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 - RECAP

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INTRODUCTION TO THE CARDIOVASCULAR SYSTEM (DEFINE)

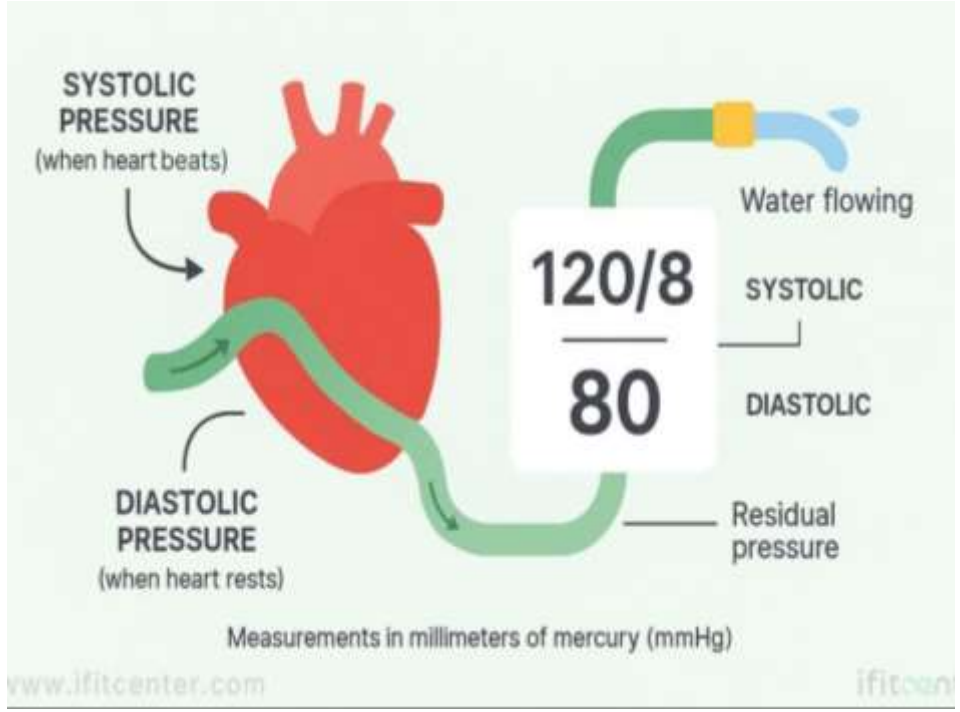
What is Blood Pressure?

- The force exerted by circulating blood against the walls of blood vessels.
- Measured in mmHg (millimeters of mercury).

INTRODUCTION TO THE CARDIOVASCULAR SYSTEM (DEFINE)

- 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).

RECORDING BLOOD PRESSURE

- **Types**: Manual (mercury, aneroid) and automatic (digital) devices.
- **Factors affecting accuracy**: Cuff size, patient position, stress, recent activity.

