



Anesthesia Department

Circulatory System

Human Biology (ANE106)

Year 1/ Spring semester

Lecture 3

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May 03, 2026



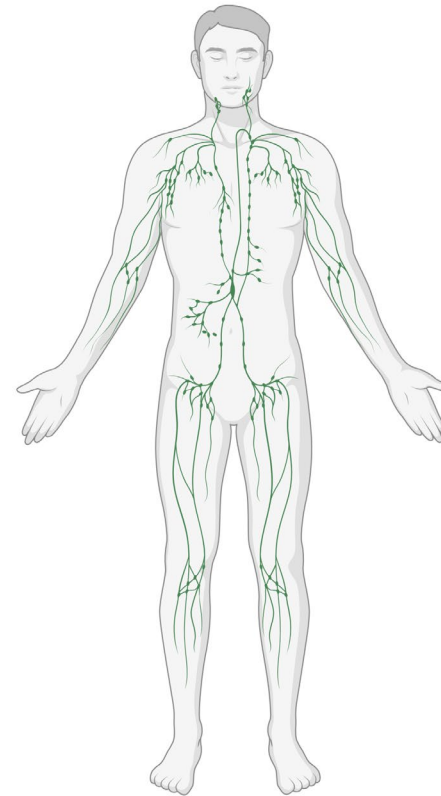
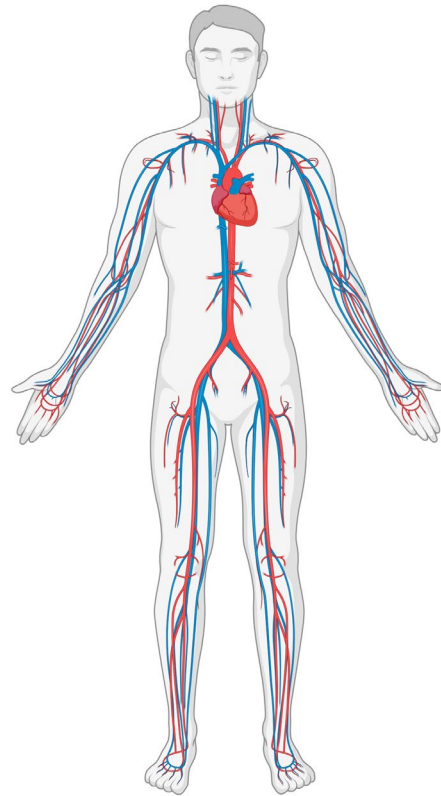
Circulatory System

The circulatory system is the body system responsible for the movement of fluids throughout the body to transport substances and maintain internal balance.

Circulatory System

The circulatory system includes:

- Cardiovascular system (blood circulation)
- Lymphatic system (fluid return and immune support)



Main functions

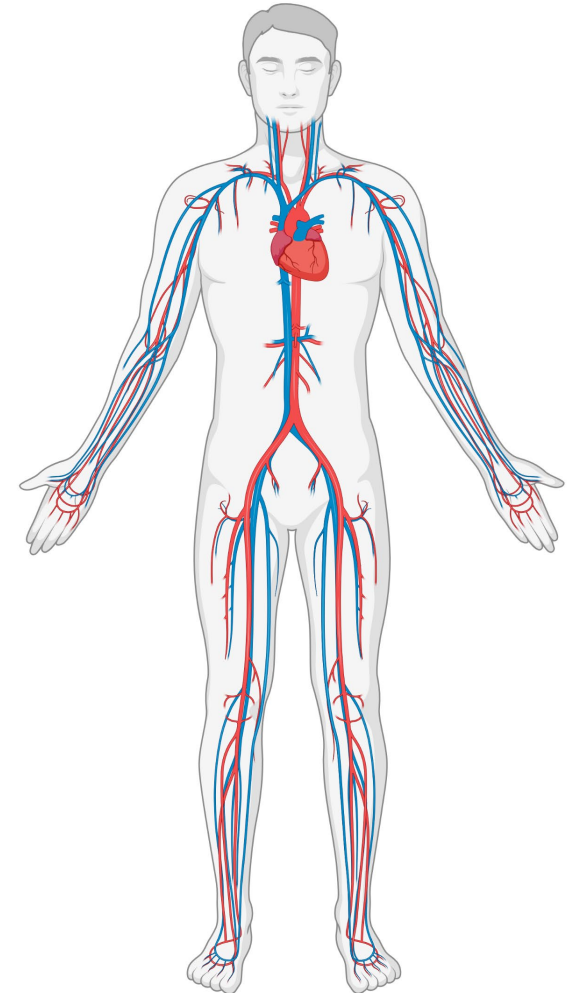
1. Transport nutrients and oxygen
2. Remove waste
3. Maintain fluid balance
4. Support immune defense



