**BASIC IMMUNOLOGY**

**1. ROLES OF THE IMMUNE SYSTEM**

**1. It defends the body against microbes.**

**2. It defends the body against the growth of tumor cells,kills the growth of tumor cells**

**3.Homeostasis imbalance:**

**- destruction of abnormal or dead cells   
(e.g. dead red or white blood cells, antigen-antibody complex).**

**2. Two types of immunity:**

1. **Innate (non-adaptive)**

**-It is the first line of immune response which relies on mechanisms that exist before infection, it is based on genetic make-up.**

**-It Relies on already formed components.**

**Innate immunity has a rapid response (within minutes of infection)**

**-It is Not specific.**

**- It has same molecules / cells respond to a range of pathogens.**

**-It has no memory.**

**- it has same response after repeated exposure.**

**-Activation of the adaptive immune system through the process known as antigen presentation.**

**MECHANISM OF INNATE IMMMUNITY**

**1. Mechanical barriers / surface secretion**

* + **skin, acidic pH in stomach, cilia**

**2. humoral mechanisms**

* + **lysozymes, basic proteins, complement proteins, interferons, TNF**

**3.Cellular defense mechanisms**

* + **natural killer cells neutrophils, macrophages, mast cells, basophils, eosinophils**

1. **Acquired (adaptive) Immunity:**

**-It is the Second line of response when innate fails. It relies on mechanisms that adapt after infection.**

**-Acquired immunity is based on T and B lymphocytes, one cell determines one antigenic determinant.**

**-Which is based upon resistance acquired during life.**

**-Relies on genetic events and cellular growth .**

**-It responds more slowly, over few days .**

**-It Is specific.**

**- each cell responds to a single epitope on an antigen.**

**-It Has anamnestic memory ,repeated exposure leads to faster, stronger response**

**MECHANISM OF ACQUIRED IMMUNITY**

**Cell-mediated immune response (CMIR)**

**-It is T-lymphocytes, eliminate intracellular microbes that survive within phagocytes or other infected cells.**

**-T-cell recognizes peptide antigen on macrophage in association with major.**

**- histo-compatibility complex (MHC) class**

**-It identifies molecules on cell surfaces .**

**-Helps body distinguish self from non-self.**

**-T-cell goes into effectors cells stage that is able to kill infected cells.**

**-Humoral immune response (HIR)**

**-B-lymphocytes**

**-mediated by antibodies**

**-eliminate extra-cellular microbes and their toxins**

* **B lymphocytes recognizes specific antigens**
* **proliferate and differentiate into antibody-secreting plasma cells**
* **Antibodies bind to specific antigens on microbes; destroy microbes via specific mechanisms**
* **Some B lymphocytes evolve into the resting state - memory cells**

**TYPES OF ADAPTIVE IMMUNITY**

1. **Natural acquired active immunity;** 
   * **As a result of infection.**
   * **this type of immunity may be long-lasting naturally.**
2. **Natural acquired passive immunity**
   * **Antibodies transferred from a mother to a fetus (trans placental transfer) or to a newborn in colostrum results in naturally in the newborn;**
   * **can last up to a few months.**
3. **Artificially acquired active immunity** 
   * **Immunity resulting from vaccination**
   * **can be long-lasting.**
4. **Artificially acquired passive immunity** 
   * **refers to humoral antibodies acquired by injection;**
   * **can last for a few weeks.**

**3.TYPES OF IMMUNITY**

* **There are Five types of antibodies namely :**

**IgG, IgM, IgA, IgD, IgE.**

**IgG**

**It comprises 70-75% of total immunoglobulin, which is secreted in high quantities in secondary exposures. it crosses the placenta and also neutralize microbes and toxins .**

**Opsonizes (coating of a particle with proteins) antigens for phagocytosis, it activates the complement proteins, And lastly protects neonates.**

**IgM**

* **It is secreted initially during primary infection and cannot cross the placenta. IgM is secreted first during primary exposure and is Used as a marker of recent infection.**
* **If present in new-born signifies infection.**
* **Single positive sample in serum or CSF indicates recent or active infection**
* **Used to detect early phase of infection .**

**IgA**

* **Dimeric (a molecule composed of two identical, simpler molecules) with secretory component in the lumen of the gastro-intestinal tract and in the respiratory tract and neutralizes microbes and toxins.**

**-Siro-diagnosis of tuberculosis**

**Synthetical respiratory virus tests.**

**IgD**

* **Monomeric (a molecule composed of a single, smile molecule), it is present on the surface of B lymphocytes and functions as membrane receptor .**

**It Has a role in antigen stimulated lymphocyte differentiation.**

**IgE**

* **Monomeric and is associated with anaphylaxis,**
* **It plays a role in immunity to helminthic parasites**
* **Siro-diagnosis of infectious and non-infectious allergies  
  (e.g., allergic bronchopulmonary aspergillosis, parasitic diseases)**

**REFERENCE**

**SCRIENCE DIRECT TOPICS**

**WIKIPEDIA**

**WWW.MERRIAM-WEBSTER.COM**

**UZAMA-OKPALAEKE EMMANUELLA**

**18/MHS02/210**