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1. **Explain the role of the immune system:**

The immune system is made up of special organs, cells and chemicals that fight against infection. The main role of the immune system is to protect the body from any foreign matters that might cause any damage or homeostasis imbalance. When an organism is threatened by micro organisms, viruses, or cancer cells, the immune system acts to provide protection.

1. **Describe the two types of immunity:**

The two types of immunity include: 1) innate immunity (non specific)

2) Adaptive immunity ( specific)

1. Innate immunity: this is the first and non specific 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 the first line of defense.

2. Adaptive immunity: this part is 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.

1. **Explain the different types of anti bodies (immunoglobulins) and their roles:**

They are 5 types of anti bodies: IgM, IgA, IgE, IgD, IgG

ImmunoglobulinG: this isoform accounts for 70-75% of all human immunoglobulins found in the blood. IgG triggers phagocytosis to initiate opsonization reaction. This is a process used to destroy foreign particles through phagocytosis. Apart from these functions, IgG is the only antibody that can cross the placenta and provides passive immunity to the fetus and infants in the first few months of life.

ImmunoglobulinM: this is the largest antibody and the first one to bbe synthesized in response to an antigen or microbe, accounting for 5% of all immunoglobulins present in the blood. IgM typically exists as polymers of identical subunits, with a pentameric form as the prevalent one. It is mostly intravascular and has low affinity for antigens. It has higher avidity for antigens than IgG and acts as an excellent activator of the complement system and agglutination.

ImmunoglobulinA: it accounts for 10-15% of all immunoglobulins and its prevalent in serum, nasal mucus, saliva, breast milk, and intestinal fluid. IgA prob=vides the primary defense against inhaled and ingested pathogens.

ImmunoglobulinE: this is the least prevalent one, with a serum concentration 10,000 times lower than IgG. However, the concentration of IgE increases significantly in allergic reactions. In response to pathogens, IgE binds to mast cells via specific receptors, followed by pathogen-mediated cross linking of these receptors (degranulaton). This causes recruitment of eosinophil at the site of infection and destruction of pathogens via ADCC-type mechanisms.

ImmunoglobulinD: This function as a B cell anitigen receptor and may participate in B cell maturation, maintenance, activation, and silencing. Although the exact function is still unclear, IgD may be involved in humoral immune response by regulating B cell selection and homeostasis.