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 **THE ROLE OF THE IMMUNE SYSTEM**

The immune system functions as the body’s defence mechanism against invasion and allows a rapid response to foreign substances in a specific manner. The immune system function is affected by a variety of factors such as, central nervous system integrity including; general physical and emotional status, medications, dietary patterns, and the stress of illness, trauma or surgery.

The basic function of the immune system is the removal of antigens such as viruses and bacteria in order to maintain homeostasis. The success of the immune system depends on its ability to discriminate between foreign (non self) and host (self) cells. When the body is threatened by microorganisms, viruses, or cancer cells, the immune system acts to provide protection. When a foreign matter enters the body, our defence system recognizes this as foreign through the immune 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 called antibodies and this is the basis for specific defence mechanisms. 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 body’s specific identifiers.

 **TYPES OF IMMUNITY**

 There are two types of immunity;

1. Natural immunity or nonspecific immunity
2. Acquired or specific immunity

 **NATURAL IMMUNITY**

This type of immunity is present at birth and it is a nonspecific kind of immunity. Natural immunity provides a broad spectrum of defence against and resistance to infection. It is considered as the first line of host defence following antigen exposure because it protects the host without remembering prior contact with an infectious agent.

Natural immunity coordinates the initial response to pathogens through the response to pathogens through the production of cytokines and other effector molecules which either activate cells for control of the pathogen (by elimination) or promote the development of the acquired immune response. The cells involved in the response are monocytes, macrophages, dendritic cells, natural killer cells (NK cells), basophils, eosinophils, and granulocytes.

Natural immune mechanisms can be divided into two stages;

1. Immediate; which generally occurs during minutes of exposure.
2. Delayed; which occurs within several days after exposure.

 **ACQUIRED IMMUNITY**

This type of immunity develops after birth and is also known as adaptive immunity which usually develops as a result of prior exposure to an antigen through immunization or by contracting a disease, both of which generate a protective immune response. And this occurs after weeks or months after exposure to the disease or vaccine.

The body produces an immune response that is sufficient to defend against the disease on re-exposure. This form of immunity relies on the recognition of specific foreign antigens. The acquired immune response is divided into two;

1. The cell mediated response involving the T-cell activation.
2. The effector mediated response involving the B-cell maturation and production of antibodies.

There are two types of acquired immunity known as active or passive

**ACTIVE ACQUIRED IMMUNITY**

Active acquired immunity refers to immunologic defences developed by a person’s own body and this immunity typically lasts for many years or even a lifetime. An example is when antigens enter the body through vaccination hence giving a long-term effect.

**PASSIVE ACQUIRED IMMUNITY**

Passive acquired immunity is a temporary immunity that is transmitted from a source outside the body that has developed immunity through previous disease or immunization. An example is immunity resulting from the transfer of antibodies from the mother to an infant in the uterus or through breast feeding or receiving injections of immune globulin.

 **TYPES OF ANTIBODIES**

Antibodies are large proteins called immunoglobulins, that defend against foreign invaders in several ways. The type of defence used depends on the structure and composition of both the antigen and the immunoglobulin. The body can produce five different types of immunoglobulins which include;

1. Immunoglobulin G (**igG**); It consists of 75% of the total immunoglobulin and it appears in the serum and tissues (interstitial fluid). It assumes a major role in blood borne and tissue infections, it also activates the complement system, enhances phagocytosis and crosses the placenta. This immunoglobulin marks microbes so that other cells can recognize and deal with them.
2. Immunoglobulin A (**igA**); It consists of 15% of the total immunoglobulin and it appears in body fluids such as (blood, saliva, tears, and breast milk as well as pulmonary, gastrointestinal, prostatic and vaginal secretions). It assumes a major role in protection against respiratory, gastrointestinal, and genitourinary infections. It also prevents absorption of antigens from food and passes to neonates in breast milk for protection.
3. Immunoglobulin M (**igM**); It consists of 10% of the total immunoglobulin and it appears mostly in intravascular serum. It appears as the first immunoglobulin produced in response to bacterial and viral infections. It activates the complement system and has a role in killing bacteria.
4. Immunoglobulin D (**igD**); It consists of 0.2% of the total immunoglobulin and appears in small amounts in serum. It possibly influences the B-lymphocyte differentiation helping them to start the immune response but its role is unclear.
5. Immunoglobulin E (**igE**); It consists of 0.004% of the total immunoglobulin and it appears in serum, it takes part in allergic and some hypersensitivity reactions and combats parasitic infections.