Electronic digital sphygmomanometer

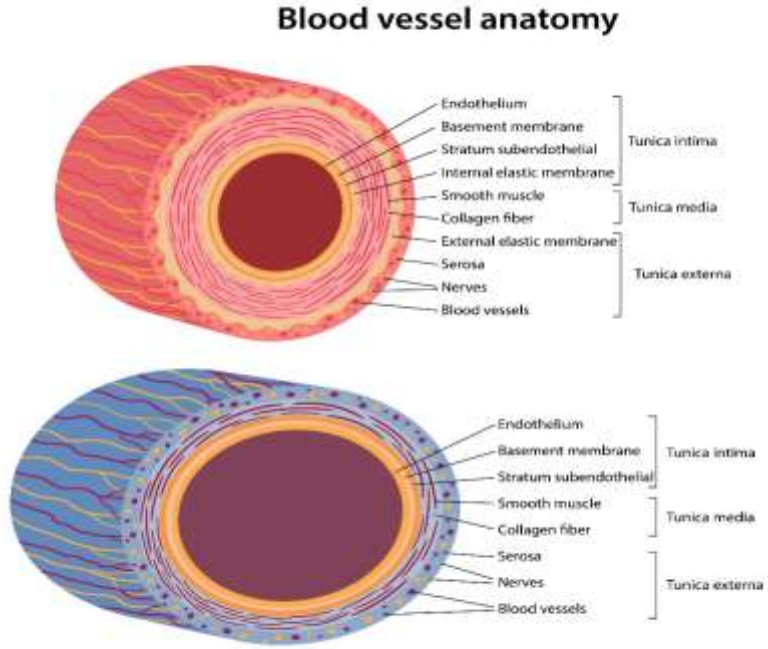

Manual aneroid sphygmomanometer


Manual mercury sphygmomanometer

ANATOMY OF BLOOD VESSELS

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

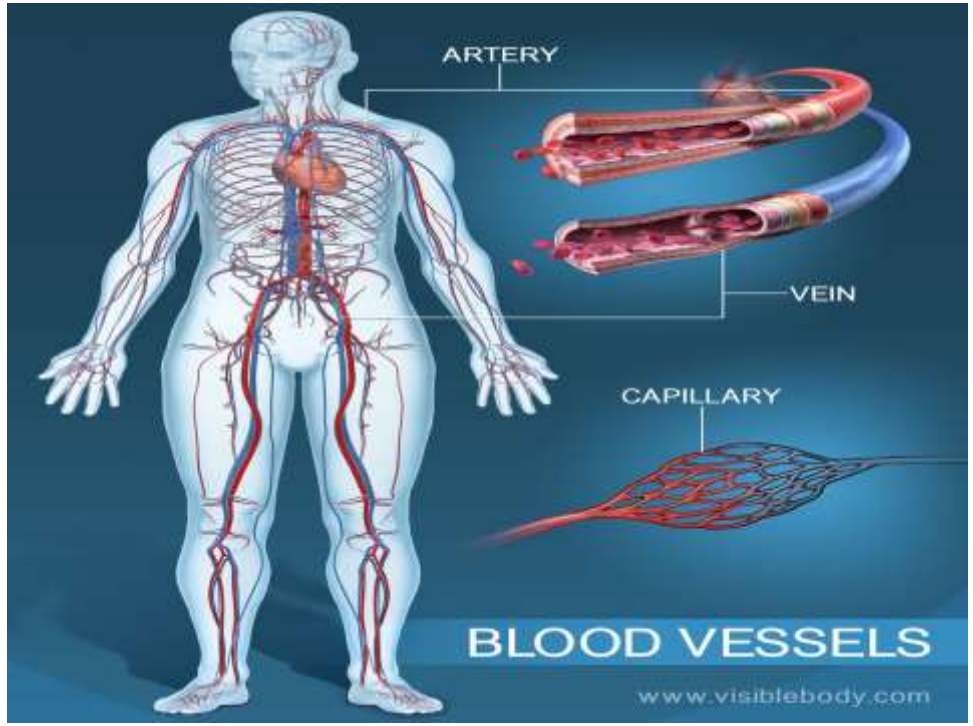
- **Tunica Intima:** Innermost, endothelium (smooth lining).
- **Tunica Media:** Middle, smooth muscle and elastic fibers (regulates diameter/BP).
- **Tunica Externa (Adventitia):** Outermost, connective tissue (protection and support).



FUNCTION OF BLOOD VESSELS

Function:

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



ANATOMY OF CAPILLARIES

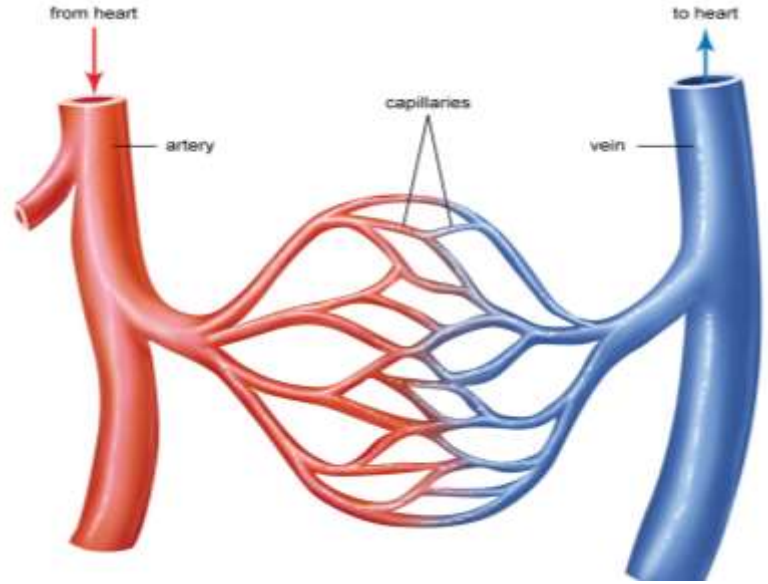
Structure: Thin-walled (single layer of endothelial cells), small diameter (~5-10 µm).

Types:

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

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

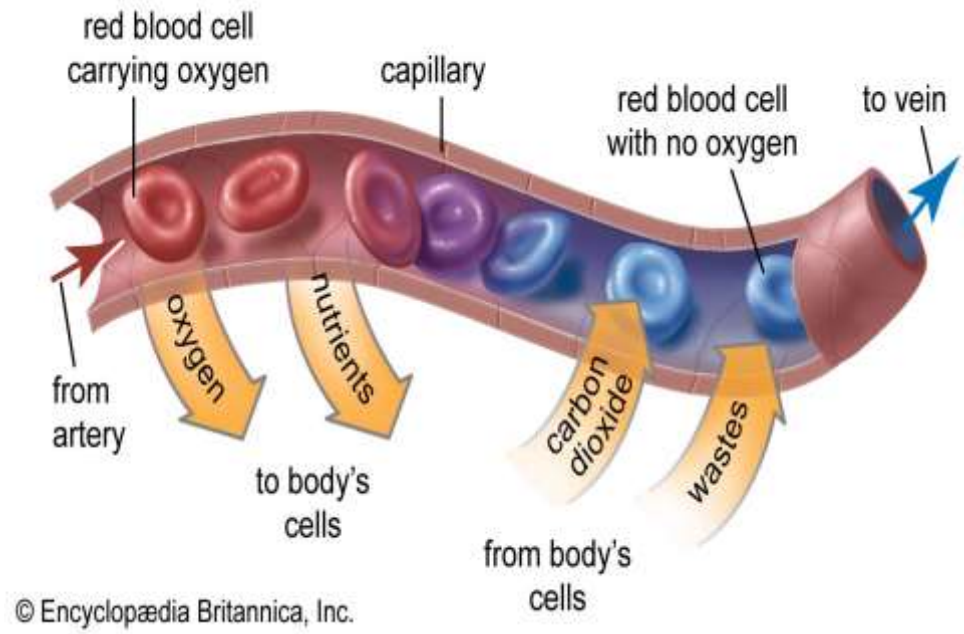
3.Sinusoidal: Large gaps, in liver, spleen.



FUNCTIONS OF CAPILLARIES

Function:

- Site of exchange for oxygen
- Nutrients
- Waste between blood and tissues.



THE ARTERIAL SYSTEM

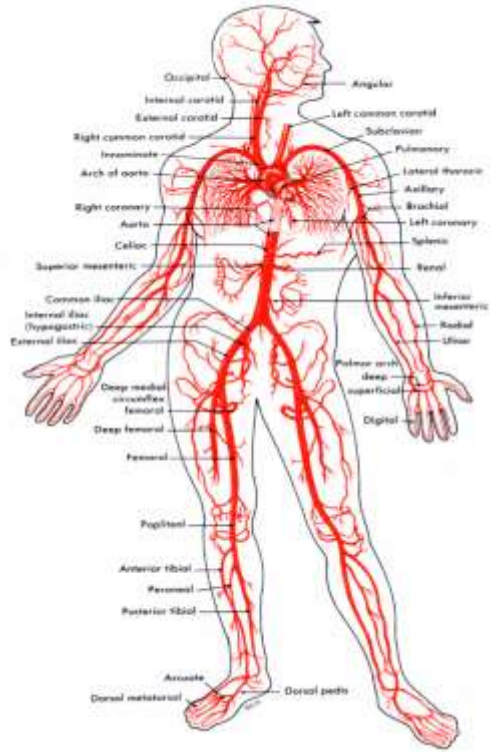
Comprises all arteries and arterioles in the body.

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).



