells, basophils, and innate lymphoid cells.

1. **Adaptive immunity:** Adaptive immunity responds slowly (over days) using antigen-specific receptors that go through multiple gene rearrangements during development and forms immunologic memory. The system learns from the initial insult readying the body to fight against future exposure to similar harmful material.

**Importance of adaptive immunity**

* **Self-recognition:** The adaptive immune system helps and has the capability of genetically encoding our cells for recognition by the immune system as either self or non self.
* **Specificity:** The adaptive immune system has the ability to recognize non self-antigens and respond in a specific manner to them, rather than responding in a random manner
* **Memory:** Adaptive immune system cells are imprinted with memory from previous contact with antigen (infectious agent). The initial contact with a molecule elicits an immune response (antigen) and leaves an imprint of information.

However, both innate and adaptive immune systems work in close cooperation and, to an important extent, the adaptive immune system relies upon the innate immune system to alert it to potential targets and shape its response to them.

**QUESTION 3**

Explain the different types of antibodies and their roles.

**ANSWER**

Human antibodies are classified into five isotypes namely; IgG, IgM, IgA, IgD, and IgE. This classification is according to their H chains which provides each isotopewith distinct characteristics and roles.

**Characteristics and Roles**

* **IgG:** This is the most abundant antibody isotypes in the blood(plasma). It accounts for 70—75% of human immunoglobins (antibodies).. its role is too detoxify harmful substances.. it helps in the recognition of antigen-antibody complexes by leukocytes and macrophages. IgG antibody is usually transferred to the fetus through the placenta and protects the infant till its own immune system id functional.
* **IgM:** This antibody usually circulates in the blood and it accounts for 10% human immunoglobins. IgM has a pentanemic structure. They eliminate pathogens in the early stages of B cell-mediated (humoral) immunity before there is sufficient IgG.
* **IgA:** This antibody is found in mucosal areas, such ass the gut, respiratory tract and urogenital tract, and prevents colonization by pathogens. Also found in saliva, tears and breast milk.
* **IgD:** This antibody accounts for less than 1% of human immunoglobin. It may be involved in the induction of antibody production in B cells, but its exact function remains unknown.
* **IgE:** This is present in minute amounts and accounts for no more than 0.001% of human immunoglobins. In regions where parasitic infection is rare, IgE is primarily involved in allergy.