

SNS COLLEGE OF ALLIED HEALTH SCIENCE

Affiliated to The Tamil Nadu Dr. M.G.R Medical University, Chennai

DEPARTMENT OF RADIOGRAPHY AND IMAGING TECHNOLOGY

COURSE NAME : HUMAN ANATOMY AND PHYSIOLOGY RELEVANT TO RADIOLOGY

UNIT :CARDIOVASCULAR SYSTEM

TOPIC : BLOOD PRESSURE & VASCULAR SYSTEM

FACULTY NAME : MRS.G.HELANA JOY

INTRODUCTION TO THE CARDIOVASCULAR SYSTEM (DEFINE)

What is Blood Pressure?

- The force exerted by circulating blood against the walls of blood vessels.
- Measured in mmHg (millimeters of mercury).
- Two values: **Systolic BP** (pressure during heart contraction) and **Diastolic BP** (pressure during heart relaxation).
- Normal BP range: ~120/80 mmHg.

Importance: Indicates cardiovascular health; high BP (hypertension) or low BP (hypotension) can lead to health issues.



RECORDING BLOOD PRESSURE

Tools: Sphygmomanometer (manual or digital), stethoscope (for manual measurement).

Procedure:

1. Patient sits comfortably, arm at heart level.
2. Cuff is placed around the upper arm.
3. Inflate cuff to ~180 mmHg, then slowly release.
4. Listen for Korotkoff sounds (first sound = systolic, disappearance = diastolic).

Types: Manual (mercury, aneroid) and automatic (digital) devices.

Factors affecting accuracy: Cuff size, patient position, stress, recent activity.



ANATOMY AND FUNCTION OF BLOOD VESSELS

All vessels (except capillaries) have three layers (Tunics):

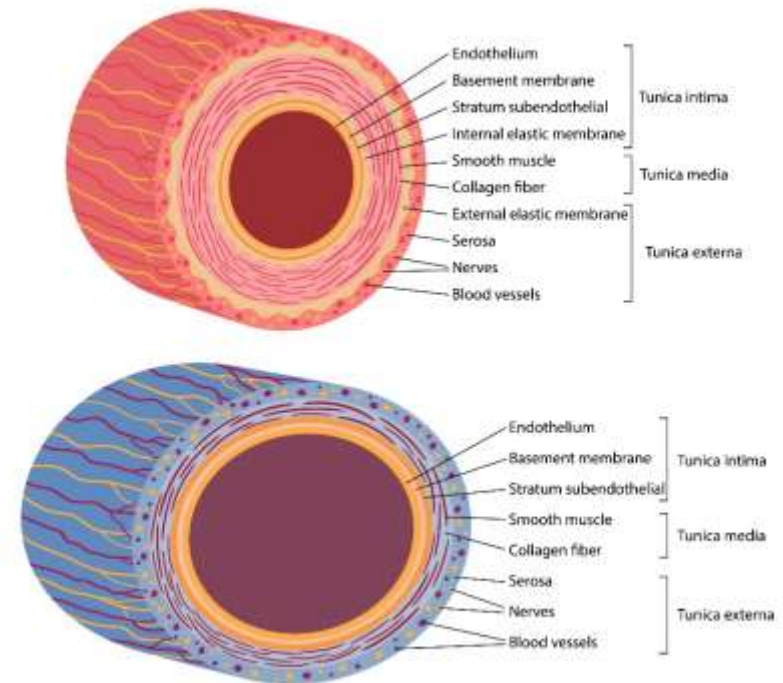
Tunica Intima: Innermost, endothelium (smooth lining).

Tunica Media: Middle, smooth muscle and elastic fibers (regulates diameter/BP).

Tunica Externa (Adventitia): Outermost, connective tissue (protection and support).

Function: Carry oxygenated blood from the heart under high pressure; elastic arteries expand and recoil to maintain BP.

Blood vessel anatomy



ANATOMY OF CAPILLARIES

Structure: Thin-walled (single layer of endothelial cells), small diameter ($\sim 5\text{-}10\ \mu\text{m}$).

