Lecture Presentation: The Cardiovascular System

Presenter Name: Dr. Huda Saad

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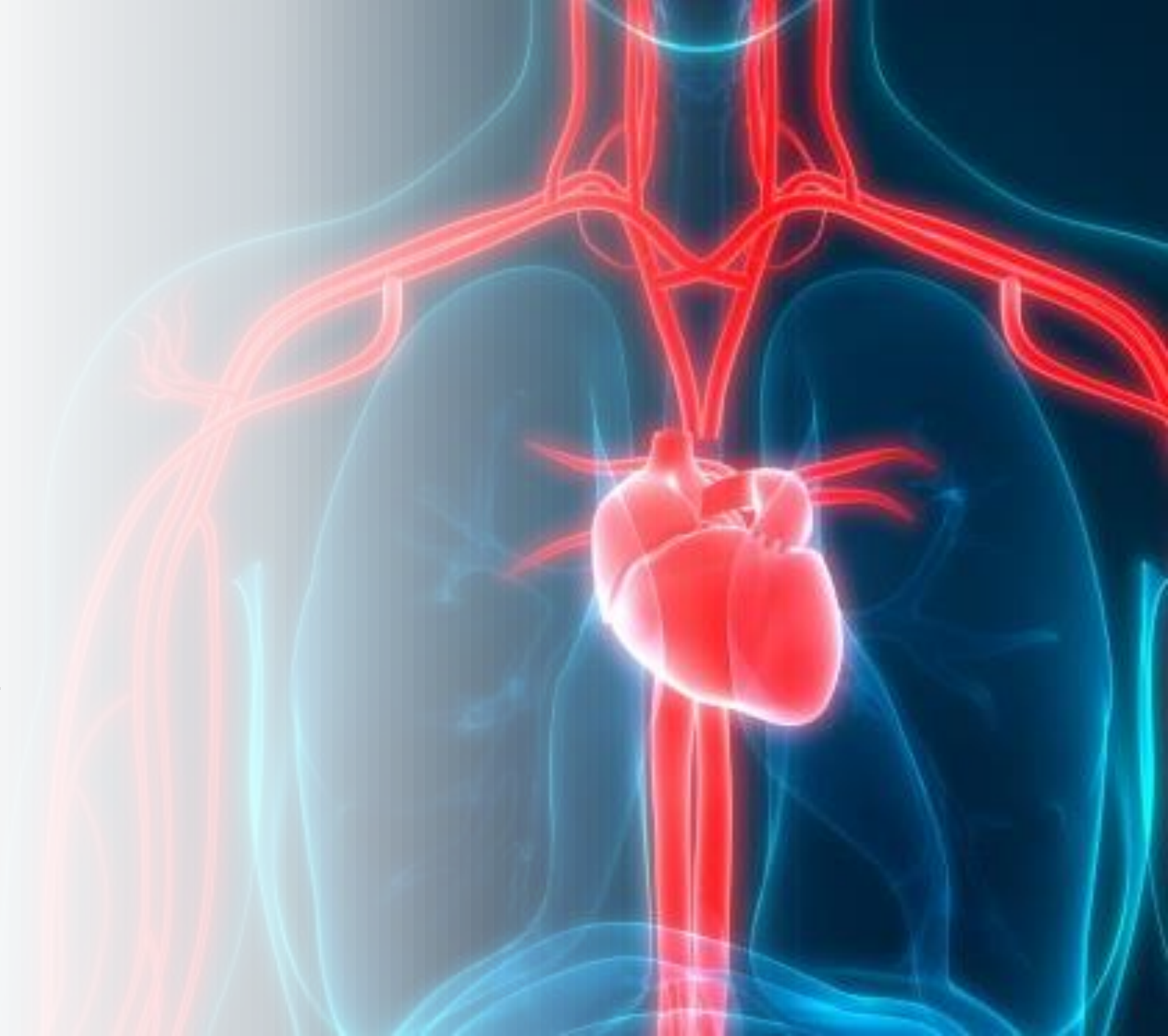


Introduction:The Circulatory System

The circulatory system is a **system of organs** that includes the heart, blood vessels, and blood which is circulated throughout the entire body of a human or other vertebrate. It includes the **cardiovascular system,** or **vascular system**, comprising the heart and blood vessels. Essential for maintaining homeostasis and overall body function.

