

# 01: Introduction to Immunology

## Key Immunology Terms

**Immune System:** It is a unique adaptive defensive system that has evolved in vertebrates to protect them from invading pathogenic microorganisms and cancer.

**Immunity:** All those physiological mechanisms that endow the animal with the capacity to recognize materials as foreign to itself and to neutralize eliminate or metabolize them with or without injury to its own tissues.

**Antigen:** Any substance (usually foreign) that bind specifically to an antibody or a T cell receptor.

**Antibody:** A protein (immunoglobulin) that recognizes a particular antigen and binds specifically to it.

**Innate immunity or native immunity:** It is the resistance to infections which an individual possesses by virtue of his genetic and constitutional make-up. It is not affected by prior contact with microorganisms or immunization.

**Adaptive immunity or acquired immunity:** It is the resistance that an individual acquires during life, as distinct from the inborn innate immunity. Adaptive immune responses exhibit four immunological attributes: Specificity, Diversity, Memory, Self and non-self recognition.

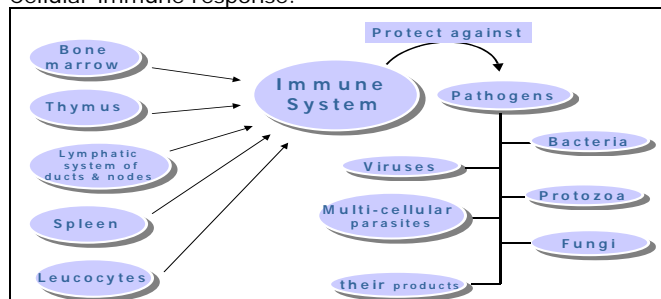
## Immune System

Vertebrates have a unique adaptive Immune System that has evolved to protect them from invading pathogenic encounters. We are able to fight against the infectious agents, because of the presence of effective, protective and complex array of Immune System.

Protection against infectious diseases is only one of the consequences of the immune response, which in its entirety is concerned with the reaction of the body against any foreign antigen.

The immune system is composed of many interdependent cell types, organs, and tissues that jointly protect the body from infections.

The immune system comprises of two parallel but interrelated systems: The Humoral immune response and Cellular immune response.



## Humoral and Cellular Immunity

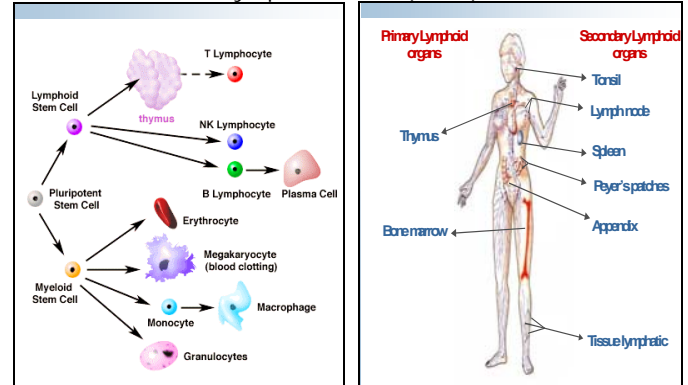
In the humoral immune response, antibodies function as recognition elements and binds specifically to antigens.

In the Cellular immune response cytotoxic T-lymphocytes kill cells that display foreign motifs on their surfaces. The cellular immune response is mediated by specific receptors that are expressed on the surface of the T cells.

## Cells and Organs of Immune System

Immune responses are mediated by variety of cells and by the soluble molecules, which they secrete. Leucocytes (WBCs) are central to all immune responses.

The organs and tissues involved in immune response can be divided as Primary lymphoid organs: Thymus and Bone marrow. Secondary lymphoid organs: Lymph nodes, spleen, & mucosal associated lymphoid tissue (MALT).



## Antigen and Antibody

An Antigen (usually foreign) is a substance that binds specifically to an antibody.

Antibody is a protein (immunoglobulin) that recognizes a particular antigen and binds specifically to it.

## Innate and Adaptive Immunity

Immune system comprises of two parallel but interrelated systems, known as Innate Immunity and Adaptive immunity.

Innate immunity is the resistance to infections which an individual possesses by virtue of his genetic and constitutional make-up and includes anatomic, physiologic, endocytic and phagocytic and inflammatory barriers that help prevent the entrance and establishment of infectious agents.

Adaptive immunity is the resistance that an individual acquires during life. Adaptive immune responses exhibit four immunological attributes: Specificity, Diversity, Memory, Self & Non-self recognition. Antigen presenting cells, B-lymphocytes and T- lymphocytes are the primary cells of the adaptive immune responses. It is of two types, active and passive.

## History of Immunology

The history of immunology can be traced back to 430 BC. Chinese and Turks developed the technique of Variolation.

Edward Jenner, 'father of vaccine', improved the technique of Variolation and his experiments on smallpox turned to be breakthrough finding in the field of immunology.

In 1885, Pasteur administered the first vaccine to a human, a young boy, Joseph Meister, bitten by rabid dog. He also developed the vaccines for anthrax and cholera.

Robert Koch, Elie Metchnikoff, Emil von Behring and Shibasaburo Kitasato are the major contributors in the development of immunology.

The history of Immunology can be traced back to 430 BC. This subject has fetched 16 Nobel Prizes.

How to Use This Cheat Sheet: These are the keys related this topic. Try to read through it carefully twice then recite it out on a blank sheet of paper. Review it again before the exams.