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COURSE:MEDICAL SURGICAL NURSING

ASSIGNMENT:IMMUNOLOGY

WHAT IS IMMUNOLOGY?

Immunology is the study of the immune system.The immune system protects us from infection through various lines of defence. If the immune system is not functioning as it should, it can result in disease, such as autoimmunity, allergy and cancer. It is also now becoming clear that immune responses contribute to the development of many common disorders not traditionally viewed as immunologic.

ROLE OF IMMUNE SYESTEM

The role of the immune system is to protect our body from any foreign matters that might cause any damage or homeostatis imbalance. The success of the immune system depends on its ability to discriminate between foreign(non self) and host(self) 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. This lack of an immune response is called tolerance.The immune system is the body's defense against infectious organisms and other invaders. Through a series of steps called the immune response, the immune system attacks organisms and substances that invade body systems and cause disease. The immune system is made up of a network of cells, tissues, and organs that work together to protect the body.

TYPES OF IMMUNITY

Immunity is the ability of human body to fight against the disease causing organisms. The human immune system has two types of immunity:

1. Innate immunity
2. Acquired immunity
3. INNATE IMMUNITY:The innate immune system is the type of immunity that is present naturally in the child at the time of birth. These natural protectors are already present in human body.The first and the foremost important barrier which prevents entry of the harmful micro-organisms in human body is skin. Skin acts as a barrier to the entry of harmful micro-organism in many vital organs of the body.White blood cells present in human blood also protect the body from many infections. Macrophages in tissues help in the destruction of harmful microbes entering into the body.
4. ACQUIRED IMMUNITY:Acquired immunity, also called the adaptive immune system, involves two processes. The primary response is produced when our body encounters a pathogen for the first time. This is a mild response produced by our body. The secondary response is produced when our body encounters the same pathogen for the second time. This secondary response is highly intensified.These responses are produced in our body by two types of lymphocytes in our blood. These two special lymphocytes are B-lymphocytes and T-lymphocytes. Whenever a foreign substance enters our body, B-lymphocytes produce proteins to fight them. These proteins are called immunoglobulin or antibodies. T-cells do not produce such proteins, but they help B-lymphocytes to produce them. There are many different kind of antibodies produced in our body. Some of the important antibodies present in human body are IgA, IgM, IgE and IgG.

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.

**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.

**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.

**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.

**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.

**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.