Structure, Function, and Common Disorders

The functions of the circulatory system are:

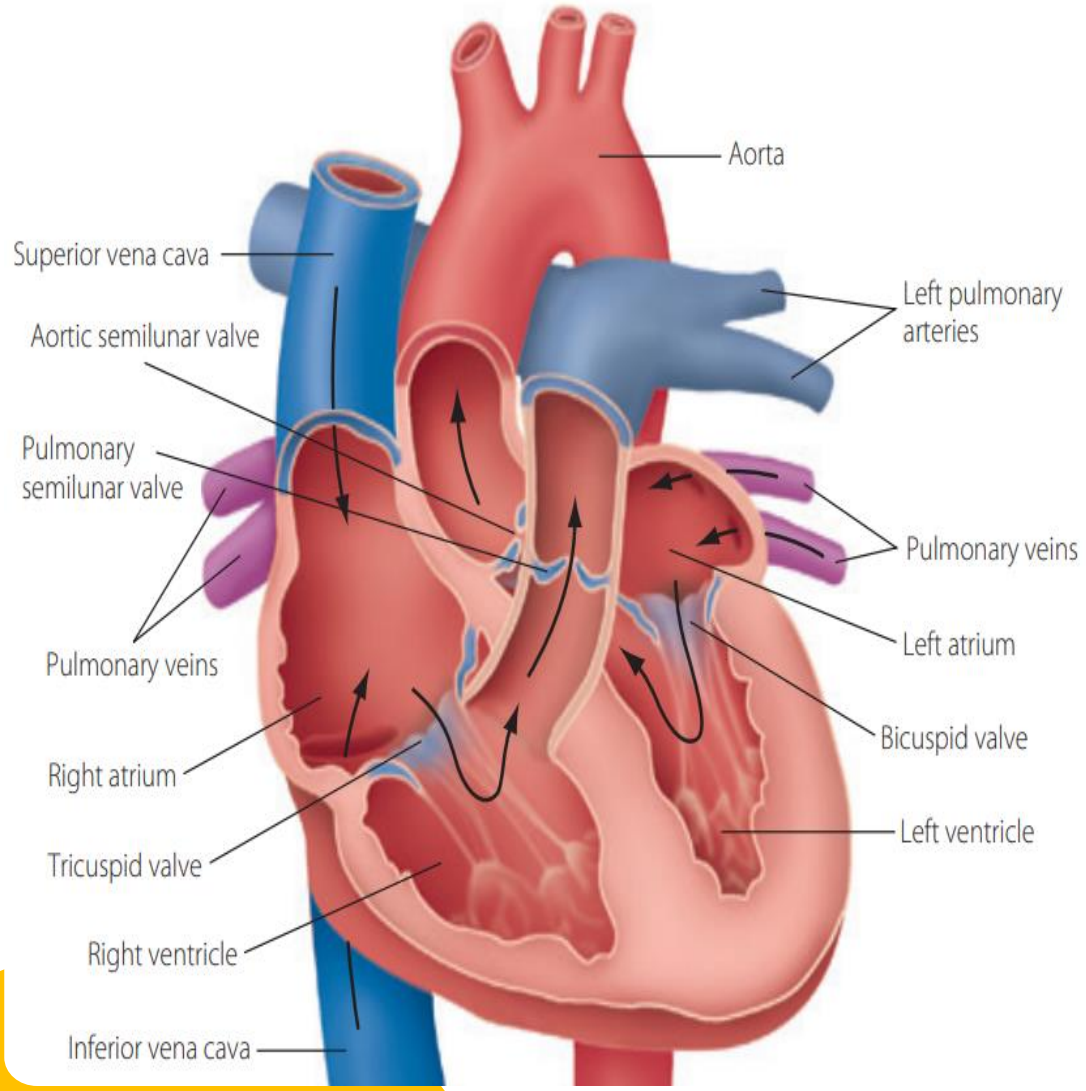
1. Transport: Gases, hormones, minerals, enzymes, and other vital substances are carried in the blood to every cell in the body; all waste materials are carried by the blood to the lungs, skin, or kidneys for elimination from the body (pulmonary circulation).

2. Body temperature: The blood vessels maintain body temperature by dilating at the skin surface to dissipate heat or by constricting to retain heat.

3. Protection: The blood and lymphatic systems protect the body against injury and foreign invasion through the immune system; blood clotting mechanisms protect against blood loss.

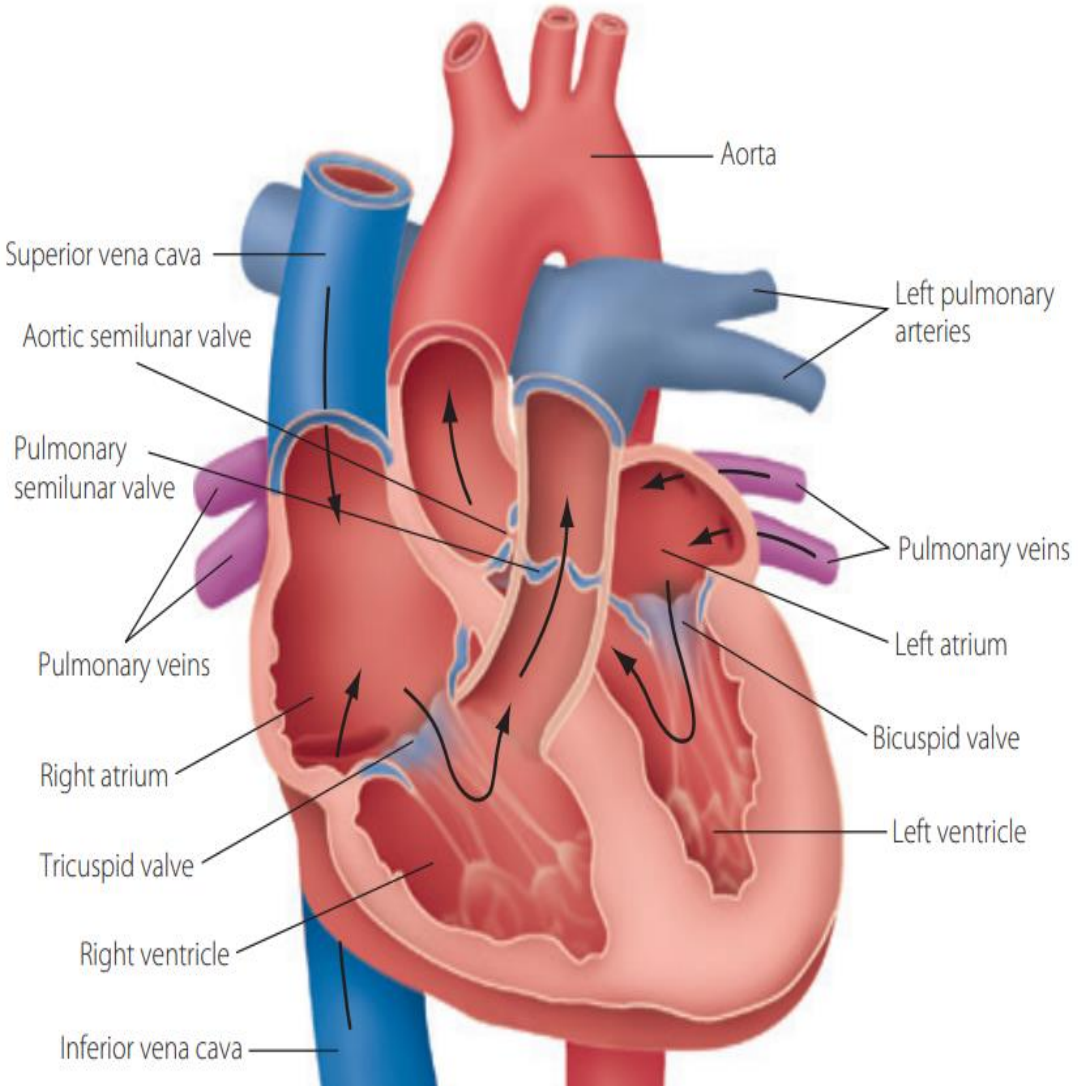
4. Buffering: Blood proteins provide an acid–base buffer system to maintain the optimum pH of the blood.

THE HEART

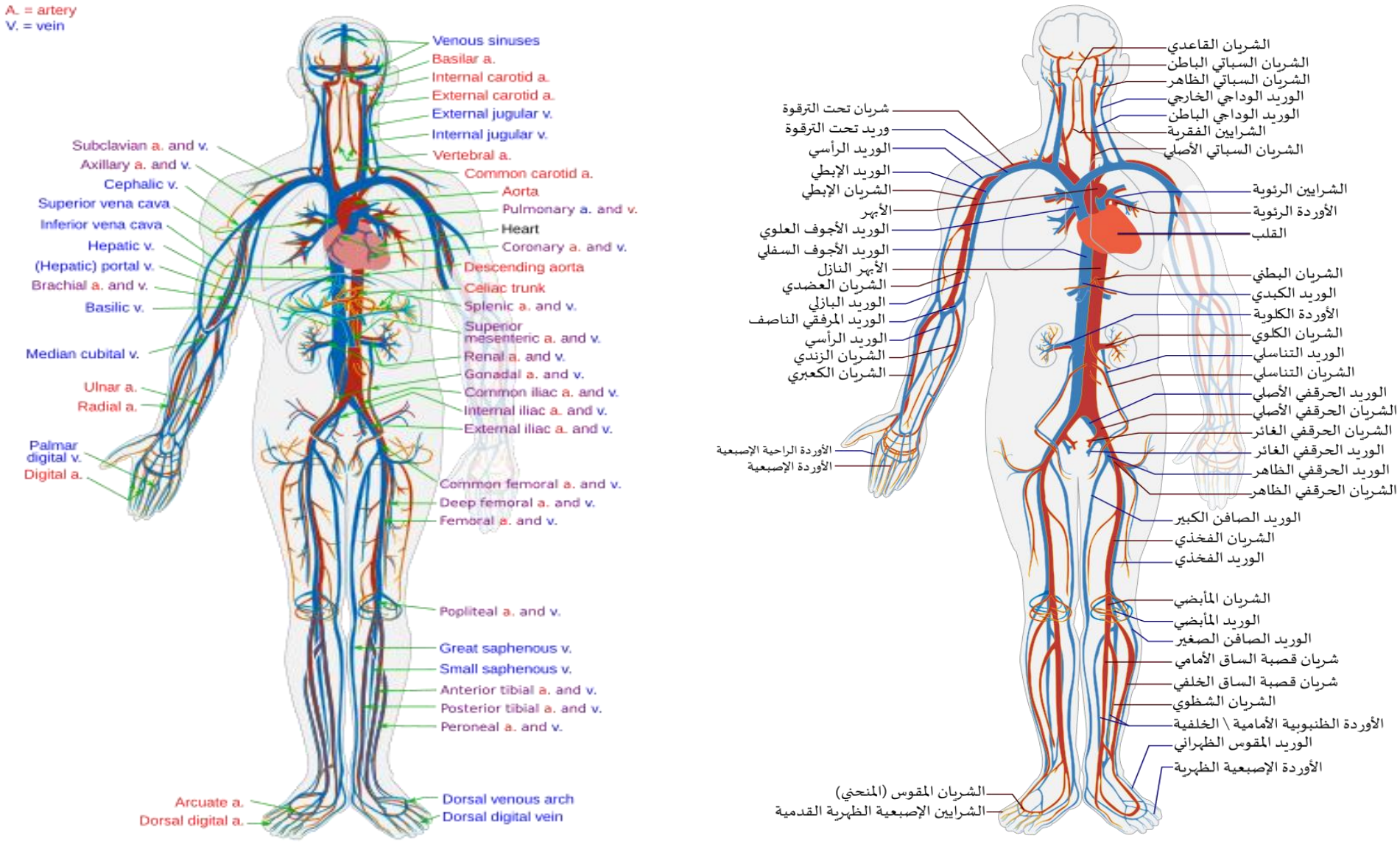


The heart pumps blood to all parts of the body providing nutrients and oxygen to every cell and removing waste products. The left heart pumps oxygenated blood returning from the lungs to the rest of the body in the **systemic circulation**. The right heart pumps deoxygenated blood to the lungs in the **pulmonary circulation**. In the human heart, there is one **atrium** and one **ventricle.**

THE HEART



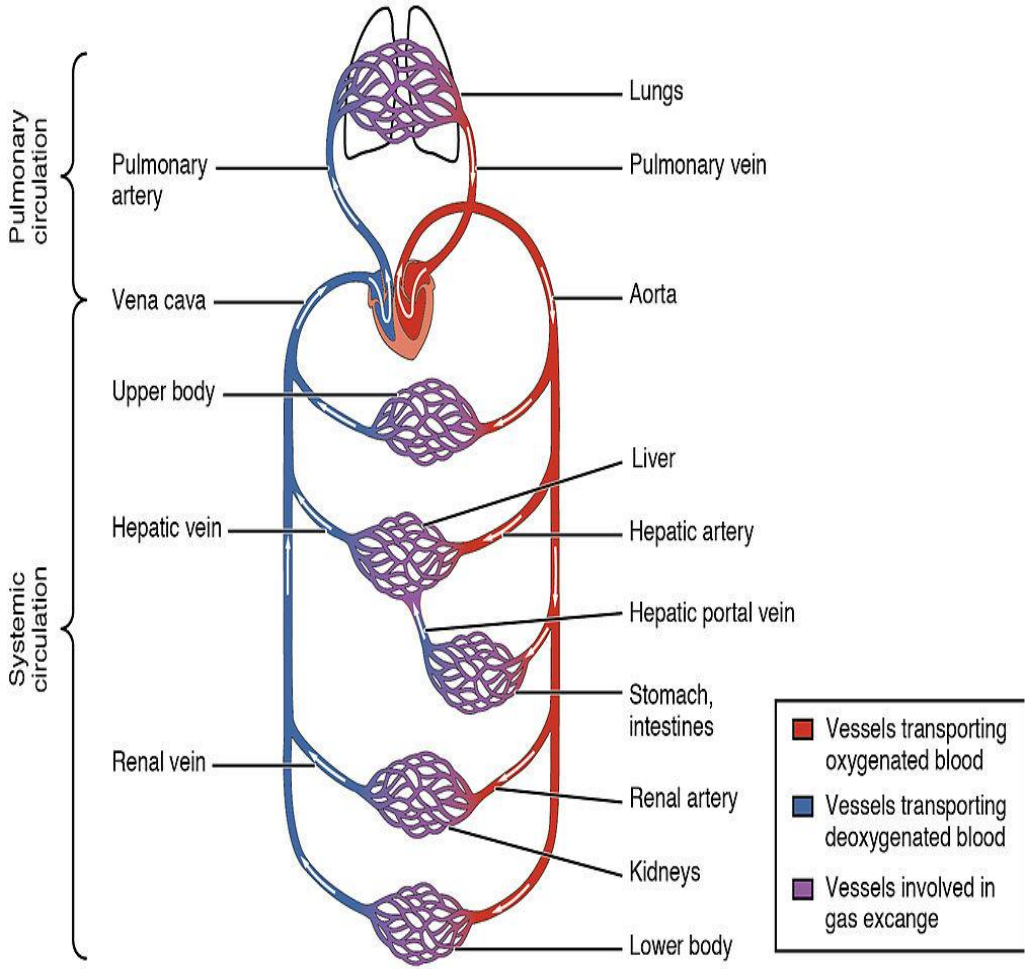
1. The heart is a **muscular organ** that pumps blood.
2. **Four chambers:**
   Right atrium, right ventricle, left atrium, left ventricle.
3. **Valves ensure one-way flow:**
   Tricuspid, pulmonary, mitral, and aortic valves.
4. Layers of the heart: **Endocardium, Myocardium, Pericardium**.



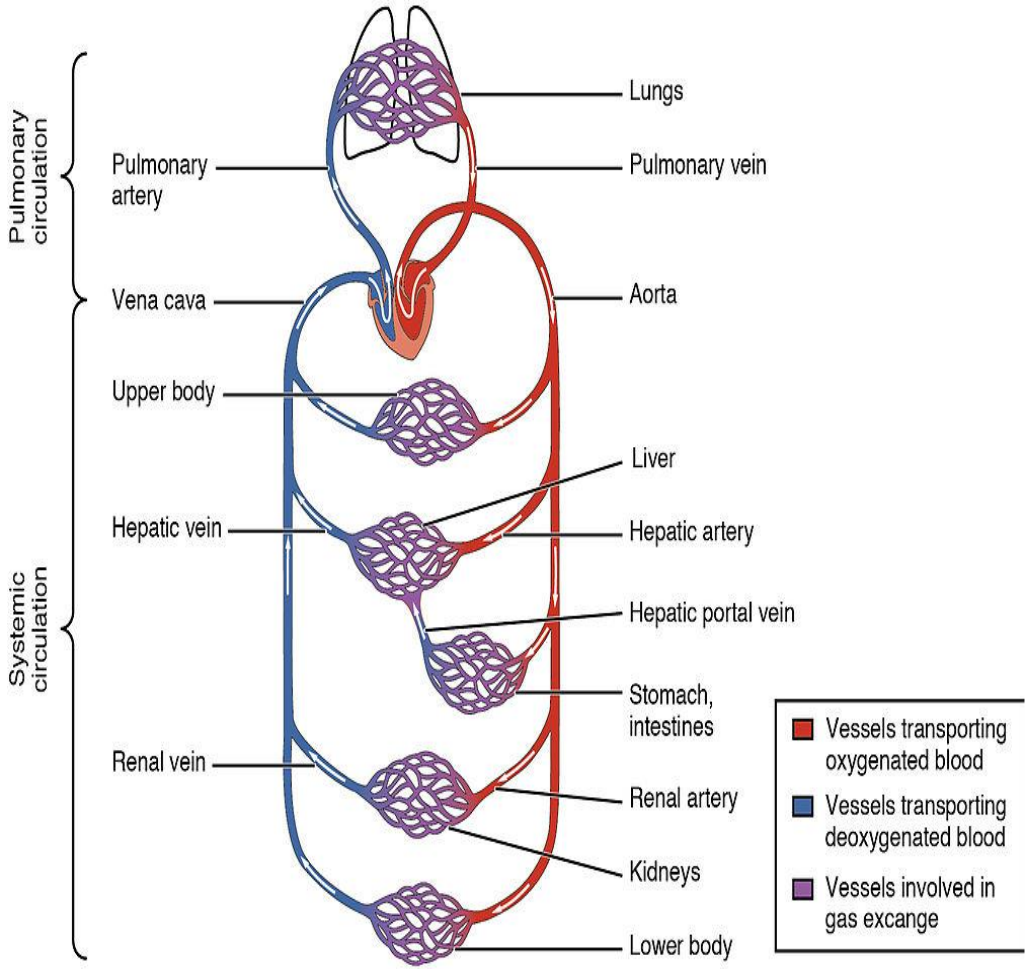
The human circulatory system (simplified). Red indicates oxygenated blood carried in arteries. Blue indicates deoxygenated blood carried in veins. Capillaries join the arteries and veins.

Blood Vessels and Circulation

Blood is a fluid consisting of plasma, red blood cells, white blood cells, and platelets; it is circulated the body carrying oxygen and nutrients to the tissues and collecting and disposing of waste materials.



- **Types of blood vessels:**
  - Arteries: Carry oxygen-rich blood away from the heart.
  - Veins: Return oxygen-poor blood to the heart.
  - Capillaries: Smallest vessels for gas and nutrient exchange.
- **Two Circulatory Pathways:**
  - **Pulmonary circulation:** Between heart and lungs.
  - **Systemic circulation:** Between heart and body tissues.



Blood Components:

Red Blood Cells (RBCs): Carry oxygen via hemoglobin.

White Blood Cells (WBCs): Fight infections and support immunity.

Platelets: Help in clotting to prevent bleeding.

Plasma: Liquid portion containing nutrients, hormones, and waste.

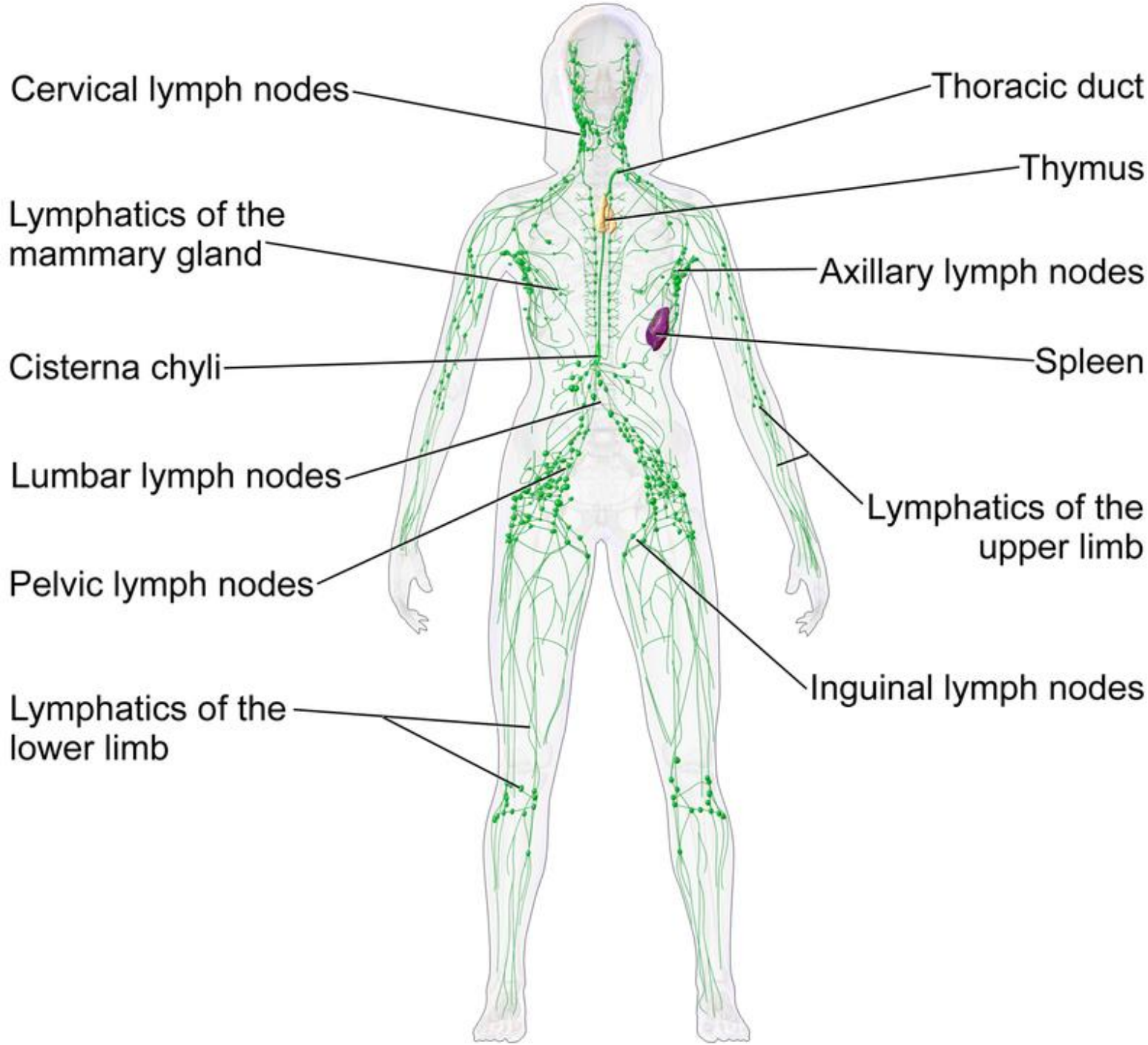
Lymphatic System

Components of the lymphatic system include lymph fluid, lymph vessels, lymph nodes, and lymphocytes. The functions of this system are:

1. Transporting fluid from the tissues back to the bloodstream.

2. Assisting in controlling infection caused by microorganisms.

3. Transporting fats away from the digestive organs.


Cervical lymph nodes
Lymphatics of the mammary gland
Cisterna chyli
Lumbar lymph nodes
Pelvic lymph nodes
Lymphatics of the lower limb
Thoracic duct
Thymus
Axillary lymph nodes
Spleen
Lymphatics of the upper limb
Inguinal lymph nodes

Common Cardiovascular Disorders