Cardiovascular System

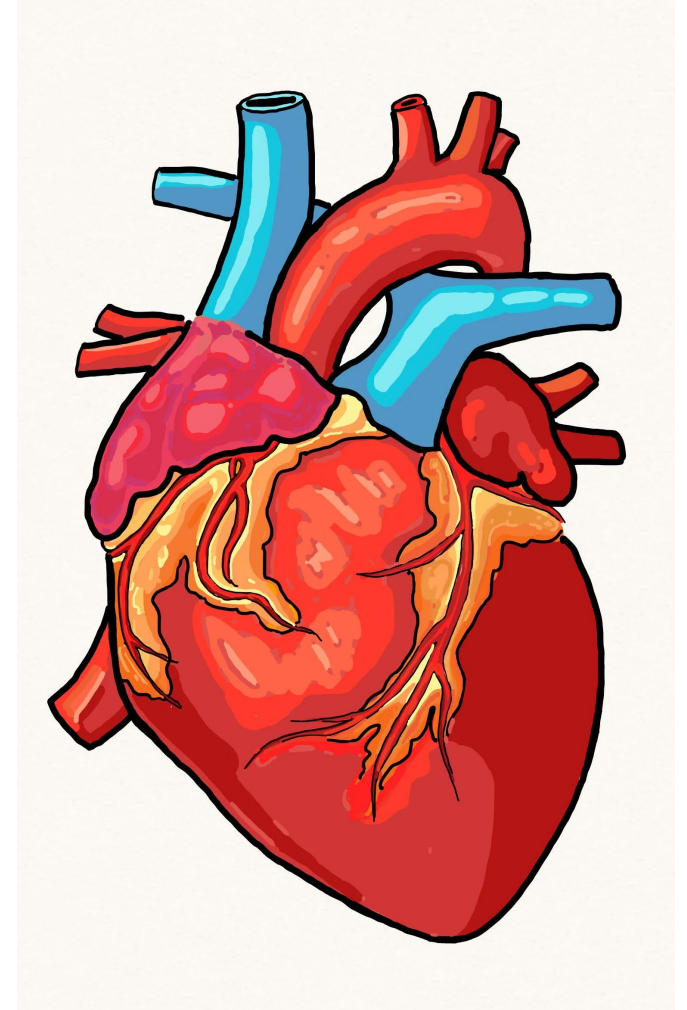
Cardiovascular System

The cardiovascular system consists of the heart, blood, and blood vessels, forming a closed network that circulates blood throughout the body. It transports oxygen, nutrients, and other substances to tissues while removing waste products.



Heart Structure

The heart is a muscular organ located in the thoracic cavity, composed of four chambers: two atria and two ventricles. It also contains valves that separate the chambers and ensure one-way movement of blood.



Internal structure:

Chambers:

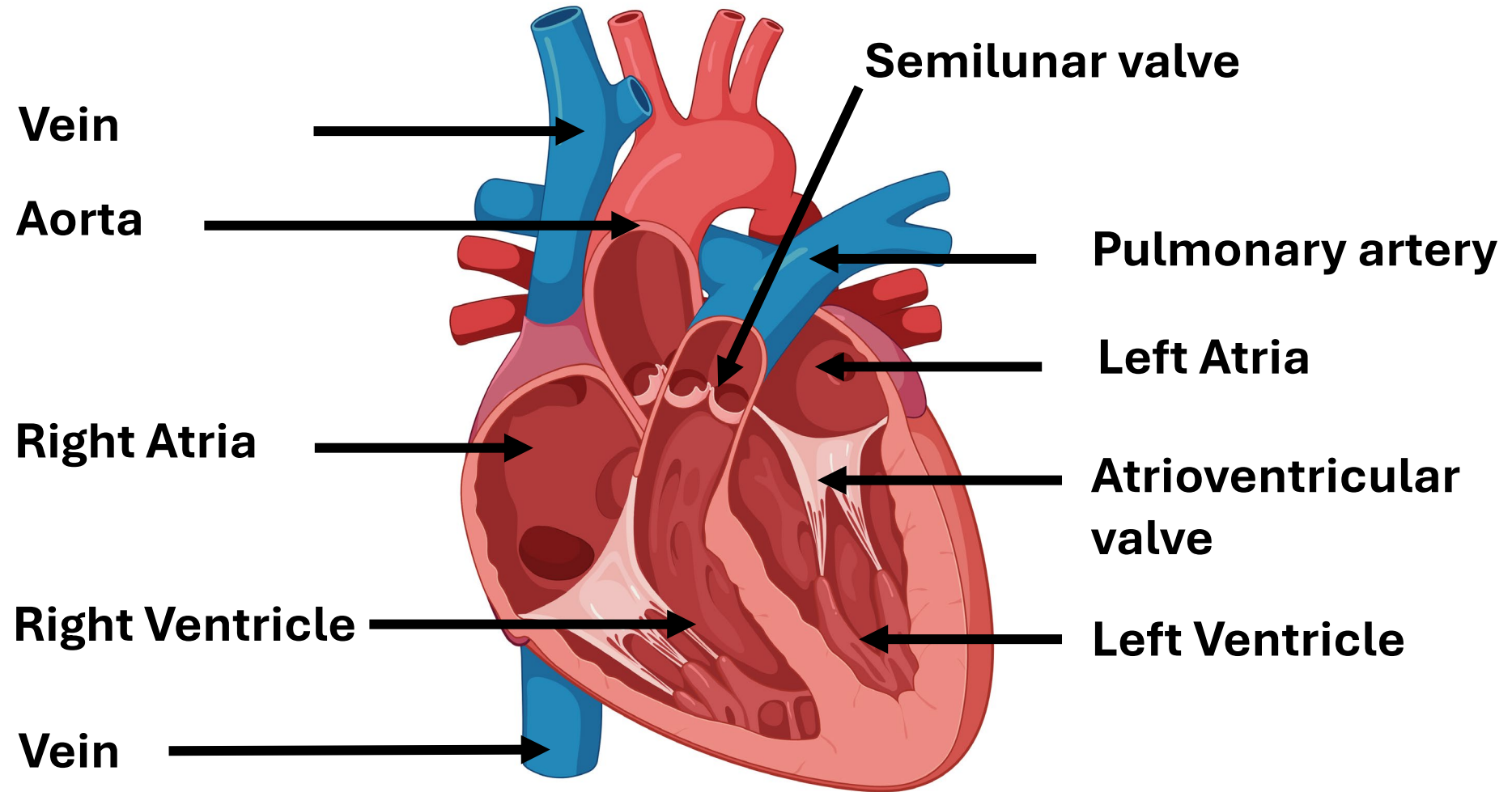
- Right atrium
- Right ventricle
- Left atrium
- Left ventricle

Internal structure:

Valves:

- Tricuspid
- Mitral
- Pulmonary
- Aortic

Structure of Heart



Blood Vessels

Types:

1. Arteries:

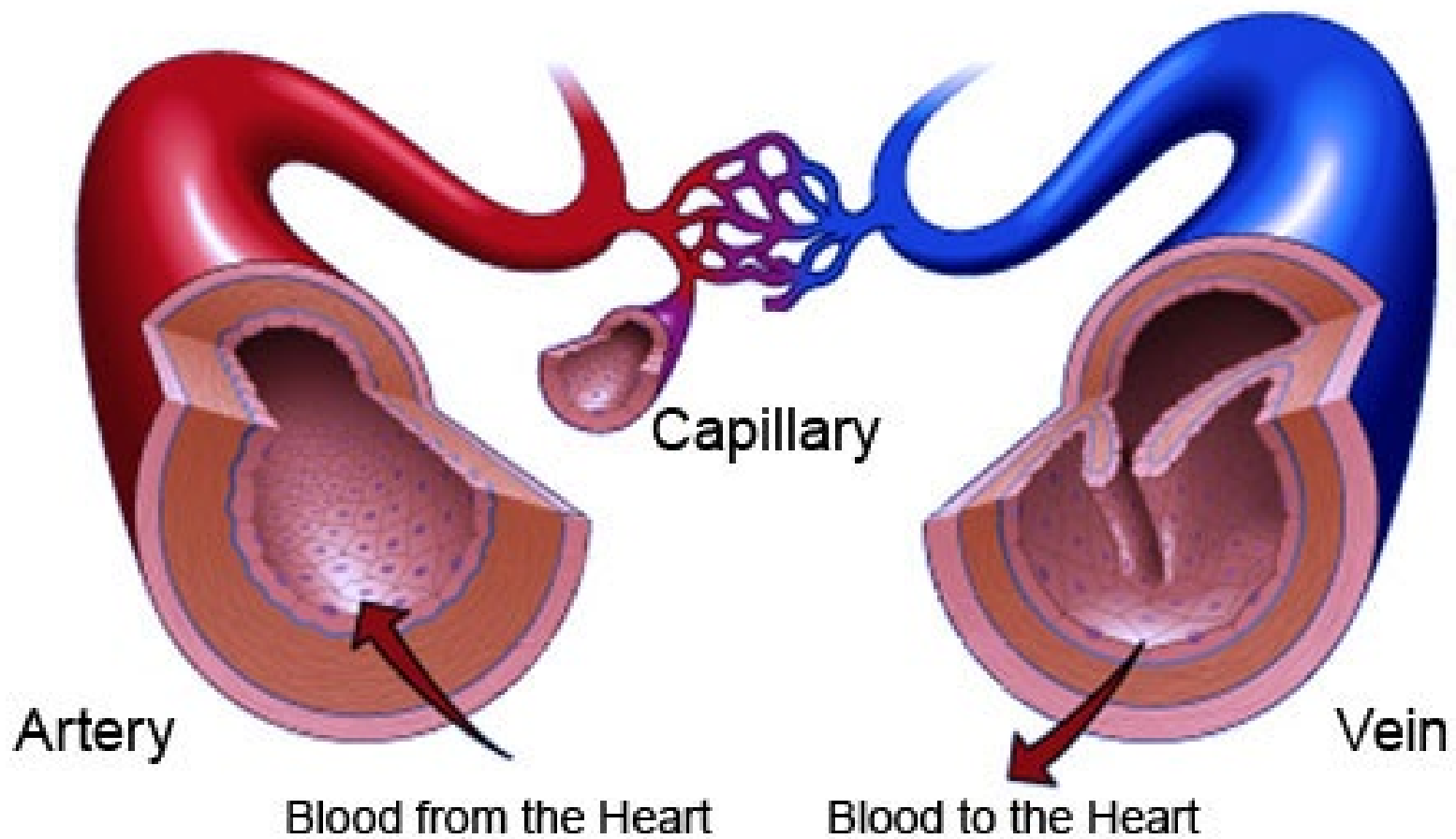
Blood vessels that carry blood away from the heart with thick, elastic walls.

2. Veins:

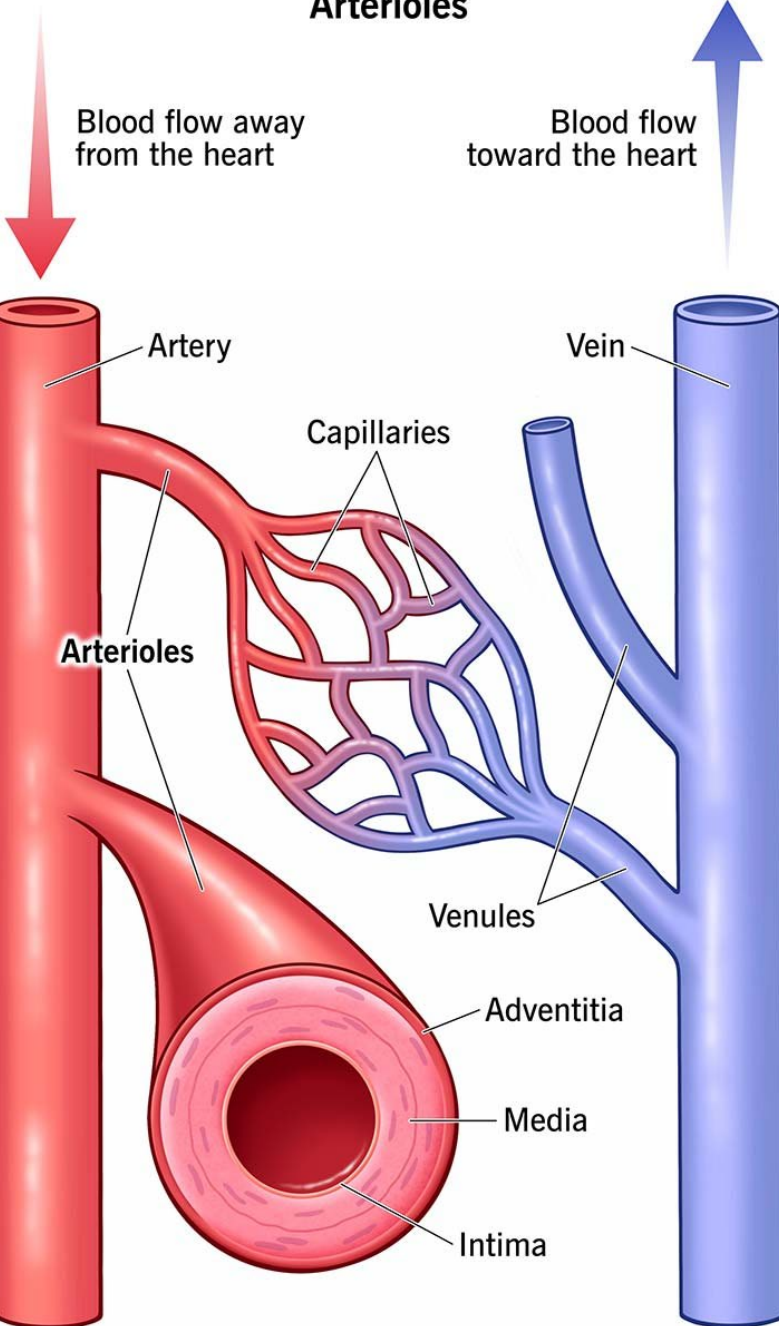
Blood vessels that return blood to the heart and contain valves to prevent backflow.

