Name: Akpiroroh Efe

Matric No: 17/mhs02/022

Course code: NSC 306

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.

Role of the immune system

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.

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 proteins and sugars that serve to identify the cell to the immune system. Foreign objects lack the identifiers that all of the body's cells have, but each one has antigens where the immune system attaches identifiers called antibodies. 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 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 specifc idenifers.

Types of Immunity

1. Innate immunity

Innate immunity is inherited by the organism from the parents and protects it from birth throughout life. We are all born with some level of immunity to invaders. Human immune systems, similarly to those of many animals, will attack foreign invaders from day one. This innate immunity includes the external barriers of our body — the first line of defense against pathogens — such as the skin and mucous membranes of the throat and gut.

(a)Skin:

The skin is physical barrier of body. Its outer tough layer, the stratum corneum prevents the entry of bacteria and viruses.

(b) Mucous Membranes:

Mucus secreted by mucous membrane traps the microor- ganisms and immobilises them. Microorganisms and dust particles can enter the respiratory tract with air during breathing which are trapped in the mucus. The cilia sweep the mucus loaded with microorganisms and dust particles into the pharynx (throat). From the pharynx it is thrown out or swallowed for elimination with the faeces.

2. Acquired Immunity

It is pathogen specific and is not present from the birth and develops during an individual's lifetime. It is specific and mediated by antibodies or lymphocytes or both which make the antigen harmless. It not only relieves the victim of the infectious disease but also prevents its further attack in future. The memory cells formed by B cells and T cells are the basis of acquired immunity.

Types of Acquired Immunity:

Acquired Immunity is of two types: active immunity and passive immunity.

1. **Active Immunity:**

In this immunity person's own cells produce antibodies in response to infection or vaccination. It is slow and takes time in

the formation of antibodies. It is long lasting and is harmless. Active immunity may be natural or artificial.

(a) A person who has recovered from an attack of small pox or measles or mumps develops natural active immunity.

(b) Artificial active immunity is the resistance induced by vaccines. Examples of vaccines are as follows: Bacterial vaccines, Viral vaccines

2. **Passive Immunity:**

It occurs when antibodies are directly injected into a person to protect the body against foreign agents. It is used when the immune response has to be faster .It is fast but lasts only for few days.

Passive immunity may be natural or artificial.

(a) Natural passive immunity is the resistance passively transferred from the mother to the foetus through placenta. IgG antibodies can cross placental barrier to reach the foetus.

After birth, immunoglobulin's are passed to the new-born through the breast milk. Human colostrum (mother's first milk) is rich in IgA antibodies. Mother's milk contains antibodies which protect the infant properly by the age of three months.

(b) Artificial passive immunity is the resistance passively transferred to a recipient by administration of antibodies. This is done by administration of hyper-immune sera of man or animals.

Different types of antibodies and their roles

Antibodies are specialized proteins made by the immune system. They help the body fight against infections and disease by "recognizing" viruses, bacteria, and infected cells.

1. **IgG -** It is the antibody that is built by immunization. It provides long term protection because it persists for months and years after the presence of the antigen that has triggered their production. IgG protect against bacteria, viruses, neutralize

bacterial toxins, trigger compliment protein systems and bind antigens to enhance the effectiveness of phagocytosis.

2. IgA - It is the antibody isotype that is found in usually mucosal areas, such as the mouth and the vagina. It can also be found in saliva, tears, and breast milk. The main function of IgA is to bind antigens on microbes before they invade tissues. It aggregates the antigens and keeps them in the secretions so when the secretion is expelled, so is the antigen.

3. IgM - It is one of the first types of antibody to be produced after a pathogen has entered the body. IgM is involved in the ABO blood group antigens on the surface of RBCs. It enhances ingestions of cells by phagocytosis.

4. IgE - It is the antibody that is responsible for the allergic response. It is mostly found in the lungs, skin, and mucous membranes. When IgE binds to an allergen, it starts the histamine reaction. It's the histamine reaction that causes the symptoms of an allergy attack. This single subunit antibody also helps to protect the body from parasitic worms.