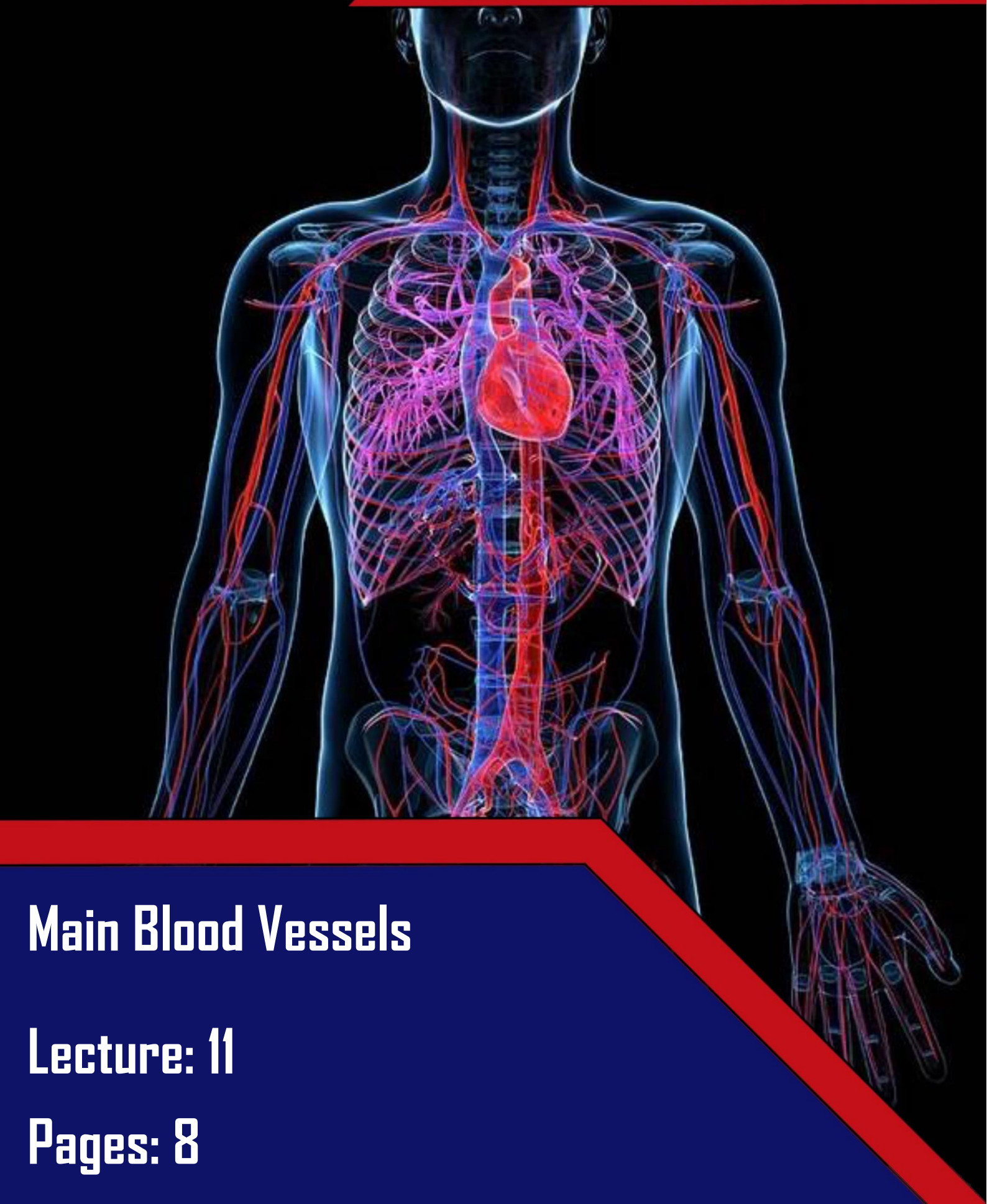
HATAHET ANATOMY



Main Blood Vessels

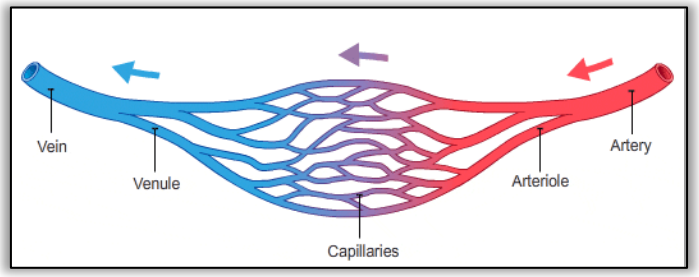
Lecture: 11

Pages: 8

Lecture 11: Blood vessels

Blood vessels are the tubes/channels through which the blood is distributed to all body tissues, classified into:

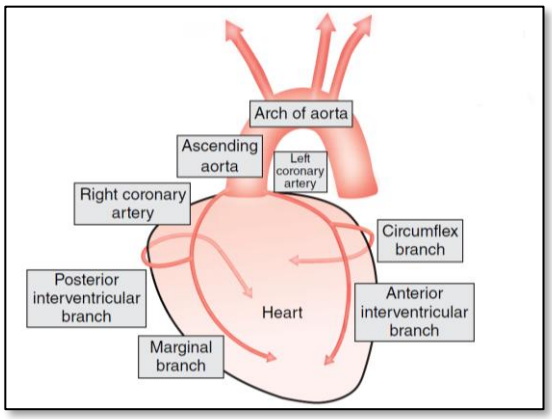
- **Arteries**, carry oxygenated blood from the heart to all tissues of the body
- Arterioles, , the smallest arteries of the body, form the arterial half of capillaries
- Capillaries, single-layered network of blood vessels where exchange of nutrient and waste takes place
- Venules, the smallest veins of the body, form the venous half of capillaries
- **Veins**, carry deoxygenated blood from body tissues to the heart



Main Arteries of the body

Aorta

- The largest artery in the entire body
- the first artery to exit the heart into the systemic circulation
- divided into 3 main branches:



➢ **Ascending aorta**, gives the coronary arteries:

1) Left coronary artery, divided into:
A. Anterior interventricular artery
B. Circumflex artery