3. Capillaries:

Microscopic vessels with very thin walls that allow exchange of substances between blood and tissues.



Arterioles



Comparison

Feature	Arteries	Veins
Wall	Thick	Thin
Lumen	Narrow	wide
Valve	No	Yes

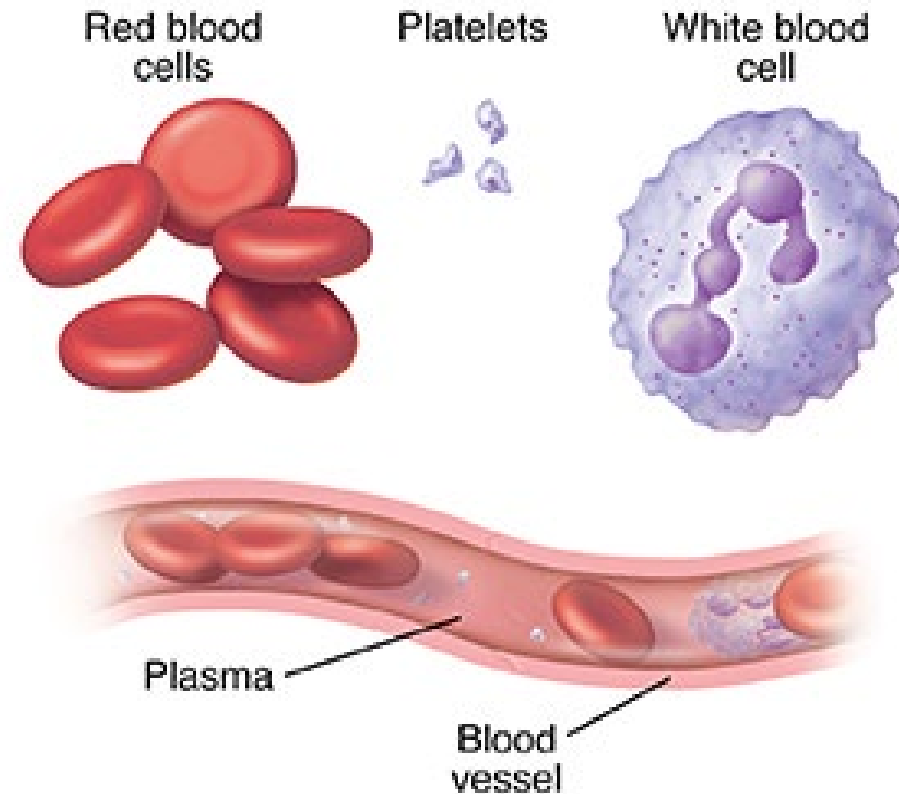
Blood Components

1. Plasma:

- Liquid medium

2. Cells:

- Red blood cells
- White blood cells
- Platelets





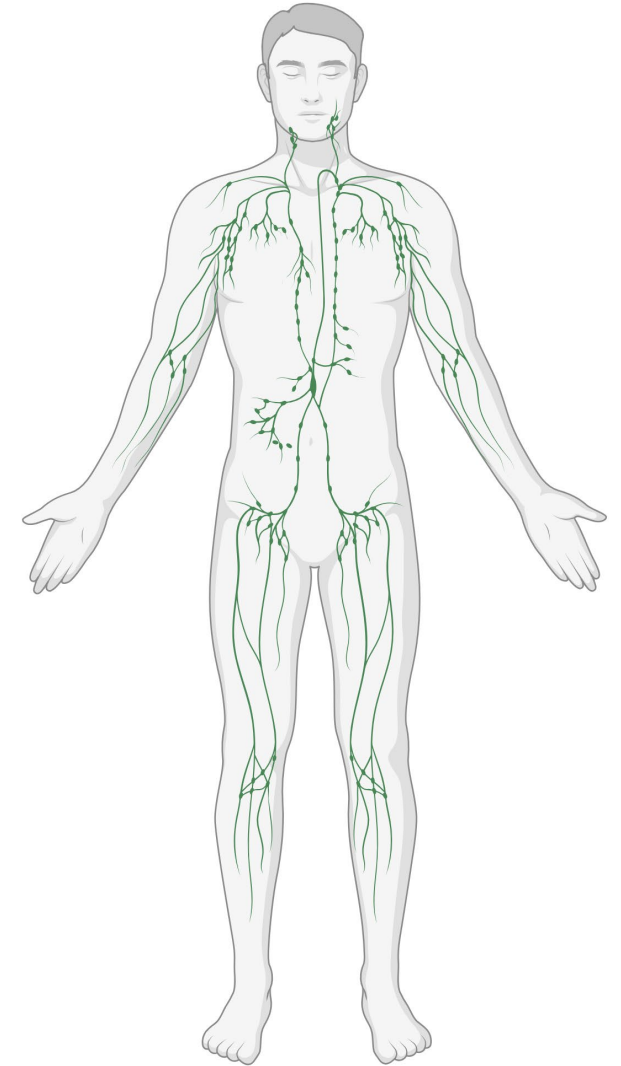
What would happen if the Cardiovascular system stopped functioning completely?



