

## INTRODUCTION TO IMMUNOLOGY

**Immunology**: is defined as the study of the molecules, cells, organs, and systems responsible for the recognition and disposal of foreign material. Immunology began as a branch of microbiology. The study of infectious disease and the body's response to them has a major role for the development of immunology.

The term immunity is derived from the Latin word "*immunis*" (exempt), which was originally referred to the protection from legal prosecution offered to the Roman senators during their tenures in office. This term was adopted subsequently to designate the naturally acquired protection against diseases, such as measles or smallpox. It indicated that an individual can develop lifelong resistance to a certain disease after having contracted it only once. The cells and molecules responsible for immunity constitute the *immune system*, and their collective and coordinated response to foreign substances is called the *immune response*.

### IMMUNITY Definition:

**Immunity**: The ability of body to resist pathogens.

**Antigen**: A substance that causes the formation of antibodies. It is also called immunogen

**Antibody**: A protein produced in the body in response to an antigen.

**Hapten**: A substance of low molecular weight that is not antigenic itself except when combined with a protein in the body. e.g, Penicillin drug, detergent.

**Phagocytosis**: The process of engulfment and digesting of an antigen by a phagocytic cell.

**Opsonization**: The coating or tagging of an antigen by complement proteins to enhance phagocytosis.

**Resistance**: The ability to fight off a pathogen through specific and non specific defenses.

**Specific Immunity**: The body's defensive response is specific against a specific pathogen.

**Non specific Immunity**: Body's defense that provides protection against any kind of pathogen.

## Types of Immunity:

The main function of the immune system is to prevent or limit infections by pathogenic microorganisms, such as bacteria, viruses, parasites, and fungi. The recognition of microorganisms and foreign substances is the first event in immune responses of a host.

### The body's defense mechanisms can be divided into:

(a) innate (natural) immunity      (b) acquired (adaptive) immunity.

## Historical Background of immunology:

Edward Jenner who first studied the response of the body to foreign substances. He observed that dairy maids who had naturally contracted a mild infection called cowpox seemed to be protected against smallpox, a horribly disfiguring disease and a major killer.

In 1796, Jenner inoculated an eight year-old boy with fluid from cowpox blisters on the hand of a dairymaid. The boy contracted cowpox. Then two month later Jenner inoculated him with fluid from a small pox blister, the boy only developed a small sore at the site of inoculation. His exposure to the mild disease cowpox had made him immune to the small pox infection. These were some of the vital events occurred in the history of immunology following Jenner's achievement.

In 1879, the first human pathogen, gonococcus, was isolated by Neisser. In 1883, Klebs and Loeffler isolated diphtheria bacilli which led to the production of the first defined antigen, diphtheria toxin, by Roux and Yersin in 1888. In the same year the first antibodies, serum bactericidins, were reported by Nuttall and Pasteur.

In 1890, von Behring and Kitasato discovered antitoxins that led to the development of toxoids for diphtheria and tetanus.

In 1900, Land Steiner discovered the blood group antigens and their corresponding antibodies. This led to the ability to give blood transfusion with out provoking reactions. It was in 1916 that the first journal of immunology began publication in which many of new findings published on it.

In general, immunology has always depended on and stimulated the application of technology, such as the use of microscopy, electrophoresis, immunoelectrofluorescence, etc. Thus immunology has not become an inborn discipline but has maintained close associations with many other fields of medical sciences.

## Review Questions

1. Who was the first person studied the body's response to foreign substance?
2. Describe the development of the field immunology
3. What was the contribution of Land Steiner for the field of immunology?