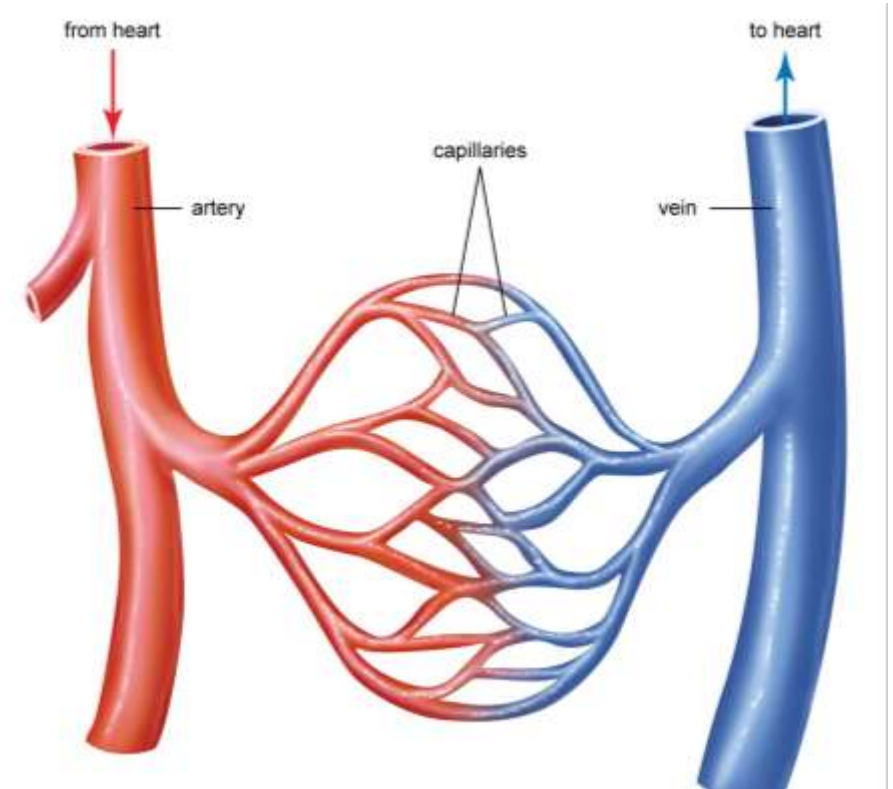
Types:

1.Continuous: Tight junctions, common in muscles, brain.

2.Fenestrated: Pores for filtration, in kidneys, intestines.

3.Sinusoidal: Large gaps, in liver, spleen.

Function: Site of exchange for oxygen, nutrients, and waste between blood and tissues.



THE ARTERIAL SYSTEM

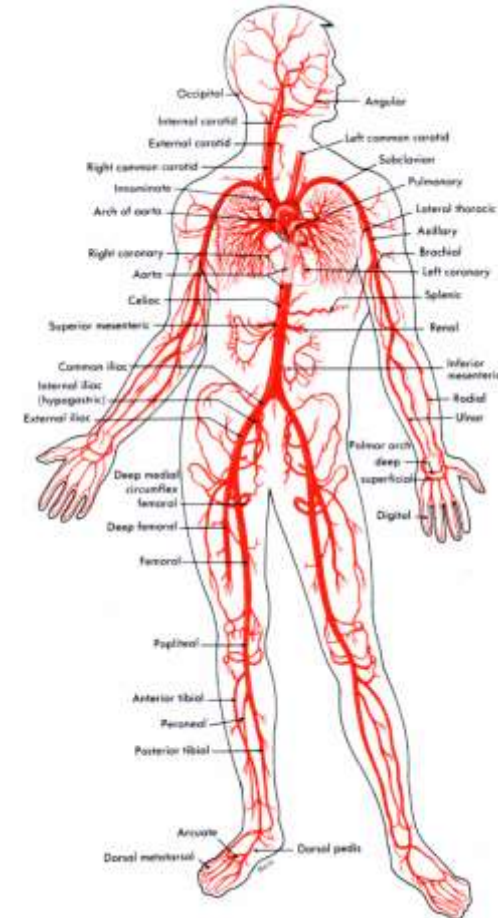
Comprises all arteries and arterioles in the body.

Major arteries: Aorta, coronary arteries, carotid arteries, femoral arteries.

Function:

- Distribute oxygenated blood from the heart to all body tissues.
- Maintain systemic pressure through elastic properties and vasoconstriction.

Regulation: Controlled by the autonomic nervous system and hormones (e.g., adrenaline).



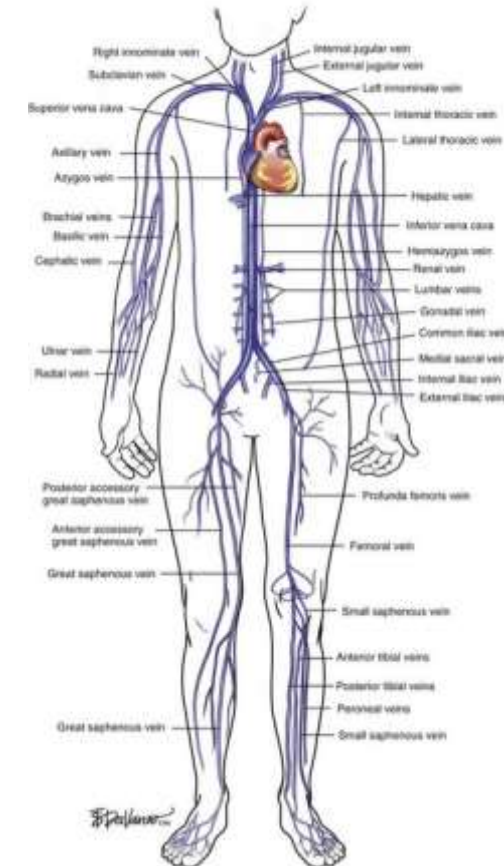
ANATOMY OF THE VENOUS SYSTEM

Structure: Similar to arteries but thinner tunica media, less elastic.

