

Introduction:

The study of the defense mechanisms of the body against foreign substances including microorganisms that enter into the body constitutes the subject immunology. Immunology began as a branch of microbiology .The study of infectious disease and the body's response to the infections led to the development of immunology. Immunity(*immunitas*-a Latin word ;freedom from disease)is due to the existence of a complex defense system in the human body ,called immune system .The term immunity is concerned with the state of being resistant (or immune)to foreign substances such as microbes.

General functions of immune system:

1-Defence against foreign invaders .

2-Autotolerance(unresponsiveness to the self tissues)

3-Surveillance:Recognition and clearance of internal antigens (old, damaged ,or mutagenic cells,...).

Types of immunity:

Immunity can be classified according to their specificity into:

a-Non-specific(innate) immunity b-Specific(acquired or adaptive) immunity

a- Non-specific (innate)immunity :

the elements of the non-specific (innate)immunity include:

(1)-Anatomical barriers (e.g. skin, intestinal movement, and oscillation of respiratory tract).(2)-Chemical factors: Include fatty acids in sweat ,lysozyme , phospholipids, pH,

defensins which are the antimicrobial polypeptides secreted by a wide variety of host cells .(3)-Physiologic barriers :e.g. fever response to infection inhibits growth of many microbes.(4)-Biological factors: Include the normal flora of the (skin ,genitourinary tract, and GIT) can prevent the colonization of pathogenic microbes by secreting toxic substances or by competing with pathogens for nutrient or attachment to host cells .

Properties of Non-specific (innate)immunity:

- present at birth and does not improve on repeated contact with the same infectious agent.
- inborn resistance
- non-specifically protects against foreign substances.
- Response is antigen- independent .
- response results in no immunologic memory.
- response is characterized by immediate maximal course and occurs at rapid rate.
- usually,not needs for time of recognition or helping from other components of immune system.

Examples of Non-specific (innate)immunity:

System/organ	immune effectors mechanisms
Skin	Mechanically prevents entry of microbes .Sweat contains fatty acids which denatures microbial cellular proteins
Saliva	Hydrolytic enzymes
Tears	Lysozymes
Lung	Cilia, lysozymes, surfactants(antimicrobial lipoproteins)
GIT	Peristalsis, gastric pH, bile acid, lysozymes, flushing, normal flora

Genitourinary tract	Low pH, normal bacterial flora
Blood	Phagocytosis, complement, acute phase proteins
Mucous membranes	Mechanically prevents entry of microbes, normal bacterial flora interfere with the attachment of pathogenic microbes to the mucous membranes and consequently entry of pathogenic microbes into body is prevented

b-Specific(acquired or adaptive) immunity :

The resistance ,which absent at the time of first exposure to a pathogen ,but develops after being exposed to the pathogen is called acquired immunity. It includes specific cells of the immune system that are able to recognize and respond to the foreign materials .The cells involved in this type of immunity are lymphocytes both T and B cells.

Properties of Specific(acquired or adaptive) immunity :

- Specific activity for each type of invaders.
- response is antigen-dependent.
- the effectiveness toward antigens increases following subsequent exposure to the same antigen. Thus second contact with the same antigen increases the immune response through antibodies or sensitized -memory cells.
- response results in immunologic memory :very important characteristic feature that the concept of vaccination depends on.
- recognition to the specific sites on the foreign substances(antigens)needs at first a certain time ,so innate immunity is faster than specific immunity ,but the later is more effective and the

program of the solid immunity against infectious diseases depends on the activation of specific immunity.

Classification of Specific(acquired or adaptive) immunity :

According to the nature of the components of immune -mediated reactions:

a- Humoral immunity(HI): mediated by specific glycoproteins called immunoglobulins ,and also named as antibodies.

b-cell mediated immunity(CMI):Mediated by specific cells which are T -lymphocytes .

Also, specific immunity can be classified according to the route of acquirement into:

