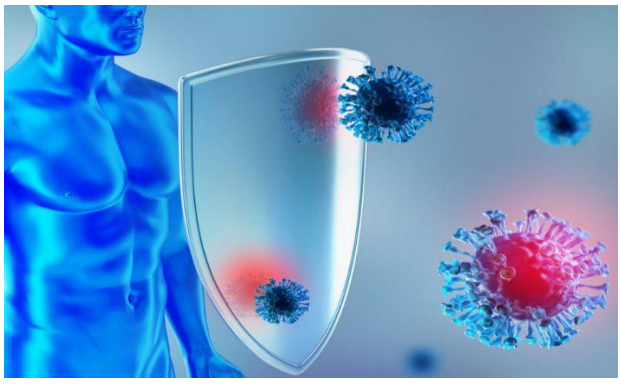
Physiology

2 stage

LEC 10

the Immune System



By

M.SC Jaafar Hamid Jaafar **Dr. Asseel Hashim Radhi**

the Immune System of the Human Body

- Definition of the Immune System: The immune system is a complex network of cells, tissues, and organs that work together to defend the body against pathogens, such as bacteria, viruses, and parasites.
- Importance of the Immune System: It plays a crucial role in protecting the body from infections and diseases, maintaining overall health.

Components of the Immune System:

1- Primary Organs:

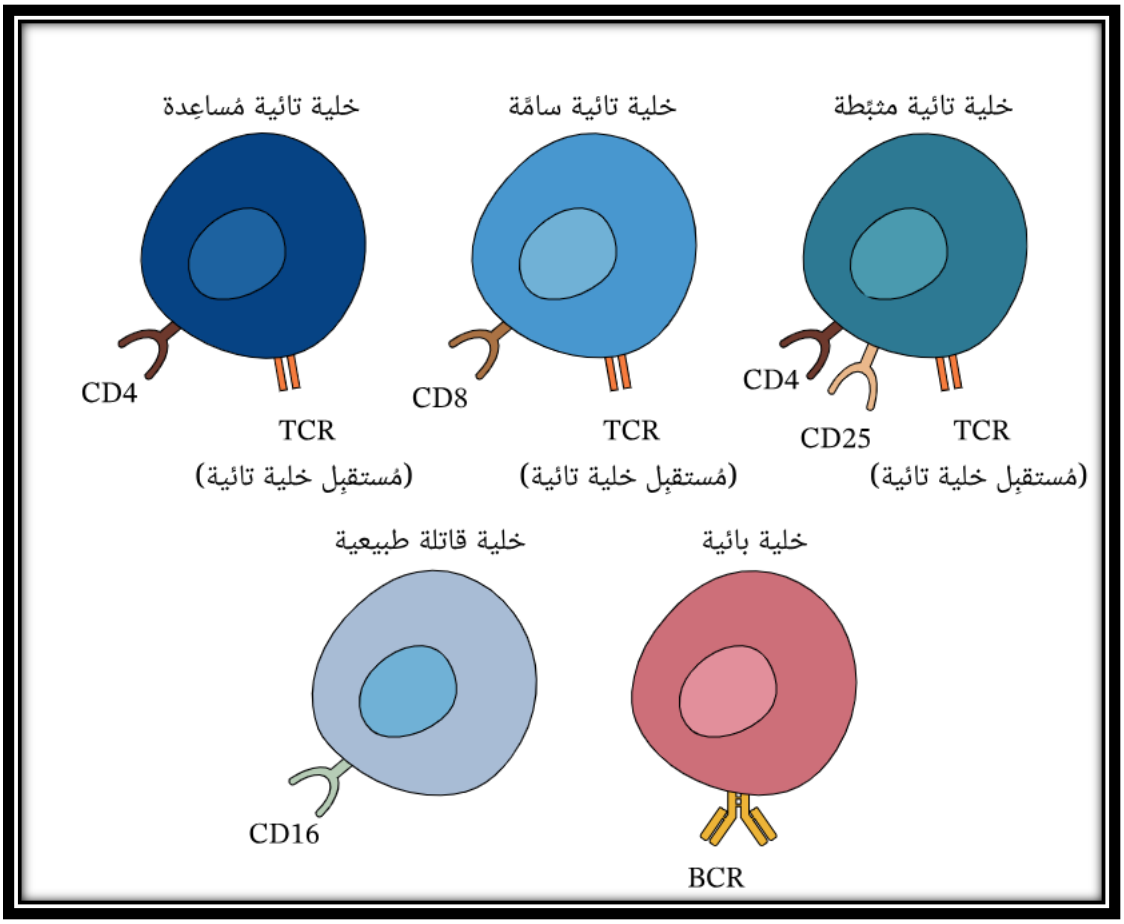
- Bone Marrow: The site where blood cells, including immune cells, are produced.
- Thymus: An organ where T cells mature and become functional.
- Spleen: Filters blood and helps activate immune responses.

2- Secondary Organs:

- Lymph Nodes: Small structures that filter lymph fluid and house immune cells.
- Mucosal Associated Lymphoid Tissue (MALT): Includes tonsils and gut-associated lymphoid tissue, which protect mucosal surfaces.

3- Immune Cells:

- B Cells: Produce antibodies that target specific pathogens.
- T Cells: Include helper T cells that activate other immune cells and cytotoxic T cells that kill infected cells.
- Macrophages and Dendritic Cells: Engulf and present antigens to T cells, initiating the immune response.



Types of Immunity

1- Innate Immunity:

- The body's first line of defense, consisting of physical barriers (skin, mucous membranes) and immune cells that respond quickly to infections.
- Non-specific response to pathogens.

2- Adaptive Immunity:

- A specific response that develops over time after exposure to pathogens.
- Involves the activation of B and T cells, leading to the formation of memory cells that provide long-lasting immunity.

Mechanism of Immune Response

1- Innate Immune Response:

- Pathogen recognition through pattern recognition receptors (PRRs).
- Inflammatory response that recruits immune cells to the site of infection.

2- Adaptive Immune Response:

- Antigen presentation by dendritic cells to T cells.
- B cells produce antibodies specific to the detected pathogens, while T cells directly attack infected cells.

Immune Disorders:

- Autoimmune Diseases: Conditions where the immune system mistakenly attacks healthy cells (e.g., lupus, rheumatoid arthritis).
- Allergies: Overreactions of the immune system to harmless substances (e.g., pollen, pet dander).
- Immunodeficiency: A weakened immune response, which can be genetic or acquired (e.g., HIV/AIDS).

Role of Vaccines:

1- How Vaccines Work: Stimulate the immune system to recognize and respond to specific pathogens without causing disease.

2- Importance of Vaccination: Helps prevent the spread of infectious diseases and protects community health through herd immunity.

- Maintaining Immune Health:

Importance of a balanced diet, regular exercise, adequate sleep, and stress management.
- Future Research: Ongoing studies aim to enhance our understanding of the immune system and develop new therapies for immune-related conditions.