2) Right coronary artery, divided into:
A. Posterior interventricular artery
B. Marginal artery

➢ **Arch of Aorta**, located at the level of **T4-T5 IV disc** and branches into:

1) Brachiocephalic trunk, further divided into:
A. Right Common Carotid Artery
B. Right Subclavian Artery

2) Left Common Carotid Artery
3) Left Subclavian Artery

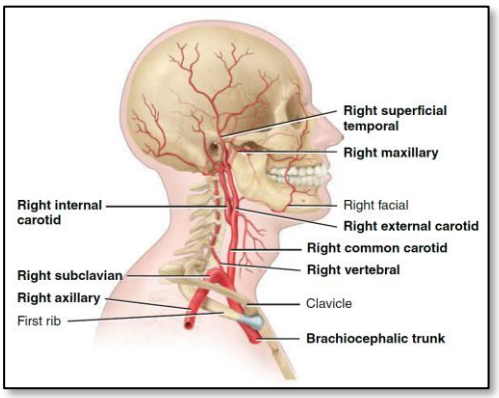
➢ **Descending aorta**, starts as the **Thoracic aorta** at the thoracic cavity, then it passes through the median hiatus of diaphragm to enter the abdominal cavity as the **Abdominal aorta**

Common Carotid artery

- the CCA gives blood supply to the Head & Neck regions
- it is divided at the level of **C3-C4 IV disc** (or the superior border of thyroid cartilage) into:

➢ Internal carotid artery

- has NO branches in the neck
- enters the cranium through the **Carotid canal**
- supplies the brain



➢ External carotid artery

- gives 8 branches to the head & neck
- it does NOT enter the skull
- terminates into 2 branches at the (**Temporomandibular joint - TMJ**):

