

Major Blood Vessels



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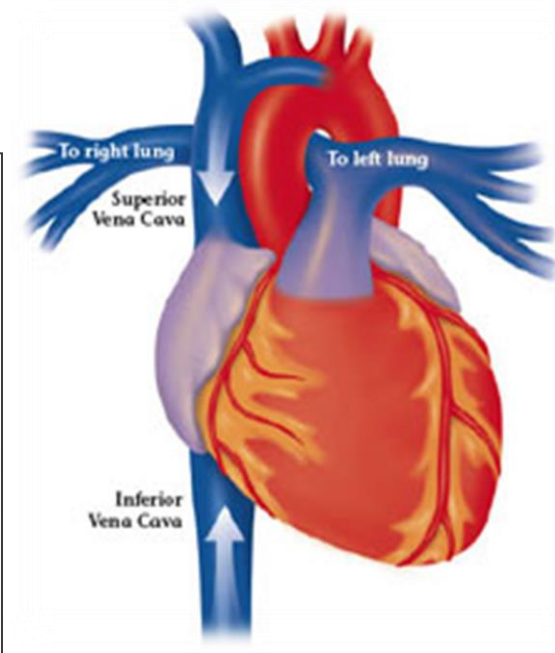
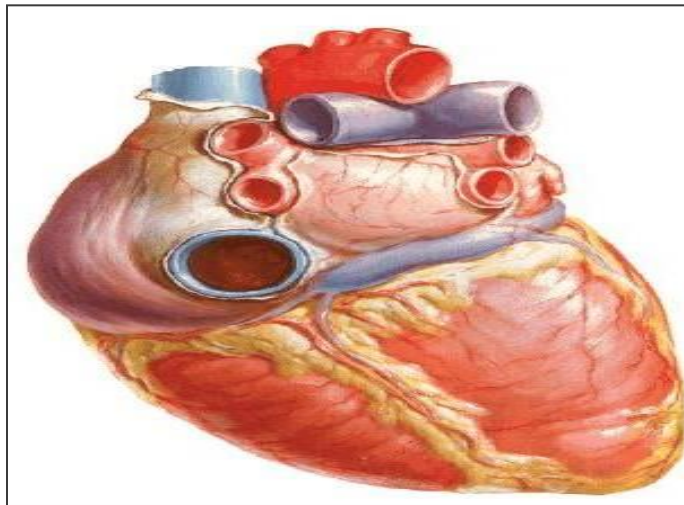
Objectives

At the end of the lecture, the student should be able to:

- ❖ **Define the veins**, and understand the **general principle** of the venous system.
- ❖ Describe the **superior & inferior Vena Cava** and their **tributaries**.
- ❖ List **major veins** and their **tributaries in the body**.
- ❖ Describe the **Portal Vein**.
- ❖ Describe the **Portocaval Anastomosis**.

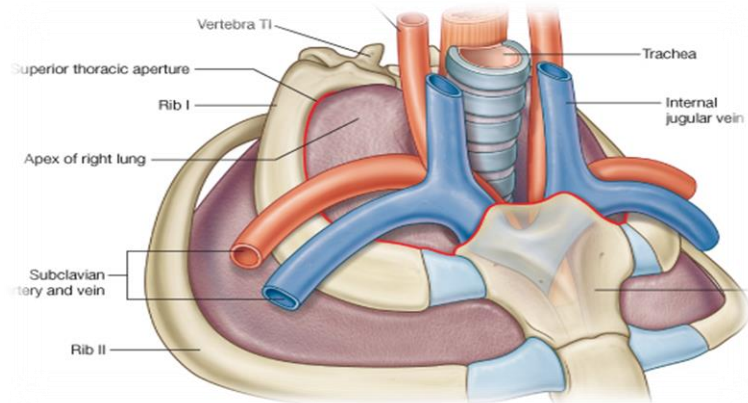
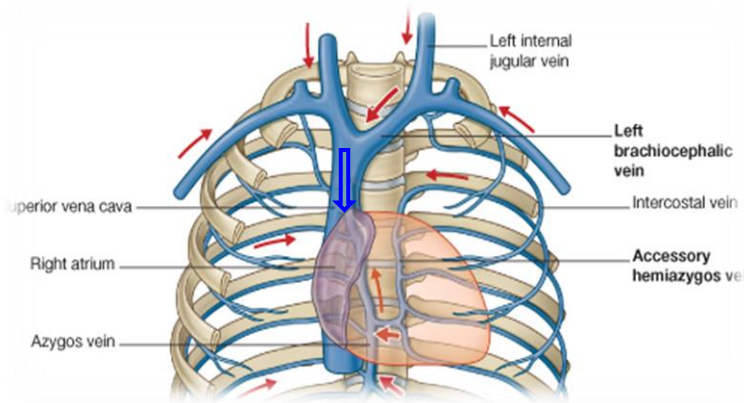
Veins

- ❖ Veins are **blood vessels** that bring blood back to the heart.
- ❖ All veins **carry deoxygenated blood**
 - with the exception of the **pulmonary veins** and **umbilical veins**.
- ❖ **There are two types of veins:**
 - **Superficial veins:** close to the surface of the body
 - ✓ NO corresponding arteries
 - **Deep veins:** found deeper in the body
 - ✓ With corresponding arteries
- ❖ **Veins of the systemic circulation:**
 - Superior and inferior vena cava with their tributaries
- ❖ **Veins of the portal circulation:**
 - Portal vein



Superior Vena Cava

- ❖ **Formed by** the union of the **right and left Brachiocephalic veins**.
 - **Brachiocephalic veins** are formed by the union of **internal jugular and subclavian veins**.
- ❖ **Drains venous blood from:**
 - Head & neck
 - Thoracic wall
 - Upper limbs
- ❖ **It Passes** downward and enter the **right atrium**.
- ❖ **Receives azygos vein** on the posterior aspect just **before** it enters the heart.



Veins of Head & Neck

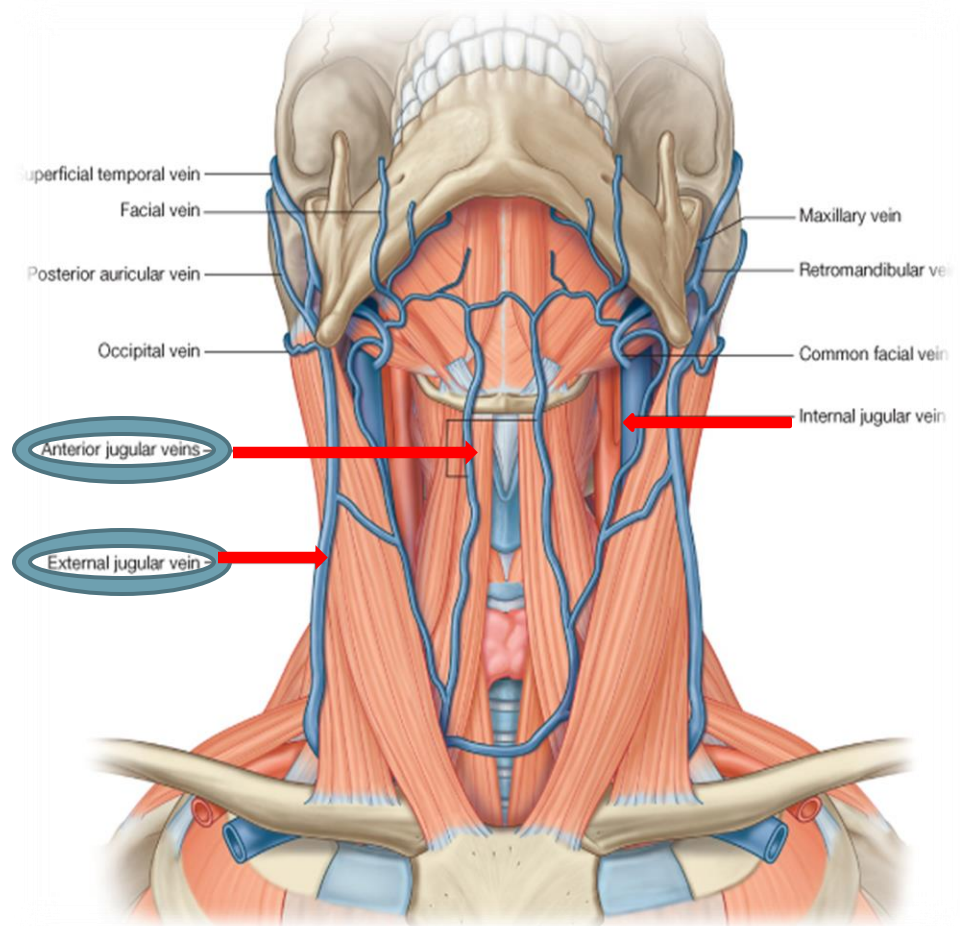
❖ Two divisions:

➤ Superficial Veins

- ✓ External Jugular veins
- ✓ Anterior jugular veins

➤ Deep Veins

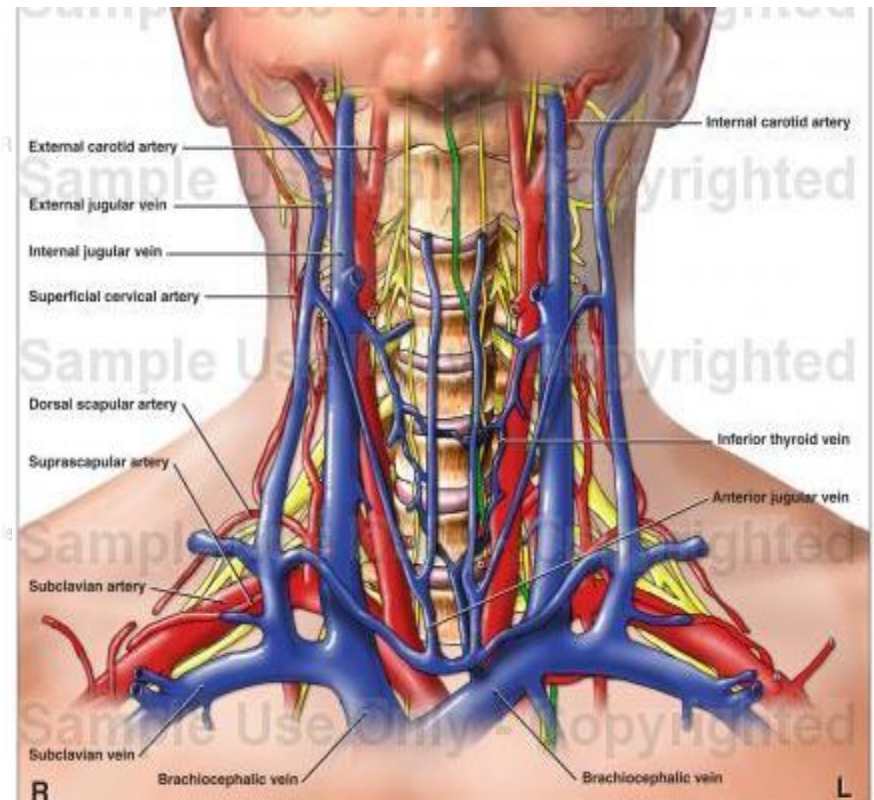
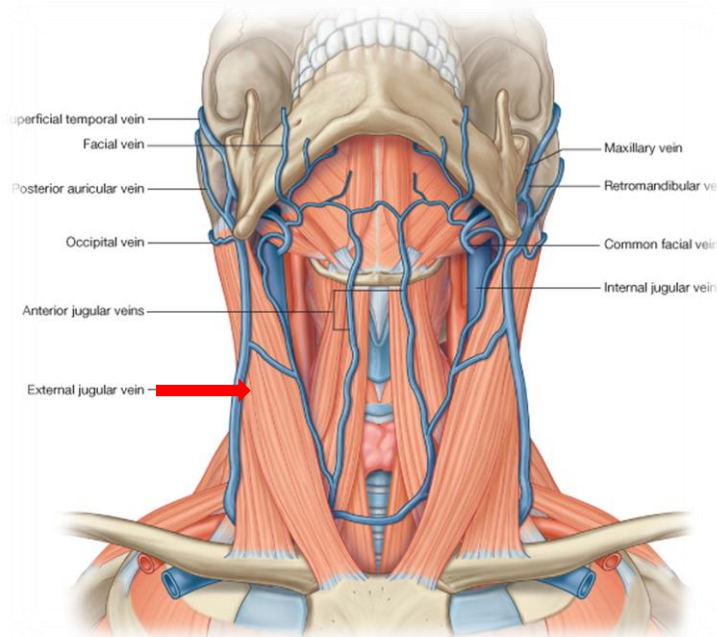
- ✓ Internal Jugulars veins.



Superficial Veins of Head & Neck

❖ External Jugular Veins:

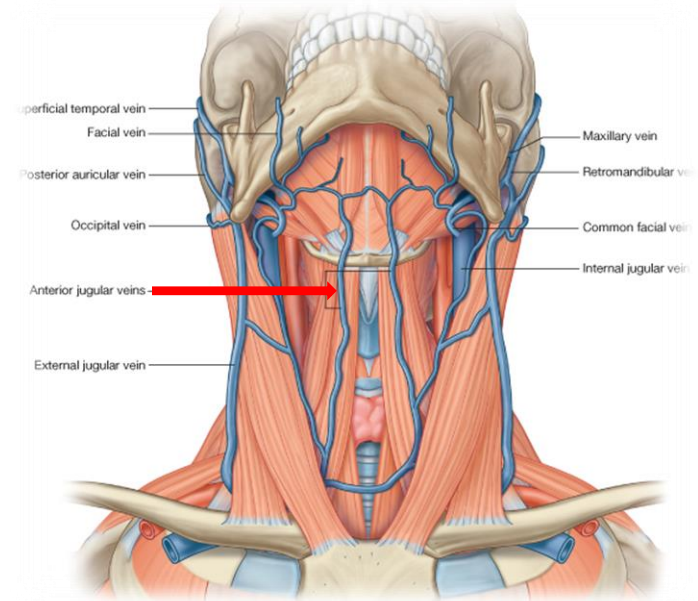
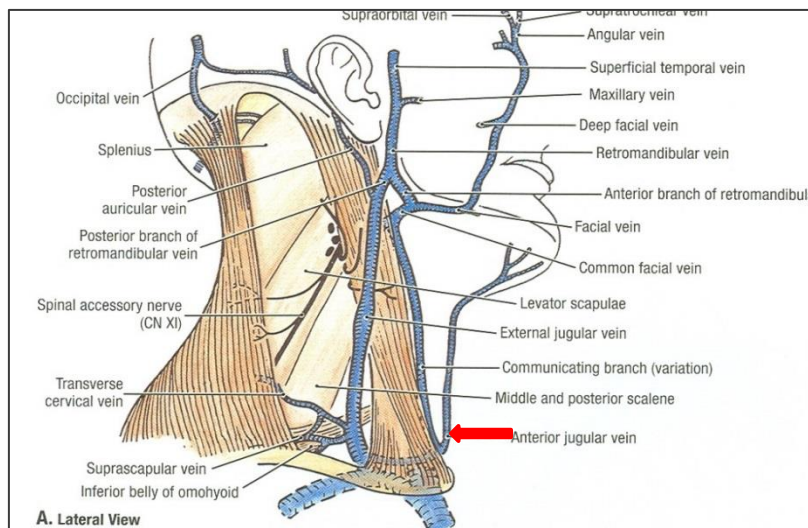
- Lies **superficial** to the **sternomastoid** muscle
- It passes down the neck and it is the **only tributary** of the **subclavian vein**.
- **It drains** blood from:
 - ✓ **Outside of the skull**
 - ✓ **Deep parts of the face.**



Superficial Veins of Head & Neck

❖ Anterior jugular veins:

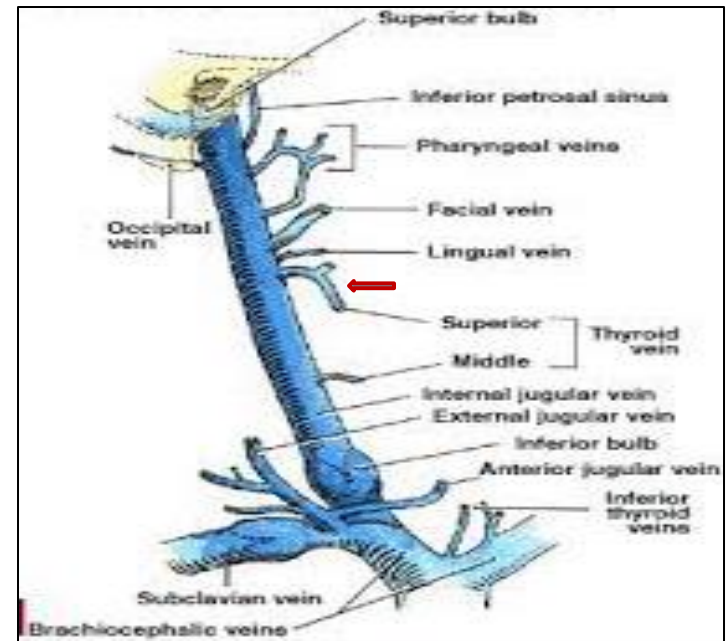
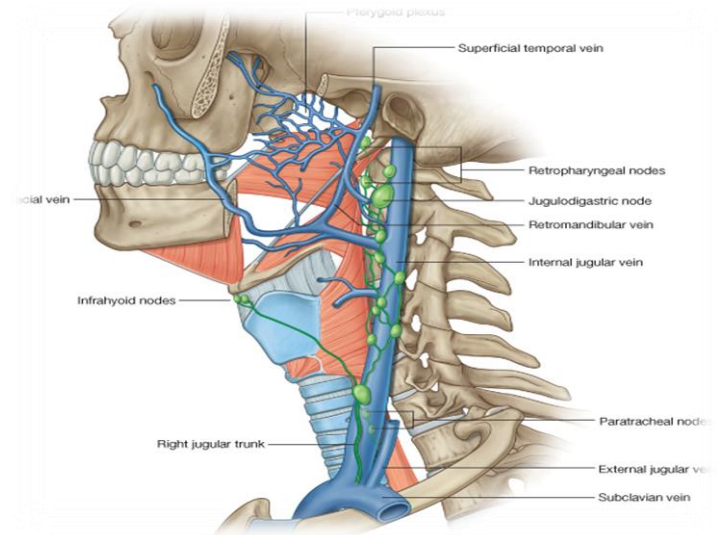
- **It begins** in the upper part of the neck by **the union of the submental veins**.
- It descends close to the median line of the neck, **medial to** the sternomastoid muscle.
- **At the lower part of the neck**, it passes laterally **beneath** that muscle to **drain into** the external jugular vein.
- **Just above the sternum** the **two anterior jugular veins** **communicate** by a **transverse vein** to form the **jugular arch**.



