

# **Introduction to Immunology.**

# What is Immunology

Immunology is the study of how the body prevents infection.

Immunologists can carry out research both on basic and clinical immunology.

Basic immunology studies cell function, while clinical immunology focuses on how immune system disorders might cause disease.

# What is Immunity?

A state in humans that allows both the acquired and innate (hardwired) immune systems to provide protection against illness

*(Katherine Gundling, MD UCSF Division of Allergy and Immunology)*

Essentially, it is the state of the human immune system that allows the body to effectively resist and overcome disease.

# Immune System?

\* The **immune system** consists of organs, cells, and molecules that protect the body from infections and diseases like cancer.

## Functions of the Immune System

White blood cells, also known as leukocytes, are one of the key cells involved. They come in two main varieties and work together to seek for and eliminate disease-causing organisms or substances.

# What does the Immune system do?

- Protects humans and animals from infections caused by:
  - viruses
  - bacteria
  - fungus
  - worms
  - protozoa
- Enhances physiological processes including wound healing and tissue cleansing.
- Eliminates malignant and other abnormal cells.

*\* Immune system dysfunction, however, can also result in illnesses like transplant rejection, autoimmune diseases, allergies, and many others.*

# The Principal Actors

- Sentinel cells in tissues
  - Dendritic cells, Macrophages, Mast cells

*Sentinel cells are cells that reside in tissues and wait for infections. These include mast cells, which deal with allergies, worms, and parasites like Plasmodium.*
- Circulating phagocytes and granulocytes

*Other cells include neutrophils, monocytes, and eosinophils. These travel around the bloodstream, waiting for infections. When they discover infection, they notify other phagocytes.*

Lymphocytes: They are pathogen-specific cells capable of inducing immunological responses (allergies and autoimmune diseases).

- **B lymphocytes**: responsible for production of antibodies
- **T lymphocytes**: responsible for cell mediated immunity
- **Natural killer cells (NK cells)**: Eliminates virus-infected cells among other functions.

❖ *Lymphocytes are part of the adaptive immune system and consist of T-cells and B cells, which are responsible for antibody synthesis.*

# Organs and Cells of the Immune System

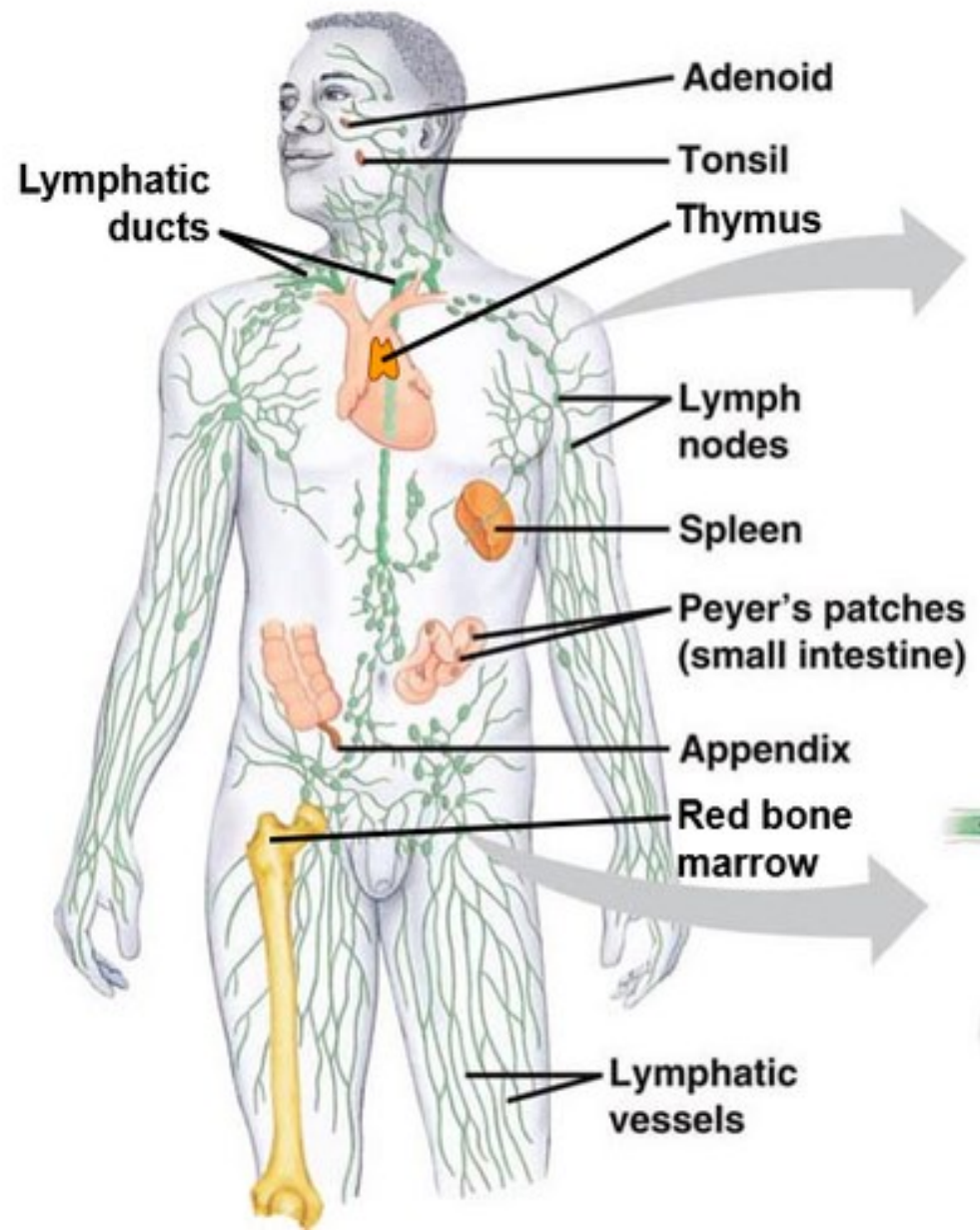
- The bone marrow and thymus are the primary lymphoid organs of the immune system.
- Secondary lymphatic tissues include the tonsils, spleen, lymph arteries, lymph nodes, adenoids, skin, and liver.
- Leukocytes (white blood cells) constitute the other arm of the innate immune system's line of defense, working independently as single cells..

- The innate immune system's leukocytes comprise phagocytes (macrophages, neutrophils, and dendritic cells), mast cells, eosinophils, basophils, and natural killer cells.



- They identify and destroy infectious pathogens and play a critical role in activating the adaptive immune system.





## Organs of the Immune System

Explain what you learned in the introduction to the topic: immunology