



المرحلة الثانية 2023-2024

# Medical Terminology



Lecture :12<sup>th</sup> **Blood and Lymphatic System in Human Physiology**

- **Dr. Ali Hussein Al-Nasrawi**
- **Otorhinolaryngologist specialist**

# The Blood and Lymphatic System in Human Physiology

## **Introduction:**

The blood and lymphatic system are integral components of the human body, playing crucial roles in maintaining overall health and well-being.

Together, these systems ensure the transportation of vital substances, infection defense, tissue repair, and waste removal

The circulatory system, also known as the cardiovascular system, is responsible for transporting blood, a vital fluid that carries oxygen, nutrients, and waste products throughout the body.

It consists of a complex network of blood vessels, including arteries, veins, and capillaries, and is powered by the heart, a muscular pump that propels blood through the vessels.

## I. The Blood System:

### A. Composition of Blood:

Blood is a complex fluid comprising various components, including

- red blood cells (erythrocytes),
- white blood cells (leukocytes),
- platelets (thrombocytes), and plasma.

Plasma consists of

- water,
- proteins,
- nutrients,
- hormones, and
- waste products.

**The lymphatic system**, often referred to as the "**silent guardian of the body**," plays a critical role in maintaining fluid balance, defending against infections, and transporting immune cells.

It consists of a network of lymphatic vessels, which transport a clear fluid called

- lymph, and
- lymph nodes, which act as filters to remove pathogens and debris from the lymph.

## B. Functions of Blood:

**Oxygen and Nutrient Transport:** Red blood cells transport oxygen from the lungs to body tissues, while plasma carries nutrients, such as glucose and amino acids, to nourish cells.

**Immune Response:** White blood cells play a vital role in the body's defense against infections and foreign substances. They detect and eliminate pathogens, such as bacteria and viruses.

**Blood Clotting:** Platelets are essential for blood clotting, preventing excessive bleeding when blood vessels are damaged. Clotting factors and fibrin form a mesh that seals wounds.

**Waste Removal:** Blood carries waste products, such as carbon dioxide and metabolic by-products, to the lungs, kidneys, and liver for elimination.

### II. The Lymphatic System:

#### A. Structure of the Lymphatic System:

The lymphatic system consists of lymphatic vessels, lymph nodes, lymphoid organs (such as the spleen and thymus), and lymphatic fluid (lymph). Lymphatic vessels resemble blood vessels and transport lymph throughout the body.

## B. Functions of the Lymphatic System:

**Fluid Balance:** The lymphatic system helps maintain fluid balance by collecting excess interstitial fluid. Lymph transports this fluid back into the bloodstream, preventing tissue swelling.

**Immune Response:** Lymph nodes act as filtering stations, removing pathogens and foreign substances from lymph fluid. They contain immune cells, such as lymphocytes, which activate the body's defense mechanisms.

**Absorption of Fat:** Specialized lymphatic vessels, called lacteals, absorb dietary fats from the small intestine, forming chyle. Chyle enters the bloodstream via the thoracic duct.

Lymph vessels, unlike blood vessels, do not form a closed loop. They start as tiny capillaries in tissues and gradually converge into larger vessels, eventually connecting to the circulatory system. Lymph vessels transport lymph, a fluid containing cells, proteins, and other substances, from tissues to lymph nodes for filtration.

Lymph nodes, bean-shaped structures scattered throughout the body, serve as filter stations for the lymphatic system. Lymph flows through the lymph nodes, where specialized immune cells, such as lymphocytes, trap and eliminate pathogens and debris. Lymph nodes play a crucial role in the immune system's defense against infections.

# III. Interactions Between the Blood and Lymphatic System:

The blood and lymphatic system work in harmony to ensure proper functioning and regulate various physiological processes.

The vascular system encompasses two interconnected networks of vessels:  
the circulatory system and  
the lymphatic system.