1. **Hypertension (High Blood Pressure)** – Increased force of blood against artery walls.

2. **Myocardial Infarction (Heart Attack)** – Blocked coronary artery leading to tissue death.

3. **Heart Failure** – Weakened heart unable to pump efficiently.

4. **Arrhythmias** – Irregular heartbeats (bradycardia, tachycardia, fibrillation).

5. **Atherosclerosis** – Plaque buildup in arteries.

6. **Stroke** – Blocked or ruptured blood vessel in the brain.

Abbreviation	Definition	Abbreviation	Definition
ASD	arterial septal defect	DVT	deep vein thrombosis
ASHD	arteriosclerotic heart disease	ECG/EKG	electrocardiogram
AS	aortic stenosis	ECHO	echocardiogram
AV	atrioventricular	Hg/Hb	hemoglobin
BNP	B-type natriuretic peptide	HDL	high-density lipoprotein
BP	blood pressure	LDL	low-density lipoprotein
CABG	coronary artery bypass graft	Mono	mononucleosis
CBC	complete blood count	MRI	magnetic resonance imaging
CCU	coronary care unit	MVP	mitral valve prolapse
CHF	congestive heart failure	O_2	oxygen
CO_2	carbon dioxide	PAD/PVD	peripheral artery disease/ peripheral vascular disease
CPR	cardiopulmonary resuscitation	PET	positron emission tomography
CVA	cerebrovascular accident	PT	prothrombin time
DASH	Dietary Approaches to Stop Hypertension	PTCA	percutaneous transluminal coronary angioplasty
DOE	dyspnea on exertion	PVC	premature ventricular contractions

Conclusion & Q&A

Notes:

- The cardiovascular system is crucial for transporting oxygen and nutrients.
- Disorders can significantly impact overall health.

Questions?

Thank you