Lymphatic System

Lymphatic System

The lymphatic system is a network of vessels, tissues, and organs that helps maintain fluid balance and supports the body's immune defense. It collects excess fluid from body tissues, filters it through lymph nodes, and returns it to the bloodstream while helping protect the body against infection.



What is a Lymph?

Lymph is a clear, colorless fluid formed from excess tissue fluid that enters the lymphatic vessels. It contains water, proteins, and immune cells, and helps transport substances while supporting the body's defense against infection.

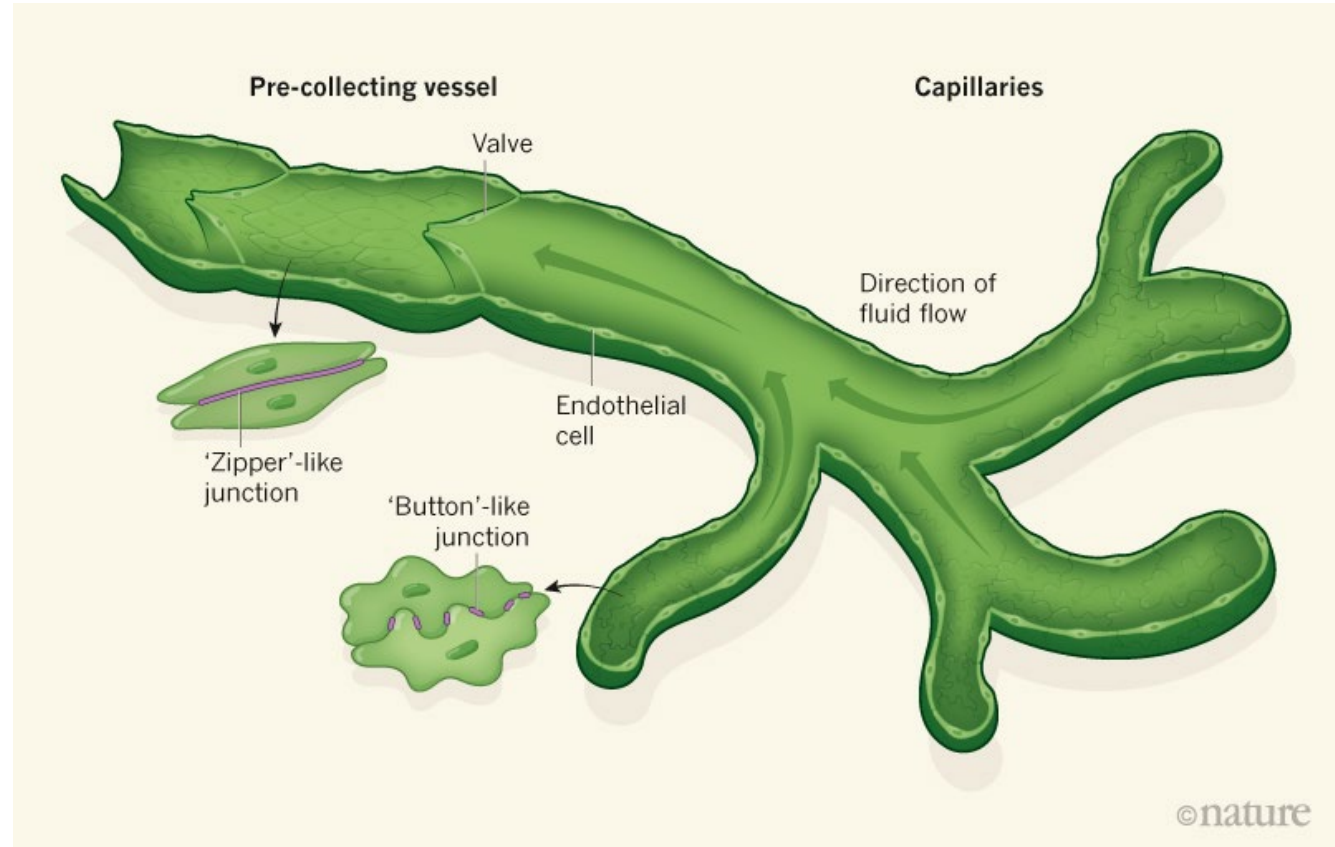
Main roles:

- Returns excess fluid to blood
- Transports fats
- Immune defense

Lymphatic Vessels

Structure:

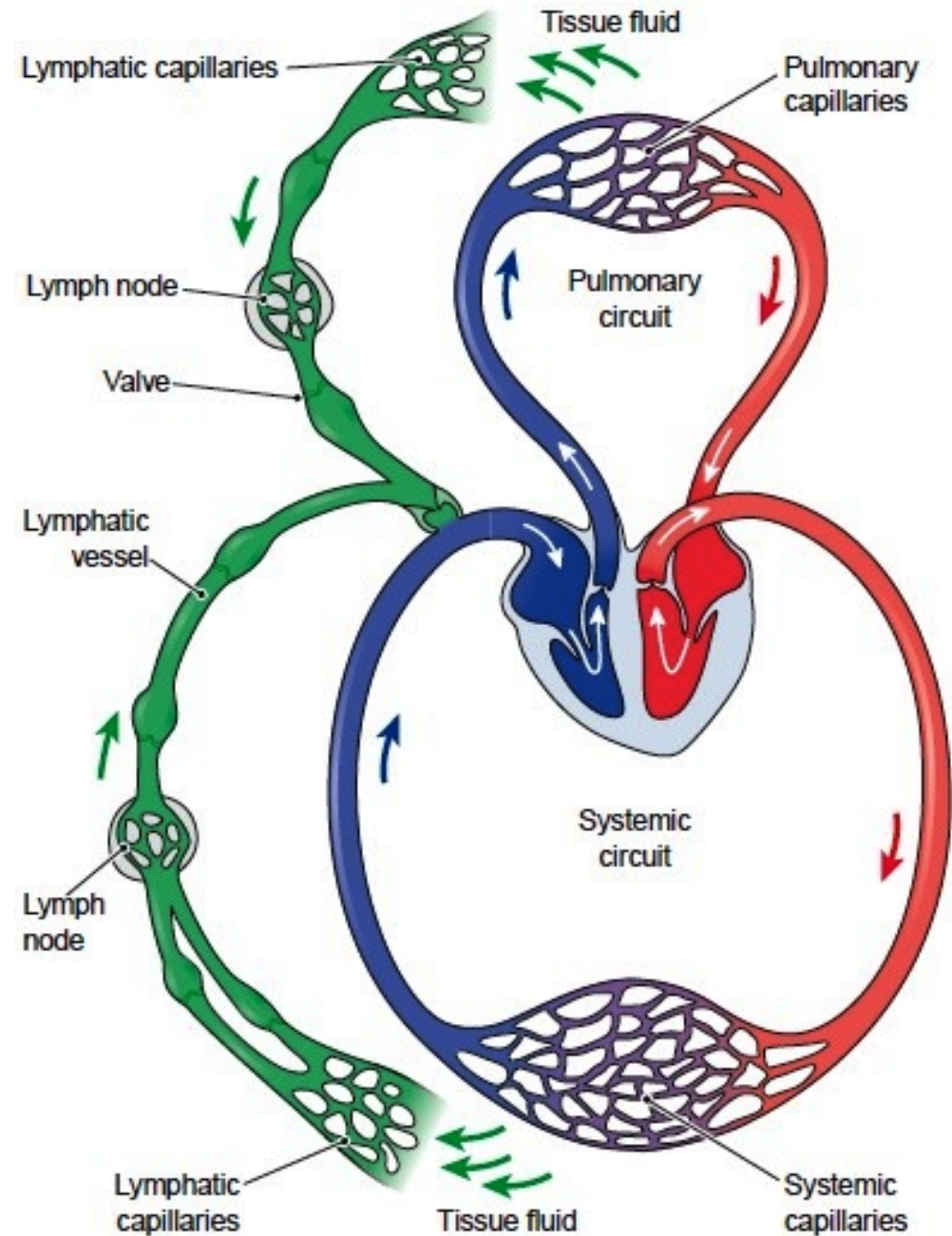
- Similar to veins
- Thin walls
- Valves present



Lymphatic Vessels

Flow:

- One-directional
- Moves toward the heart



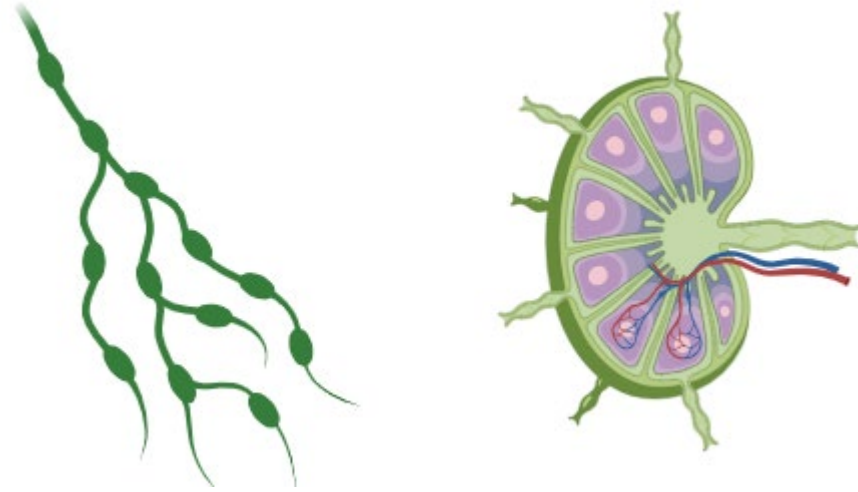
Comparison

Feature	Cardiovascular System	Lymphatic System
Type of circulation	Closed	Open
Fluid	Blood	Lymph
Pump	Heart	No Pump