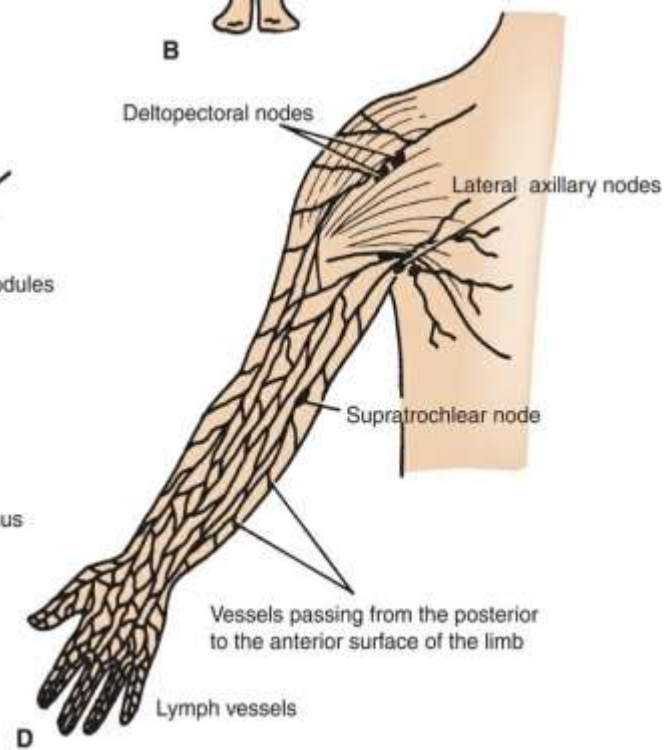
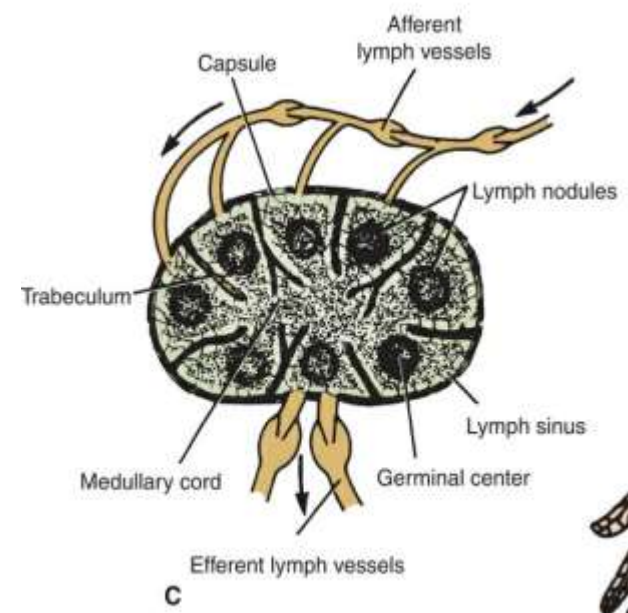
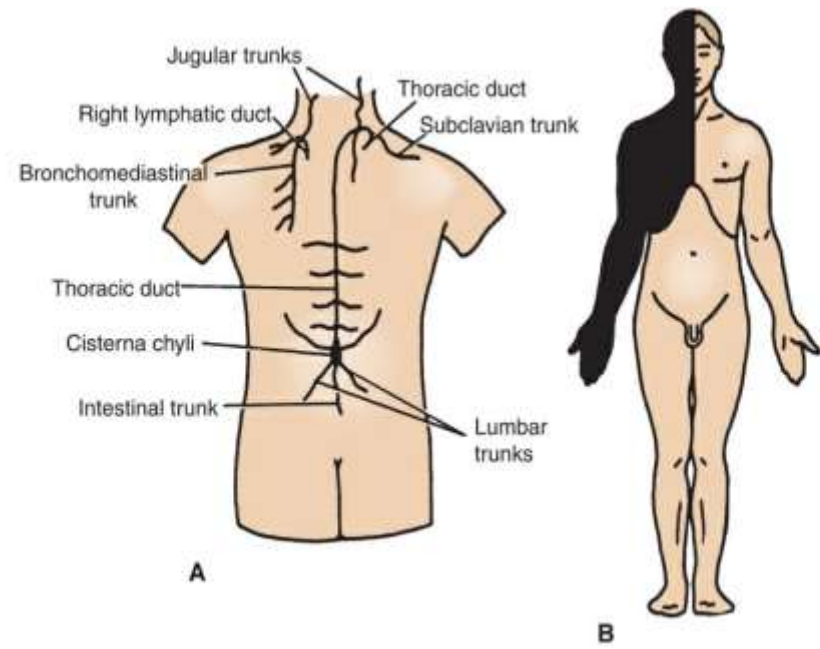
These systems work in tandem to transport essential substances throughout the body, playing crucial roles in maintaining homeostasis and supporting various physiological processes.

## A. Blood-Lymph **Exchange**:

Capillaries in tissues allow the exchange of substances between blood plasma and interstitial fluid. Excess interstitial fluid, along with waste products and pathogens, enters lymphatic vessels and is transported as lymph to the lymph nodes.

## B. Lymphatic **Drainage** into the Blood:

Lymphatic vessels eventually merge to form larger lymphatic ducts, which return lymph to the bloodstream through the subclavian veins. Once in the blood, nutrients, hormones, immune cells, and waste products are redistributed throughout the body.



thank  
you