❶ Maxillary artery → gives 15 branches, and the most important one is the Middle meningeal artery that enters the cranium through the Pterion

❷ Superficial Temporal artery → ascends anterior to the ear, and its pulse can be felt there

Subclavian artery

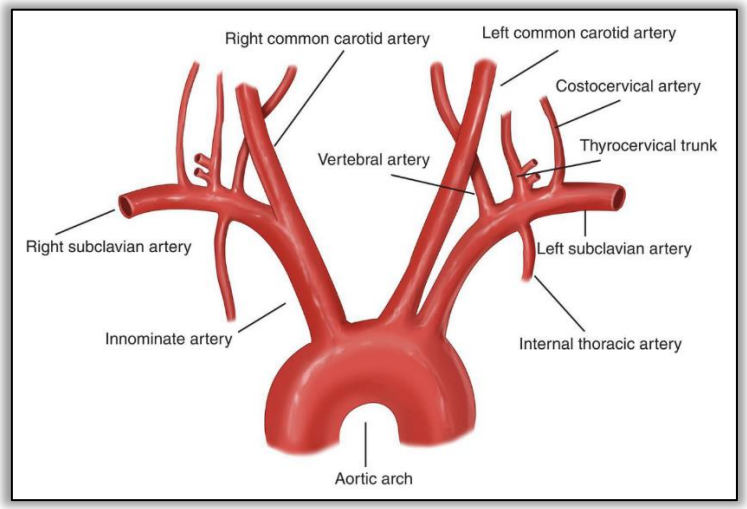
➢ Vertebral artery

- runs through the transverse foramina of the first 6 cervical vertebrae
- skips the transverse foramen of C7; to prevent the formation of 90^{o} kink which closes the artery (it doesn't happen)
- enters the cranium through the foramen magnum and supplies the brain

➢ Internal thoracic artery, gives rise to 11 pairs of Anterior intercostal arteries

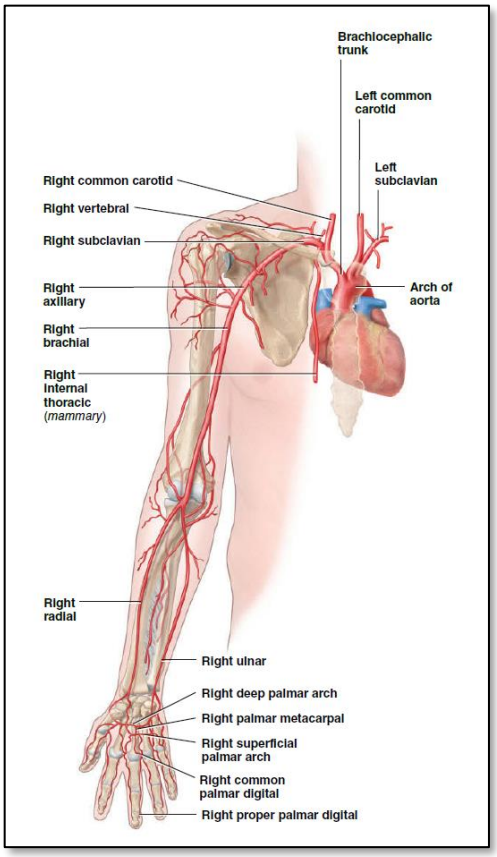
➢ Thyrocervical trunk, supplies the thyroid gland & the neck

➢ Costocervical trunk, gives rise to the upper 2 pairs of Posterior intercostal arteries & supplies the neck



➢ Axillary artery

- begins at the outer border of the **1st rib**
- when it reaches the inferior border of **Teres major**, it becomes the (**Brachial artery**)



➢ Brachial artery

- begins at the lower border of Teres major
- gives the (Deep brachial artery) that will join the Radial artery
- divides at the **Cubital fossa** (below the anterior elbow joint) into:

1) Ulnar artery

- the large and medial artery
- forms the **Superficial palmar arch** of the hand