Lymphatic Organs

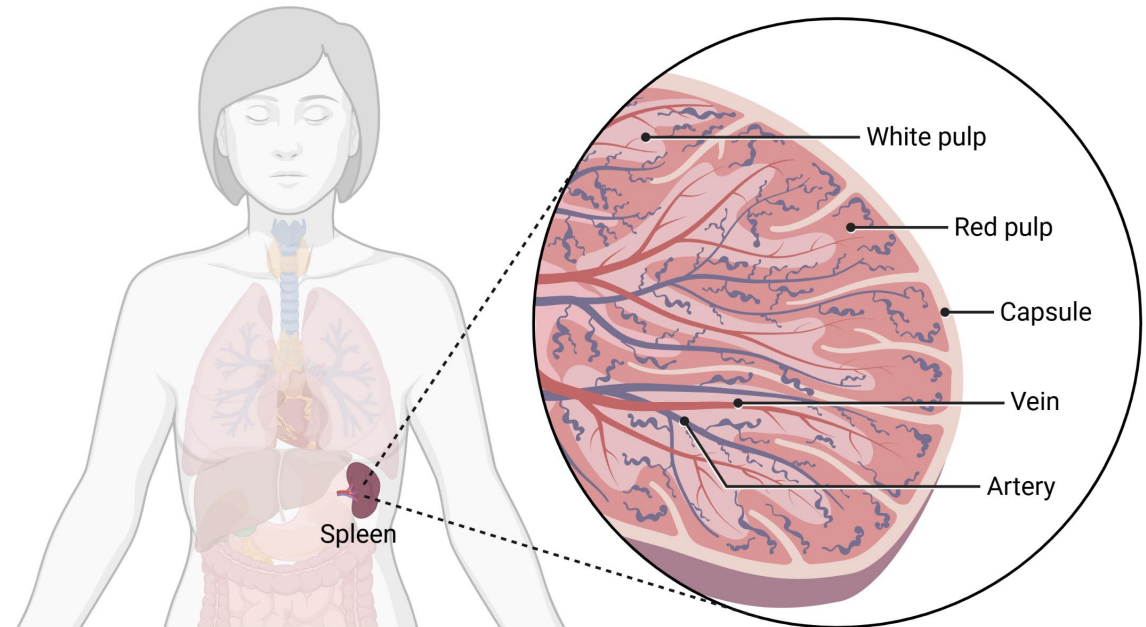
1. Lymph Nodes:

- Small, bean-shaped
- Filter lymph



2. Spleen:

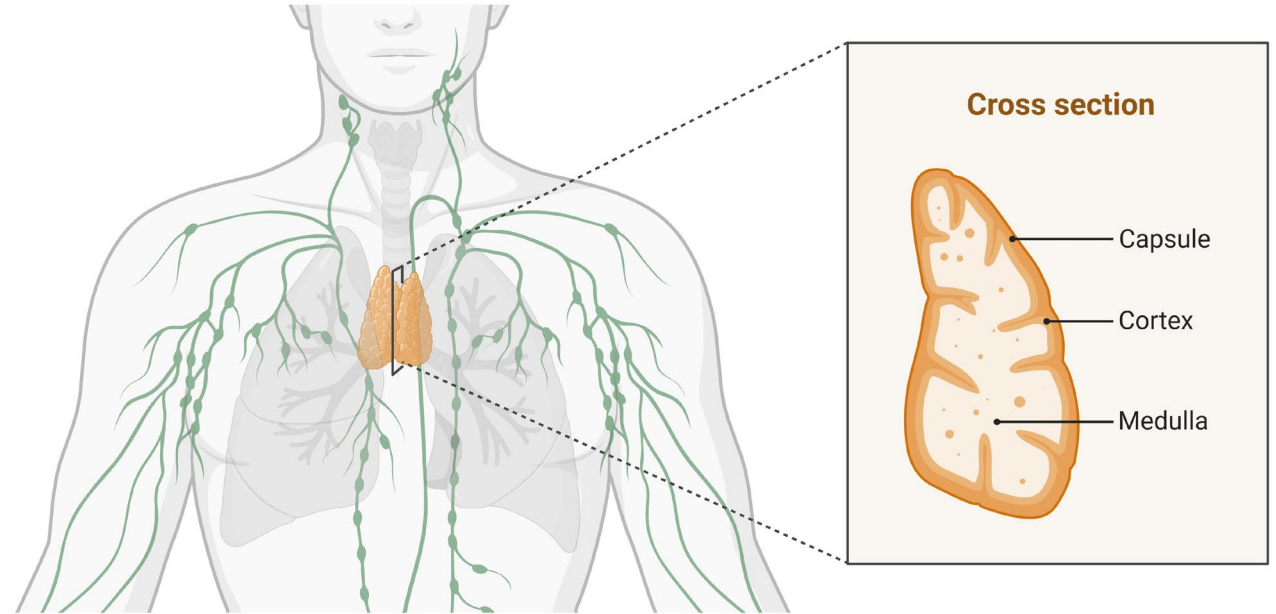
- Largest lymphatic organ
- Located in left upper abdomen



Lymphatic Organs

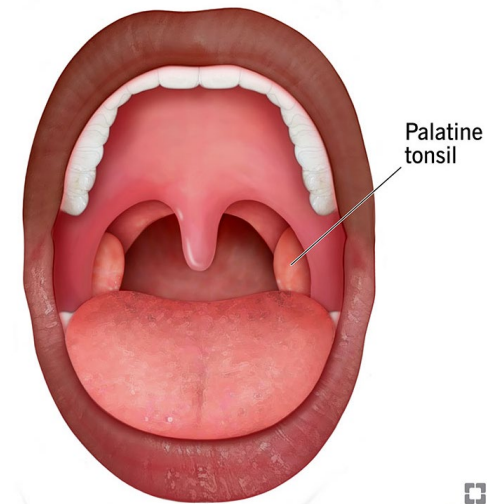
3. Thymus:

- Located in chest
- Important in early life



4. Tonsils:

- Located in throat
- First line of defense

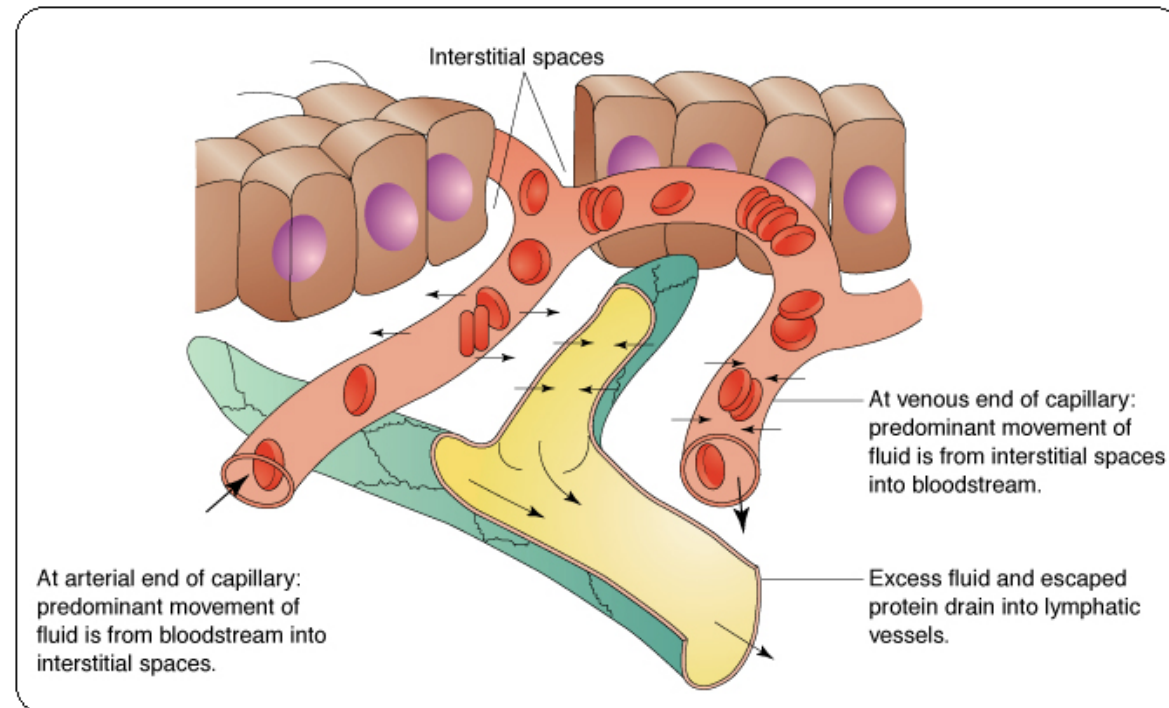




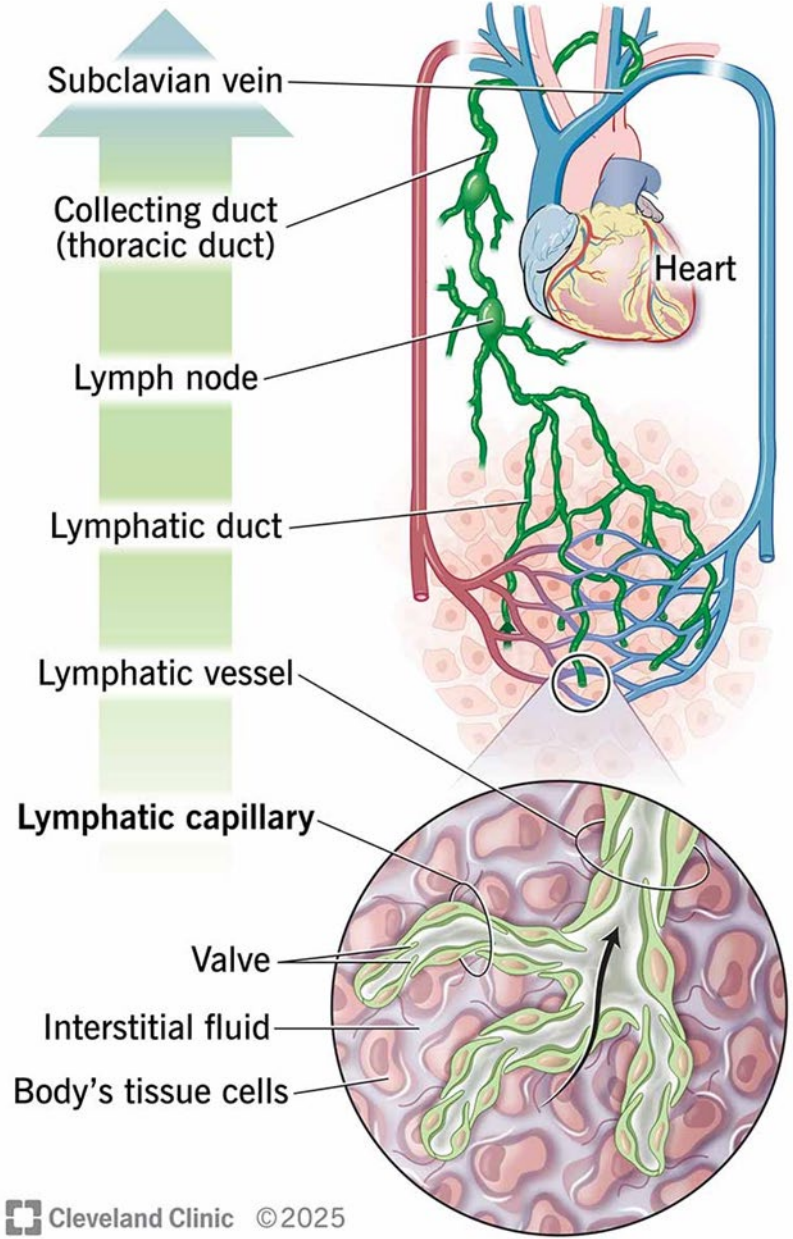
What would happen if the lymphatic system stopped functioning completely?

Integration Between Systems

The cardiovascular and lymphatic systems work together to maintain fluid circulation and balance within the body. The cardiovascular system transports blood throughout the body, while the lymphatic system collects excess tissue fluid and returns it to the bloodstream at the **junctions of the internal jugular veins and subclavian veins** near the base of the neck.



Lymphatic capillaries





What happens if fluid leaks from blood vessels and doesn't return or lymphatic vessels are blocked