**ASSIGNMENT**

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**COURSE TITLE**: **MEDICAL SURGICAL NURSING II**

**QUESTION**

* EXPLAIN THE ROLE OF THE IMMUNE SYSTEM
* DESCRIBE THE TWO TYPES OF IMMUNITY
* EXPLAIN THE DIFFERENT TYPES OF ANTIBODIES AND THEIR ROLES.

**ROLE OF THE IMMUNE SYSTEM**

The major function of the immune system is to protect the host from environmental agents such as microbes or chemical, thereby preserving integrity of the body. This is done by the recognition of self and response to non-self. The immune response has been artificially divided into innate immunity (resistance) and specific immunity.

The role of the immune system is to protect our body from any foreign matter that might cause any damage or homeostasis imbalance. The success of the immune system depends in is ability to discriminate between foreign (non-self) and host (self) cells. When an organism is threatened by microorganism, virus, or cancer cells, the immune system acts to provide protection. Normally the immune system does not mount a response against self. This lacks 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 it’s surface a mixture of protein an sugar that serves to identify the cells to the immune system. Foreign objects lacks the identifiers that all of the body’s cells have, but each one has unique features or antigen where the immune system attaches identifiers called antibodies. This is the basis for the specific defense mechanisms. Once you have built the antibodies for a specific antigen, the immune system will respond faster than if the 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 virus, which do not bear the body’s specific identifiers.

**Type Of Immunity**

Immunity means being protected from something and being unaffected or not bothered by it. There are two main types of immunity; **innate** (natural or inherited) and **adaptive**

**INNATE IMMUNITY**

Plants and animals have what is called the innate immunity. Innate immunity is the first line of defense against pathogens. It involves several cell types, protein, and even an organ. The organ involved is yours skin. Yes, skin is part of the first line of defense. It protects you and prevents pathogen from getting inside your body.

So, what are some ways a pathogen gets inside? Air, food, or a break in the skin are some ways a pathogen enters. A pathogen entering through food or air has mucus to go through. The mucosal surfaces prevent pathogen from attaching to cells and causing disease. A set of protein called the complement system attacks the pathogen and marks it for destruction.

A pathogen getting through skin and mucus will have a deal with several types of cells including **phagocytes**, eating cells, and natural killer (NK) cells before it can cause disease. Pathogens have warning flags on their surface that say: ‘I don’t belong here’.

Neutrophils, macrophages, and dendritic cells are all phagocytes. They recognize the warning flag, attack the pathogen, and eat it - a process known as **phagocytosis**. If a pathogen is too big for one cell alone, several cells attack at once.

NK cells on the other hand, identity infected cells (host cells) activate the host cell’s death receptor pathway or give the cells a lethal injection (injecting enzymes that degrade proteins). Host cell even try to fight back by turning off machinery that would help the pathogen sending out distress signals.

If pathogen make it through all this, it’s time for adaptive immunity to step in, and they do this with the help of dendritic cells.

**ADAPTIVE IMMUNITY**

Adaptive immunity also known as acquired immunity is a learned immune response to a specific foreign invader, it works slower than innate, and is more specific. It is also protection that the body builds when it meets and remembers antigens, which is another name for germs and other foreign substance in the body. When your body recognize the antigens it produces antibodies to fight the antigen. It takes about 14 days for the body to make an antibody. More importantly the body memorizes this fight so that if it meets the same antigen again , it can recognize and attack quickly.There are two types of adaptive immunity; active and passive .

* + ACTIVE IMMUNITY: antibodies that develop in a person’s own immune system after the body is exposed to an antigen through a disease or when you get an immunization (i.e flu shot). This type of immunity lasts for a long time.
  + PASSIVE IMMUNITY: antibodies given to a person to prevent disease or treat disease after body is exposed to an antigen. Passive immunity is given from mother to child through the placenta before birth, and through breast milk after birth. It can also be given medically through blood product that contain antibodies, such as immune globulin. This type of immunity is fast acting but lasts only a few weeks or month.

**ANTIBODIES AND THEIR ROLES**

There 5 types of antibodies in the body.

* 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 it 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 it own immune system is functional.

* IgM

IgM usually circulates in the blood, accounting for about 10% of human immunoglobulin. 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 antigen than IgG it has higher avidity for antigen because of its pentameric/hexameric structure. IgM, by binding to the cell surface receptor, also activates cell signalling pathways.

* IgA

IgA is abundant in serum, nasal mucus, saliva, breast milk, and intestinal fluid, accounting for 10-15% of human immunoglobulin. 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 immunoglobulin. IgD may be involved in the induction of antibody production in B cells, but its exact function remains unknown.