17/MHS01/246

1) Explain the role of the immune system

The role of the immune system is to protect our body from any foreign matters that might cause any damage or homeostasis imbalance. The success of the immune system depends on its ability to discriminate between foreign and host cells. When an organism is threatened by microorganisms, viruses or cancer cells, the immune system acts to provide protection. Normally the immune system does not mount a response against self. The lack of an immune response is called tolerance.

When a foreign matter enters the human body, our defense system recognizes this as foreign through the immune system. How the human body recognize foreign against itself employs a complex "I.D." system. Each cell in the human body carries on its surface a mixture of proteins and sugars that serve to identify the cell to the immune system. Foreign objects lack the identifiers that all of the body cells have, but each one has unique features or antigens where the immune system attaches identifiers called antibodies. This is the basis for the specific defensemechanisms, once you have built the antibodies for a specific antigen, the immune system will respond faster than if he had been no previous exposure to the antigen(i.e you are immune to the pathogen, but only that specific pathogen, because your immune system responds faster). The non-specific part of the immune system is mostly composed of phagocytes(eating-cells) which engulf and digest foreign substances like bacteria and viruses, which do not bear the bodys specific identifiers.

2) Describe the two types of immunity

The two main types of immunity are:

- Innate immunity , also called native immunity, exists byvirtue of an organisms constitution, that is its genetic make-up without an external stimulation or a previous infection. It is divided into two types:
 - a) Non-specific innate immunity, a degree of resistance to all infections in general.
 - b) Specific inate immunity, a resistance to a particular kind of microorganism only.
- ii) Adaptive immunity can be sub-divided depending on how the immunity was introduced in "naturally acquired" through chance contact with a disease-causing agent, whereas "artificially acquired immunity" develops through deliberate actions such as vaccination. Both naturally and artificially acquired immunity can be further divide depending on whether the host built up immunity itself by

antigen as 'active community' and lasts long-term, sometimes lifelong. 'passive community' is acquired through transfer(injection or transfusion) of antibodies or avtivated T-cells from an immune host; it is short-lived, usually lasting only a few months. Adaptive immunity can also be divided by the type of mrdiators involved; humoral immunity and cell mediated immunity.



3) Explain the different types of antibodies and their roles

Human antibodies are classified into five isotypes according to their H chains, which are:

types	definition	Roles
lgG	It is the most abundant antibody isotype in the	IgG detoxifies harmful substances and is important in the
	blood(plasma), accounting for 70-75% of	recognition of antigen-antibody complexes by leukocytes
	human immunoglobulins(antibodies).	and macrophages, it is transferred to the fetus through
		the placenta and protects the infant until its own immune
		system is functional.
IgM	It circulates in the blood, accounting for about	IgM has a pentametric structure in which five basic Y-
	10% of human immunoglobulins.	shaped molecules are linked togrther. B cells produce
		IgM first in response to microbial infection/antigen
		invasion. Although it has a lower affinity for antigens than
		IgG, it has higher avidity for antigens because of its
		pentameric/hexameric structure.
		IgM by binding to the cell surface receptor, also activates
		cell signaling pathways.
IgA	It is abundant in serum, nasal mucus, saliva,	IgA forms dimmers(i.e two IgA monomers joined
	breast milk, and intestinal fluid, accounting for	together). IgA in breast milk protects the gastrointestinal
	10-15% of human immunoglobulins	tract of neonates from pathogens.
IgE	It is present in minute amounts, accounting for	Its original role is to protect against parasites. In regions
	no more than 0.001% of human	where parasitic infection is rare, IgE is primarily involved
	immunoglobulins.	in allergy
IgD	It accounts for less than 1% of human	It may be involved in the induction of antibody
	immunoglobulins	production in B cells, but its exact function remains
		unknown.