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**MATRIC NO: 17/MHS02/044**

**DEPARTMENT: NURSING SCIENCE**

**COURSE CODE: NSC 306**

**COURSE TITLE: MEDICAL SURGICAL NURSING**

**TOPIC: BASIC IMMUNOLOGY**

 **ASSIGNMENT**

**1. EXPLAIN THE ROLE OF THE IMMUNE SYSTEM:** the major function of the immune system is to protect the body from environmental agents such as microbes or chemicals, thereby preserving the integrity of the body. It also protects the body from foreign matters that might cause any damage or homeostasis imbalances. The success of the immune system depends on its ability to discriminate between foreign matters (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.

 When a foreign matter enters the human body, our defense system recognizes this as foreign through the immune system. How the human body recognizes 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 serves to identify the cell to the immune system. Foreign objects lack the identifiers of the body’s 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 defense’s mechanisms. Once you have built the antibodies for a specific antigen, the immune system will respond faster than if they 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 mostly composed of phagocytes (eating cells) which engulf and digest foreign substances like bacteria and viruses, which do not bear the body’s specific identifiers. A collection of structures and processes within the body is to protect against diseases or other potentially damaging foreign bodies. When functioning properly, the immune system identifies a variety of threats, including viruses, bacteria and parasites, and distinguishes them from the body’s own healthy tissue.

**2. DESCRIBE THE TWO TYPES OF IMMUNITY:** the two types of immunity that is are; natural immunity (innate) and acquired immunity (adaptive).

* For natural (innate) immunity: it is present at birth. Which is nonspecific, provides a broad spectrum of defense against the and resistance to infections.it is considered to be the first line of host defense following antigen exposure, because it protects the host without “remembering” prior contact with an infectious agent. Responses to a foreign invader are very similar from one encounter to the next regardless of the number of times the invader is encountered. Natural (innate) immunity coordinates the initial response to the pathogens through the production of cytokines and other effector molecules, which either activate cells for control or promote the development of the acquired immune response. The cells involved in this response are monocytes, macrophages, dendritic cells, natural killer (NK) cells, basophil, eosinophil and granulocytes. The early events in ths process are critical in determining the

Nature of the adaptive immune response. Natural immune mechanism can be divided into two stages: immediate (generally occurring within 4hours) and delayed (occurring between 4 and 96 hours after exposure).

* For acquired (adaptive) immunity: the immunity that an individual acquires after the birth is called acquired or adaptive or specific immunity. It is specific and medicated by antibodies or lymphocytes or both which make the antigen harmless. It not only relieves the victim of the infectious diseases but also prevents its further attack in future. The memory cells formed by B cells and T cells are the basis of acquired immunity. Thus acquired immunity consists of specialized B and T lymphocytes and antibodies. It usually develops as a result of prior exposure to an antigen through immunization (vaccine) or by contracting a disease, both of which generate a protective immune response. Weeks or months after exposure to the disease or vaccine, the body produces an immune response that is sufficient to defend against the diseases on re-exposure. In contrast to the rapid but nonspecific natural immune response, tis form of immunity relies on the recognition of specific foreign antigens. The acquired immune response is broadly divided into two mechanism; the cell mediated response, involving T cell activation, and; effector mechanism s, involving B cell maturation and production of antibodies.

 The two types of acquired immunity are known as active and passive and are strongly interrelated. Active acquired immunity refers to immunologic defenses developed by the persons own body. This immunity typically lasts many years or even a life time. Passive acquired immunity is temporary immunity transmitted from a source outside the body that has developed immunity through previous disease or immunization. Examples are immune globulin or immunity resulting from the transfer of antibodies from the mother to an infant in utero or through breast feeding. Active and passive acquired immunity involve humoral and cellular ( cell mediated) immunologic responses.

**3. EXPLAIN THE DIFFERENT TYPES OF ANTIBODIES AND THEIR ROLES:** **antibody** also called **immunoglobulin,** a protective protein produced by the immune system in response to the presence of a foreign substance, called an antigen. Antibodies recognize and latch onto antigens in order to remove them from the body. A wide range of substances are regarded by the body as antigens including disease-causing organisms and toxic materials such as insect venom. They are;

**1.** **IgG**:

* Structure: monomer
* Percentage serum antibodies: 80%
* Location: blood, lymph, intestine
* Half-life in serum: 23 days
* Complement fixation: yes
* Placental transfer: yes
* Known functions: enhances phagocytosis, neutralizes toxins and viruses, protects fetus and new born.

**2. IgM:**

* Structure: pentamer
* Percentage serum antibodies: 5-10%
* Location: blood, lymph, cell surface( monomer)
* Half-life in serum antibodies: 5days
* Complement fixation: yes
* Placental transfer: no
* Known functions: first antibodies produced during an infection. Effective against microbes and agglutinating antigens.

**3. IgA:**

* Structure: dimer
* Percentage: serum antibodies : 10-15%
* Location: secretions ( tear, saliva, intestine, milk), blood and lymph.
* Half-life in serum : 6 days
* Complement fixation: no
* Placental transfer: no
* Known functions: localized protection of mucosal surfaces. Provides immunity to infant digestive tract.

**4 .IgD:**

* Structure: monomer
* Percentage: serum antibodies :0.2%
* Location : B- cell surface, blood, and lymph
* Half-life in serum:3 days
* Complement fixation: no
* Placental transfer: no
* Known function: in serum function is unknown. On B cell surface, initiative immune respons.

**5. IgE:**

* Structure: monomer
* Percentage serum antibodies : 0.002%
* Location: bound to mast cells and basophils throughout body. Blood
* Half-life in serum : 2 days
* Complement fixation : no
* Placental transfer: no
* Known functions: allergic reactions. Possibly lysis of worms.