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NURSING
NSC 306 ASSIGNMENT

1. ROLES OF THE IMMUNE SYSTEM

Immune system is a complex network of specialized cells, cell products, tissues and molecules and their interactions incurred during the phylogenetic development of organisms.

The main function of the immune system is to Recognize pathogen,Respond to it and Remove it.

Other functions are:

I. Reaction to foreign dangerous agents
II. Immunological surveillance
III. Defence against pathogens, viruses, bacteria, fungi, protozoa, parasites.
IV. Detects and removes abnormal cells
V. Anti-allergen reaction
VI. Distinguish self from foreign
VII. Homeostasis preservation
VIII. Maintaining the integrity of microorganism.

2. TYPES OF IMMUNITY

A. <u>INNATE IMMUNITY</u>

It is also called natural or native immunity, consist of mechanisms that exist before infection and are capable of rapid responses to microbes.

It comprises 4 types of defense barriers

A. Anatomical barriers e.g skin, mucous membrane
B. Physiologic barriers e.g stomach acid, bile, cerumen, lysozyme, nasal hair
C. Cellular barriers e.g leucocytes, macrophages,NK cells, complement system, monocytes
D. Blood proteins and
E. Cytokines

B. <u>ACQUIRED IMMUNITY</u>

Acquired or adaptive immunity is the immunity that is developed by the host in its body after exposure to suitable antigen or after transfer of antibodies or lymphocytes from an immune donor

Characteristics of acquired immunity

- Antigen specifity
- Diversity

- Immunologic memory
- Self/non-self recognition

Acquired immunity is of 2 types

I. Active immunity: It is induced by natural exposure to a pathogen or by vaccination.It is categorized into;Naturally acquired and artificially active immunity.
II. Passive immunity: It is achieved by transfer of immune products, such as antibody or sensitized T-cells, from an immune individual to non immune one.It is of 2 types; Naturally acquired and artificially acquired passive immunity.

3. TYPES OF ANTIBODIES AND THEIR ROLES

Human antibodies are classified into five isotypes (IgM, IgD, IgG, IgA, and IgE) according to their H chains, which provide each isotype with distinct characteristics and roles.

1. IgG:

IgG is the most abundant antibody isotype in the blood (plasma), accounting for 70-75% of human immunoglobulins (antibodies). IgG detoxifies harmful substances and is important in the recognition of antigen-antibody complexes by leukocytes and macrophages. IgG is transferred to the fetus through the placenta and protects the infant until its own immune system is functional.

2. IgM

IgM usually circulates in the blood, accounting for about 10% of human immunoglobulins. IgM has a pentameric structure in which five basic Y-shaped molecules are linked together. B cells produce IgM first in response to microbial infection/antigen invasion.
Although IgM 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.

3. IgA

IgA is abundant in serum, nasal mucus, saliva, breast milk, and intestinal fluid, accounting for 10-15% of human immunoglobulins. IgA forms dimers (i.e., two IgA monomers joined together). IgA in breast milk protects the gastrointestinal tract of neonates from pathogens.

4. IgE

IgE is present in minute amounts, accounting for no more than 0.001% of human immunoglobulins. Its original role is to protect against parasites. In regions where parasitic infection is rare, IgE is primarily involved in allergy.

5. IgD

IgD accounts for less than 1% of human immunoglobulins. IgD may be involved in the induction of antibody production in B cells, but its exact function remains unknown.