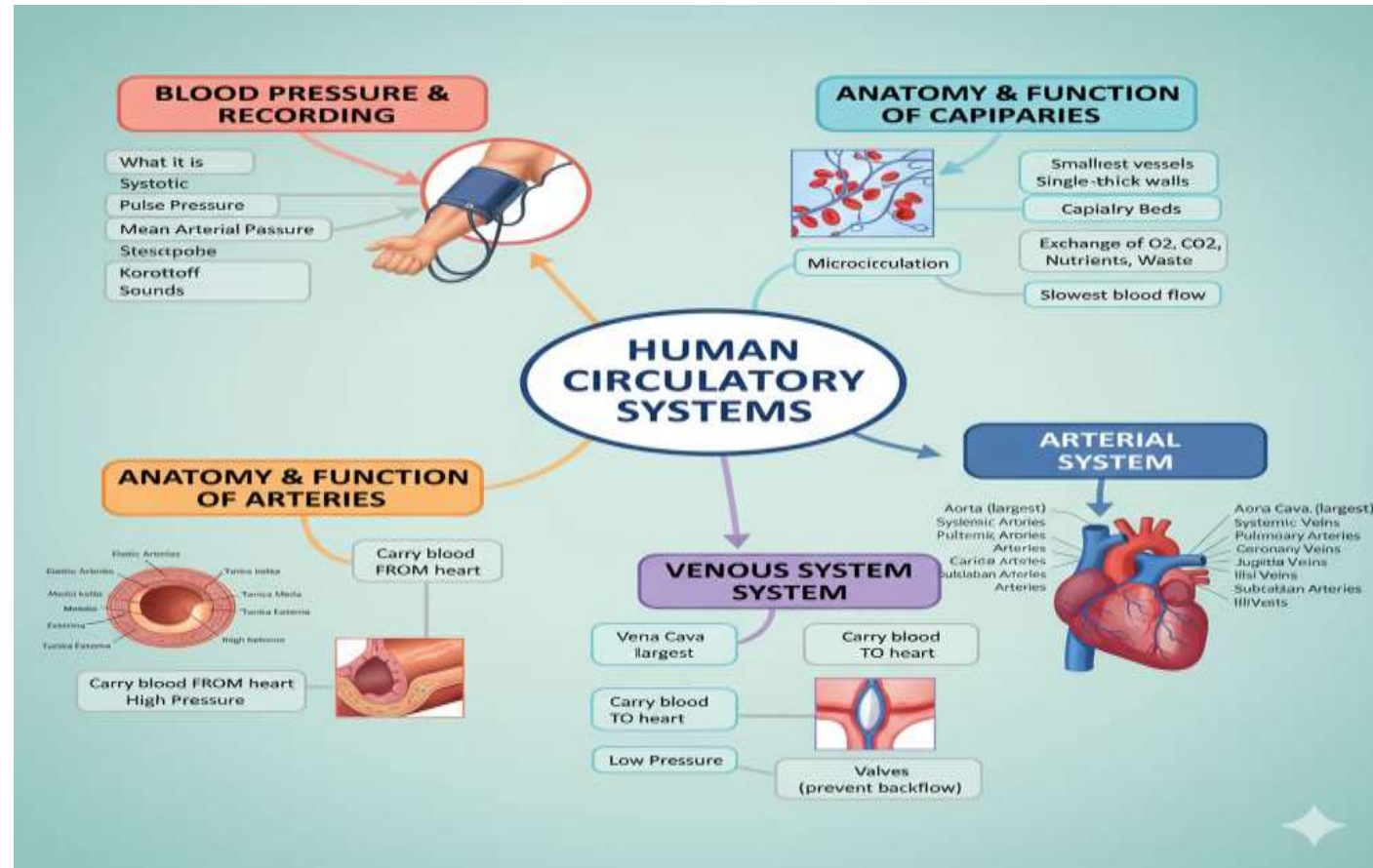
- Contain **valves** to prevent backflow of blood.

Types: Superficial veins (e.g., saphenous), deep veins (e.g., femoral), venous sinuses.

Function: Return deoxygenated blood to the heart (except pulmonary veins).



SUMMARY



References

- Tortora, G. J., & Derrickson, B. (2017). Principles of Anatomy and Physiology. 15th ed. Wiley.
- <https://www.mayoclinic.org/diseases-conditions/high-blood-pressure/in-depth/blood-pressure/art-20050982>
- <https://www.ncbi.nlm.nih.gov/books/NBK279250/>