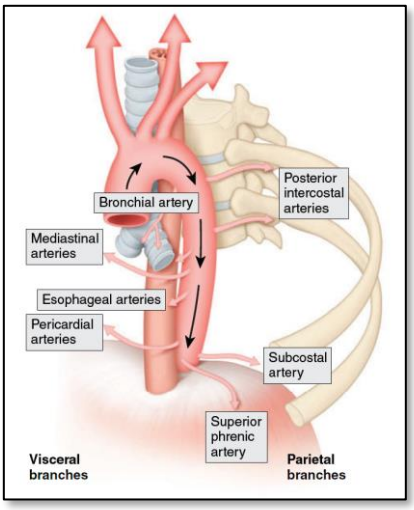
2) Radial artery

- the small and lateral artery
- forms the **Deep palmar arch** of the hand

Thoracic Aorta

➢ Visceral branches (supplying organs)

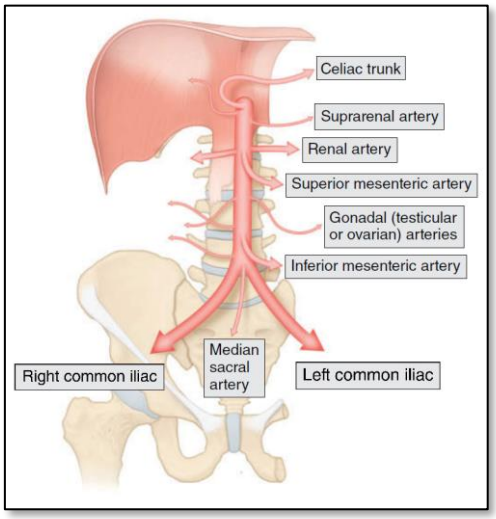
1) Bronchial artery
2) Mediastinal artery
3) Esophageal artery
4) Pericardial artery



➢ Parietal branches (supplying muscles)

1) 3-11 Posterior intercostal arteries, supplies intercostal muscles
2) Subcostal artery
3) Superior Phrenic artery, supplies the diaphragm

Abdominal Aorta (3x3x3)



➢ Anterior branches (x3)

1) Celiac trunk, supplies foregut, divides into:

A. Splenic artery
B. Common hepatic artery
C. Left gastric artery

2) Superior mesenteric artery, supplies midgut
3) Inferior mesenteric artery, supplies hindgut

➢ **Lateral branches (x3)**

1) **Suprarenal arteries**, supplies the suprarenal gland (Adrenal gland)
2) **Renal arteries**, supplies the kidneys
3) **Gonadal (Testicular or Ovarian) arteries**, supplies the sex glands, either testicles in males or ovaries in females

➢ **Terminal branches (x3)**

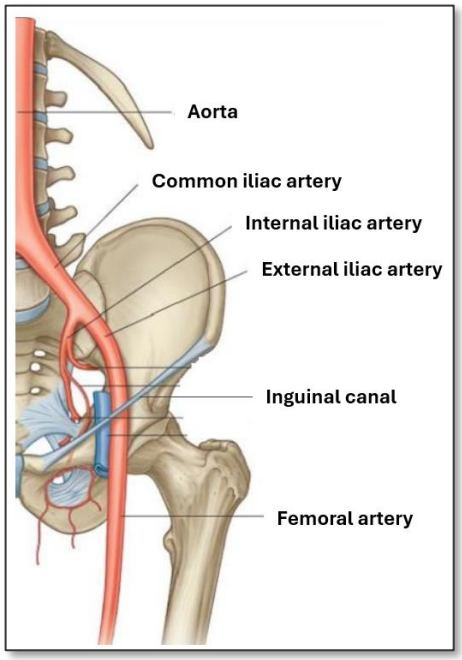
1) **Common iliac arteries (Right & Left)**, supplies the lower limbs, divides into:

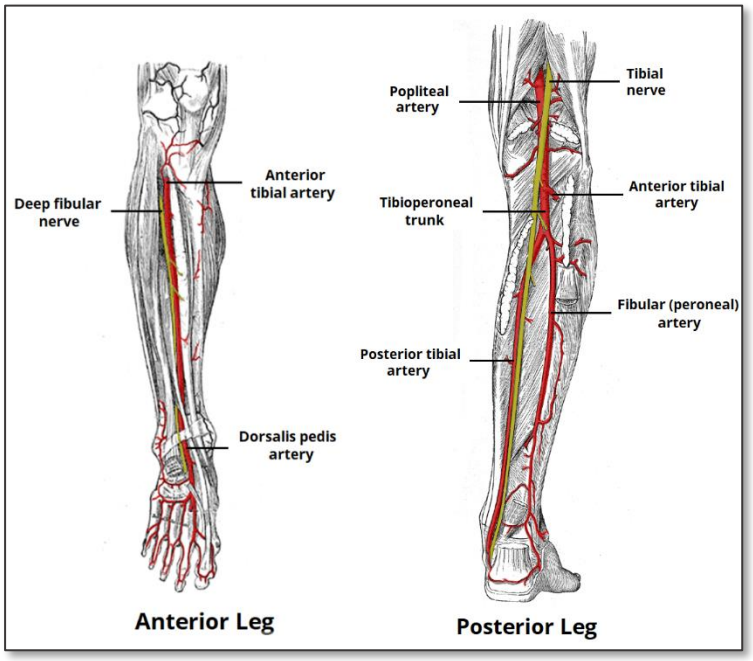
A. External iliac artery → continues at the inguinal ligament as the Femoral artery → continues at the popliteal fossa as the Popliteal artery → divides there into:

❶ Anterior tibial artery → gives the Dorsalis Pedis artery in the foot
❷ Posterior tibial artery → gives the Fibular artery (Peroneal artery)

B. Internal iliac artery, supplies the organs of the pelvis like urinary bladder and uterus

***Note**: Femoral artery will give a deeper branch called (Profundus/Deep femoral artery)





2) **Median sacral artery**, supplies the sacrum, coccyx, rectum, and anus

Main Veins of the body

In **arteries**, they start from the larger arteries then branch to smaller branches, but In **veins**, smaller veins join each other and become bigger and bigger until they reach the heart (SVC & IVC)

Veins of the **upper and lower limbs** are either:

- **Superficial veins** → visible under the skin (in the superficial fascia)
- **Deep veins** → follow the course of the arteries and have their names

Superior Vena Cava

- drains the head, neck, and the upper limbs
- a lot shorter than the inferior vena cava
- formed by the union of R&L Brachiocephalic veins

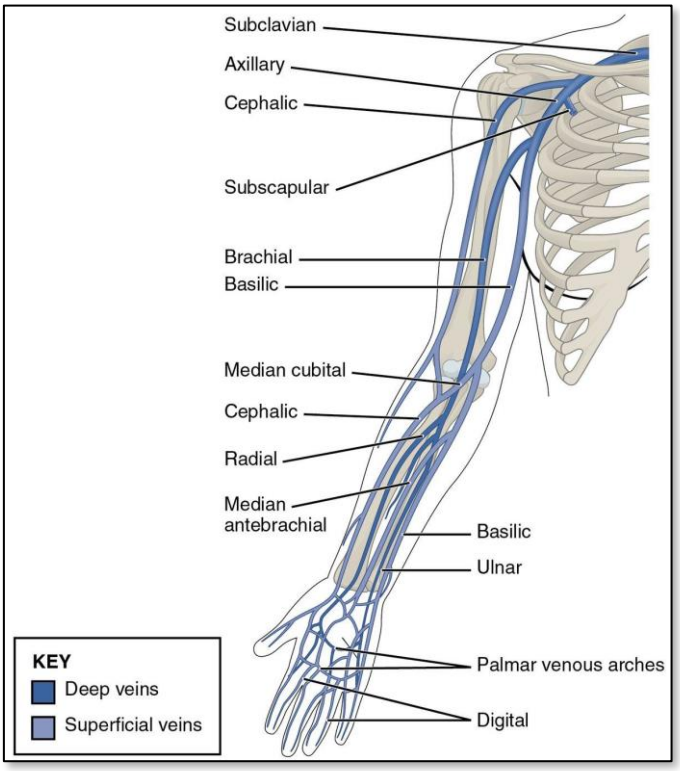
➢ Upper limbs

• Superficial veins:

1) Basilic vein
- drains the medial arm
- empties in the **brachial vein**

2) Cephalic vein
- drains the lateral arm
- empties in the **axillary vein**

3) Medial cubital vein
- small vein anterior to the elbow joint
- formed by the Cephalic & Basilic veins
- used commonly for IV cannula & venipuncture



• Deep veins:

1) Radial vein
- drains the lateral forearm
- empties in the **brachial vein**

2) Ulnar vein
- drains the medial forearm
- empties in the **brachial vein**

3) Brachial vein
- formed by the radial and ulnar veins
- empties in the **axillary vein**

4) Axillary vein
- receives all the superficial (basilic & cephalic) and deep (brachial) veins of the upper limbs
- empties in the **subclavian vein**

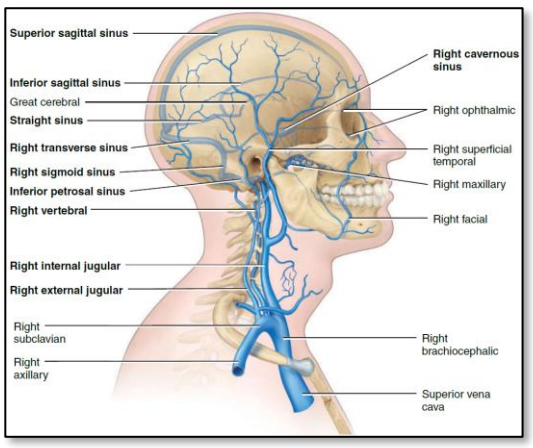
➢ Head and Neck

1) Jugular veins

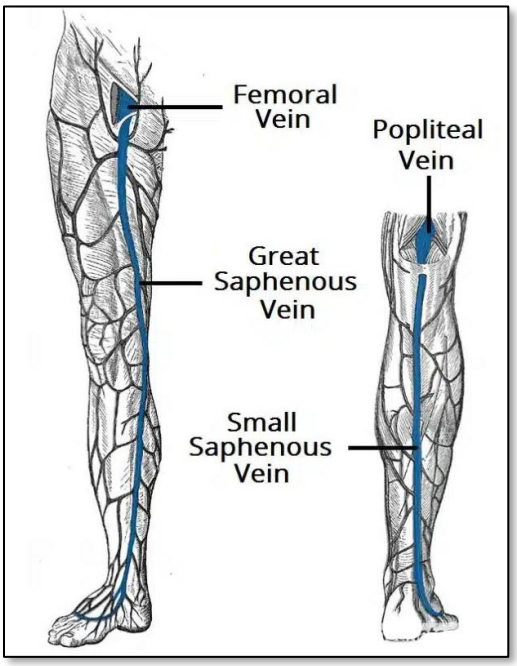
A. Internal jugular vein
- exits skull through the jugular foramen
- empties in the brachiocephalic vein

B. External jugular vein
- empties into the subclavian vein

2) Vertebral veins
- pass through the transverse foramina of the cervical vertebrae
- empties in the brachiocephalic vein.



Inferior Vena Cava



➢ **Abdominal cavity veins**

➢ **Lower limbs**

- **Superficial veins:**

1) Great saphenous vein:

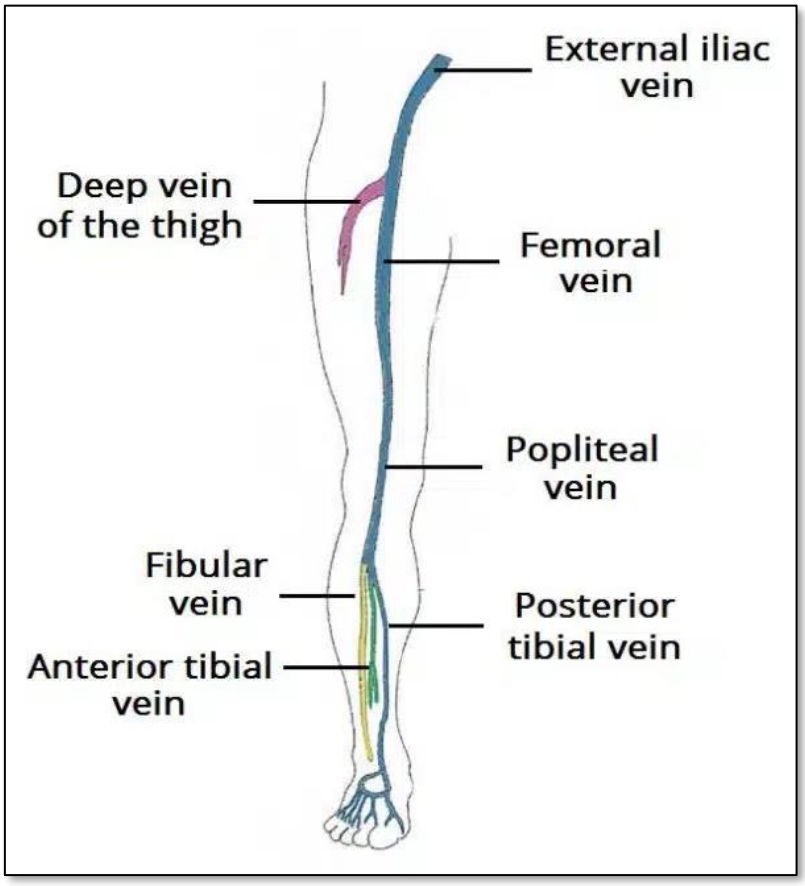
- begins anterior to the medial malleolus of the tibia
- ascends superiorly along the medial aspect of leg and thigh
- empties into the **femoral vein**
- commonly used in the Coronary artery bypass surgery

2) Small saphenous vein:

- begins posterior to the lateral malleolus of the fibula
- ascends superiorly deep within the muscles of the leg
- empties at the **popliteal vein** at the popliteal fossa

- **Deep veins:**

1) **Anterior tibial vein**, drains the leg and empties in the popliteal vein
2) **Posterior tibial vein**, drains the leg and empties in the popliteal vein
3) **Fibular vein** **(Peroneal vein)**, drains the leg and empties in the popliteal vein
4) **Popliteal vein**, empties in the **Femoral vein** which empties in the **External iliac vein** which empties in the **Common iliac vein** which empties in the **Inferior vena cava** :)