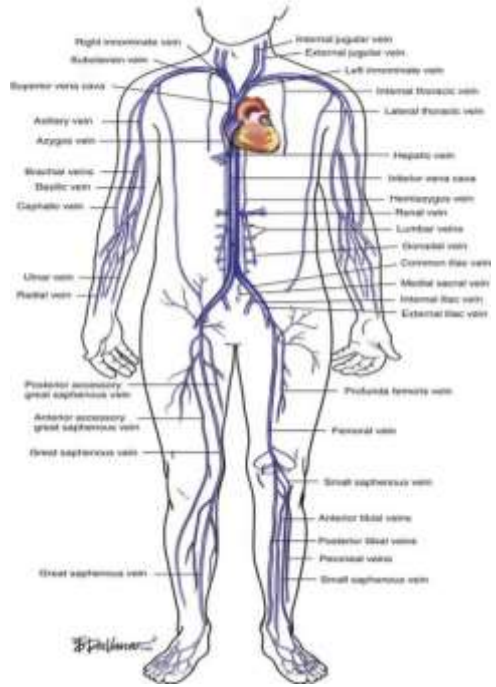
ANATOMY OF THE VENOUS SYSTEM

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

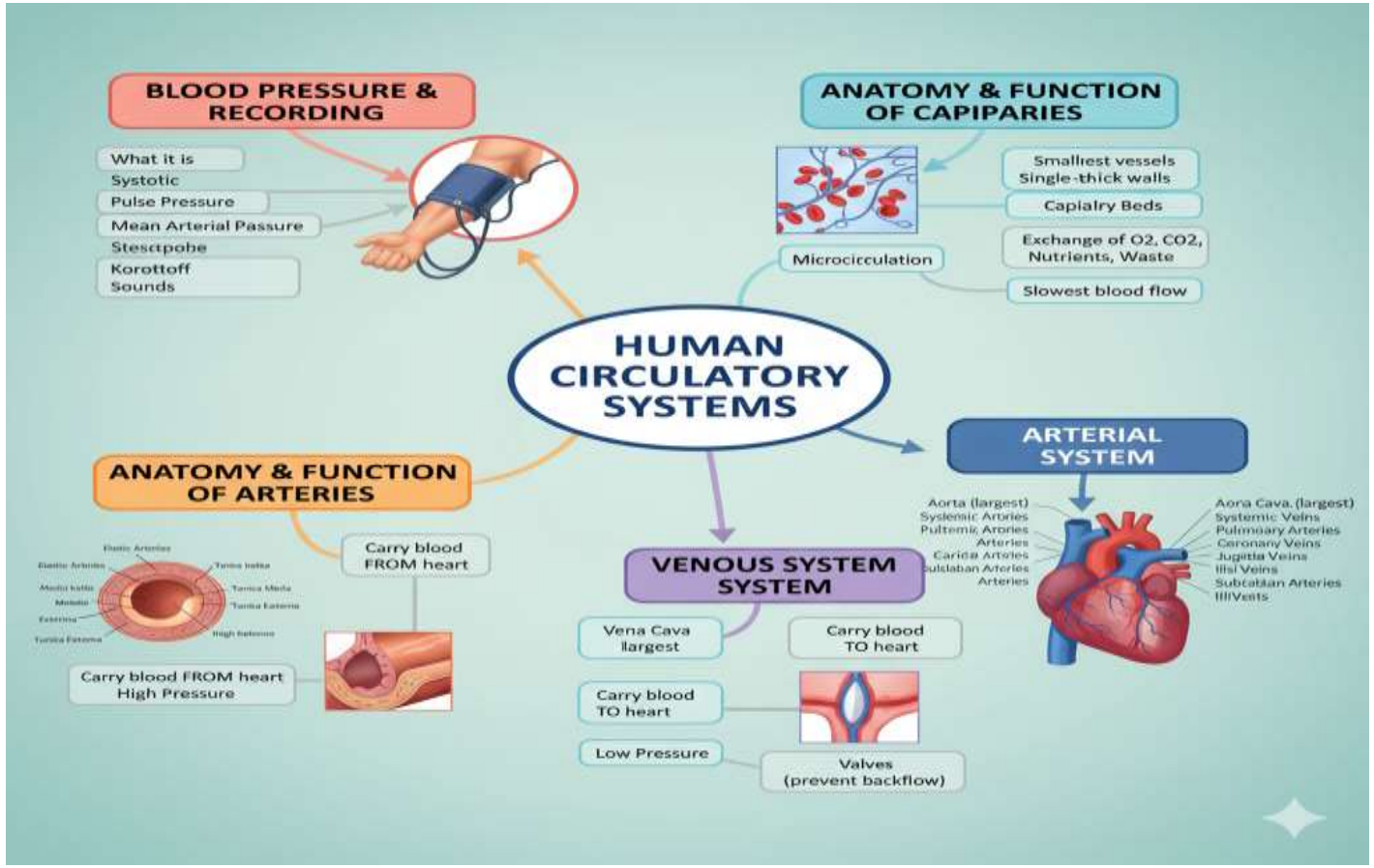
Contain **valves** to prevent backflow of blood.

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

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



SUMMARY


BLOOD PRESSURE & RECORDING
What it is
Systotic
Pulse Pressure
Mean Arterial Passure
Stesctpobe
Korottoff Sounds
ANATOMY & FUNCTION OF CAPIPARIES
Smallrest vessels Single-thick walls
Capialry Beds
Exchange of O2, CO2, Nutrients, Waste
Slowest blood flow
Microcicculation
HUMAN CIRCULATORY SYSTEMS
ANATOMY & FUNCTION OF ARTERIES
Carry blood FROM heart
Carry blood FROM heart High Pressure
VENOUS SYSTEM SYSTEM
Vena Cava llargest
Carry blood TO heart
Carry blood TO heart
Low Pressure
Valves (prevent backflow)
ARTERIAL SYSTEM
Aorta (largest)
Systemic Arteries
Pultemic Arteries
Arteries
Carida Artoles
Arteries
Aora Cava. (largest)
Systemic Veins
Pulmoary Arteries
Caronary Veins
Jugitla Veins
Ilsl Veins
Subcalan Arteries
IllVeits

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/