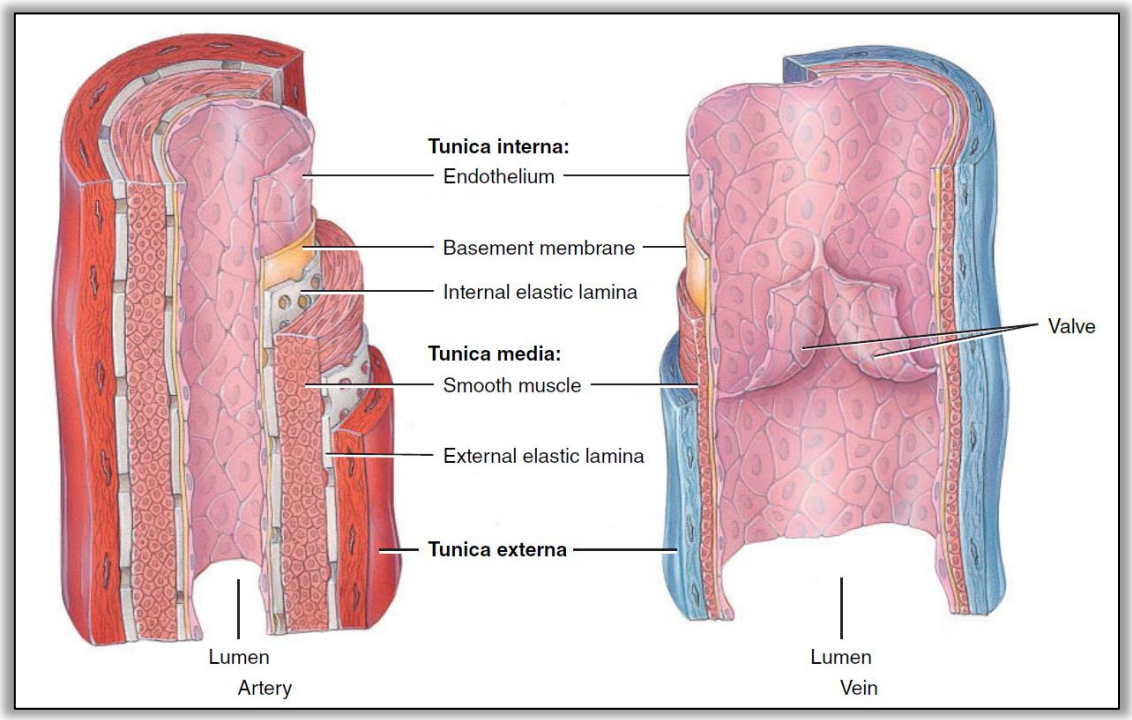


Miscellaneous

Histology of blood vessels

The blood vessels are hollow tubes, each one of them is composed of 3 main layers (Tunics):

❶ **Tunica intima (Inner)** → composed of endothelium "Epithelial tissue"
❷ **Tunica media (Middle)** → composed of smooth muscles "Muscular tissue", this is the main layers in arteries
❸ **Tunica adventitia (Outer)** → composed of elastic CT "Connective tissue", this is the main layer in veins



***Note**: The tunica media in arteries is rich in elastic fibers, so it has the ability to retain its shape after certain force has been removed. This doesn't happen in veins

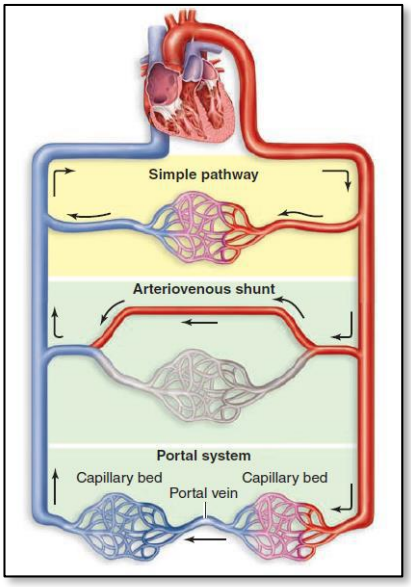
Unique circulations

[1] Arteriovenous shunt

- it is the movement of blood from peripheral arteries to veins directly; bypassing capillaries
- functions in transporting heat from the peripheries (hands, feet, ears, nose) into the deep organs

[2] Portal system

- venous blood from the GIT passes through the liver via the **Portal vein** before entering the systemic circulation; to detoxify and toxins
- it can either activate or degenerate swallowed drugs (**1st pass effect**)



Brain Arterial supply

The arterial blood supply of the brain is (at your level) is provided by 4 arteries:

➢ Internal carotid arteries

- pass laterally to both R&L vertebral arteries
- gives 2 branches:

  ❶ Anterior cerebral arteries
  ❷ Middle cerebral arteries

➢ Vertebral arteries

- both R&L vertebral arteries meet together to form the **Basilar artery**
- the basilar artery will further divide into Posterior cerebral arteries

➢ **Anterior communicating artery**, it connects the inter carotid arteries together anteriorly

➢ **Posterior communicating arteries**, connect each posterior cerebral artery with the adjacent ICA

***Note**: All the listed arteries above form what is called "Circle of Willis" EXCEPT the middle cerebral artery