Deep Veins of Head & Neck

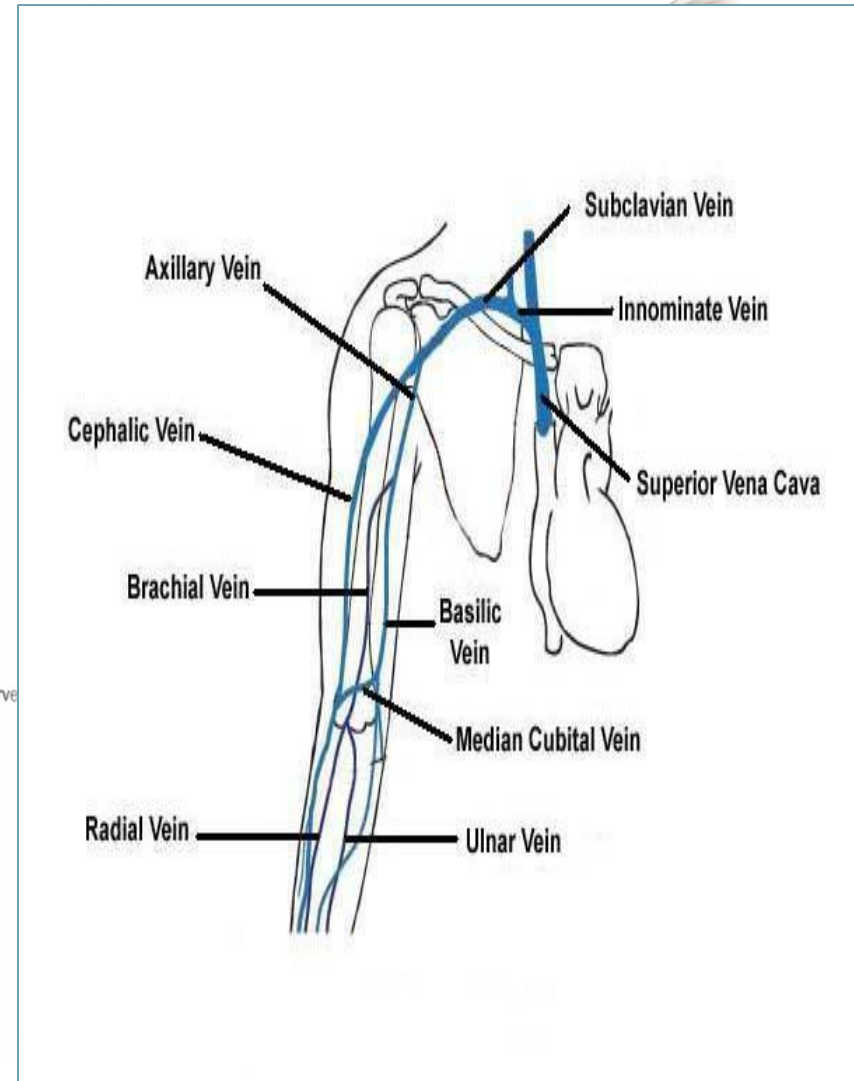
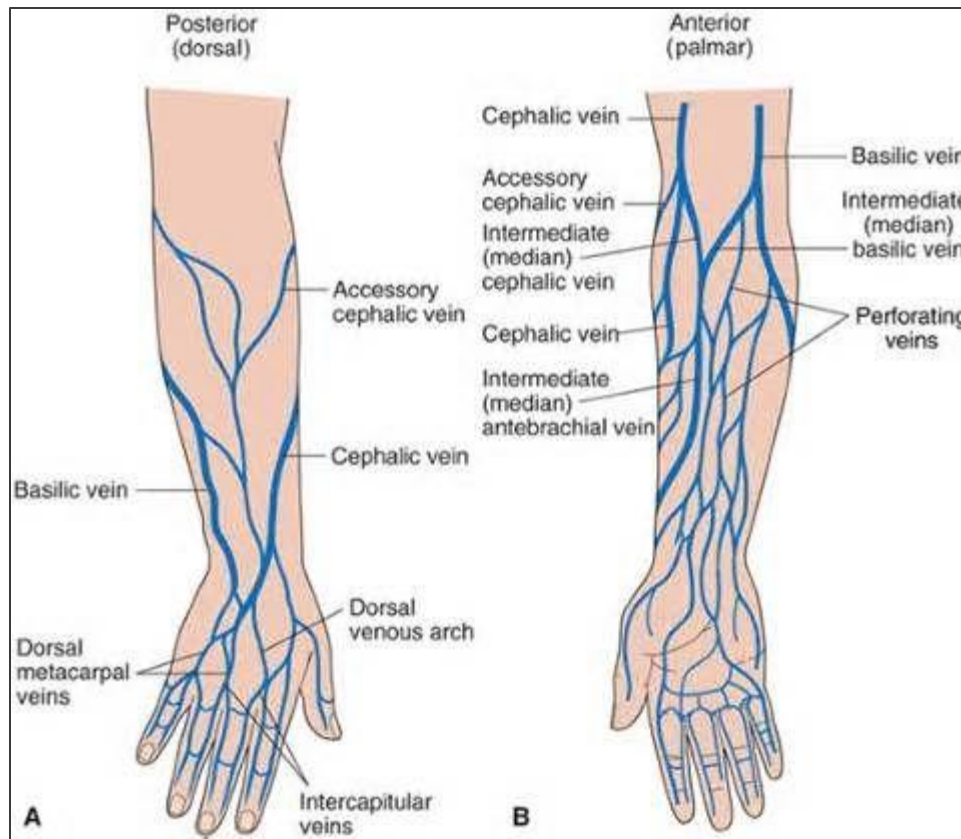
❖ Internal Jugular vein:

- **Drains** blood from the brain, face, head & neck.
- It descends in the neck along with the **internal** and **common carotid** arteries and **vagus nerve**, within the **carotid sheath**.
- Joins the **subclavian vein** to form the **brachiocephalic vein**.
- **Tributaries:**
 - ✓ Superior thyroid
 - ✓ Lingual
 - ✓ Facial
 - ✓ Pharyngeal.
 - ✓ Occipital veins
 - ✓ Dural venous sinuses (inferior petrosal sinus).



Veins of Upper Limbs

- ❖ Two divisions:
 - Superficial Veins
 - Deep Veins



Veins of Upper Limbs

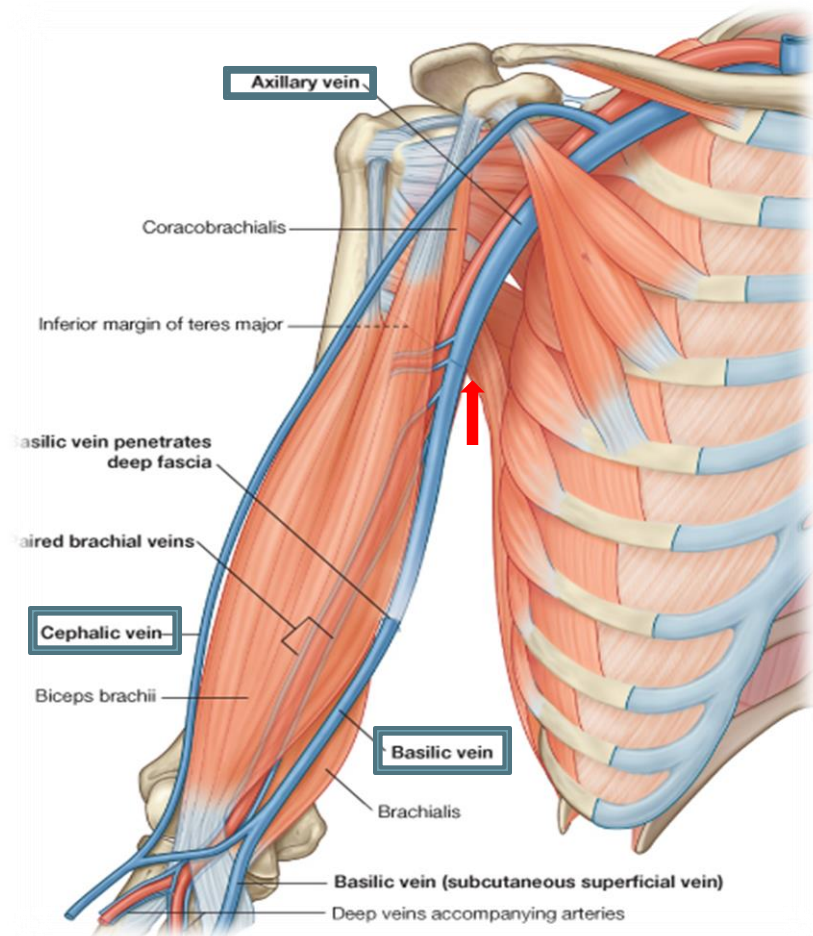
□ Superficial Veins

❖ Cephalic vein

- Ascends in the superficial fascia on the lateral side of the **biceps**.
- **Drains into** the **Axillary vein**.

❖ Basilic vein

- Ascends in the superficial fascia on the medial side of the **biceps**.
- Halfway up the arm, it pierces the deep fascia
- At the lower border of the **teres major** it joins the **venae comitantes** of the **brachial artery to form** the **Axillary vein**.



Veins of Upper Limbs

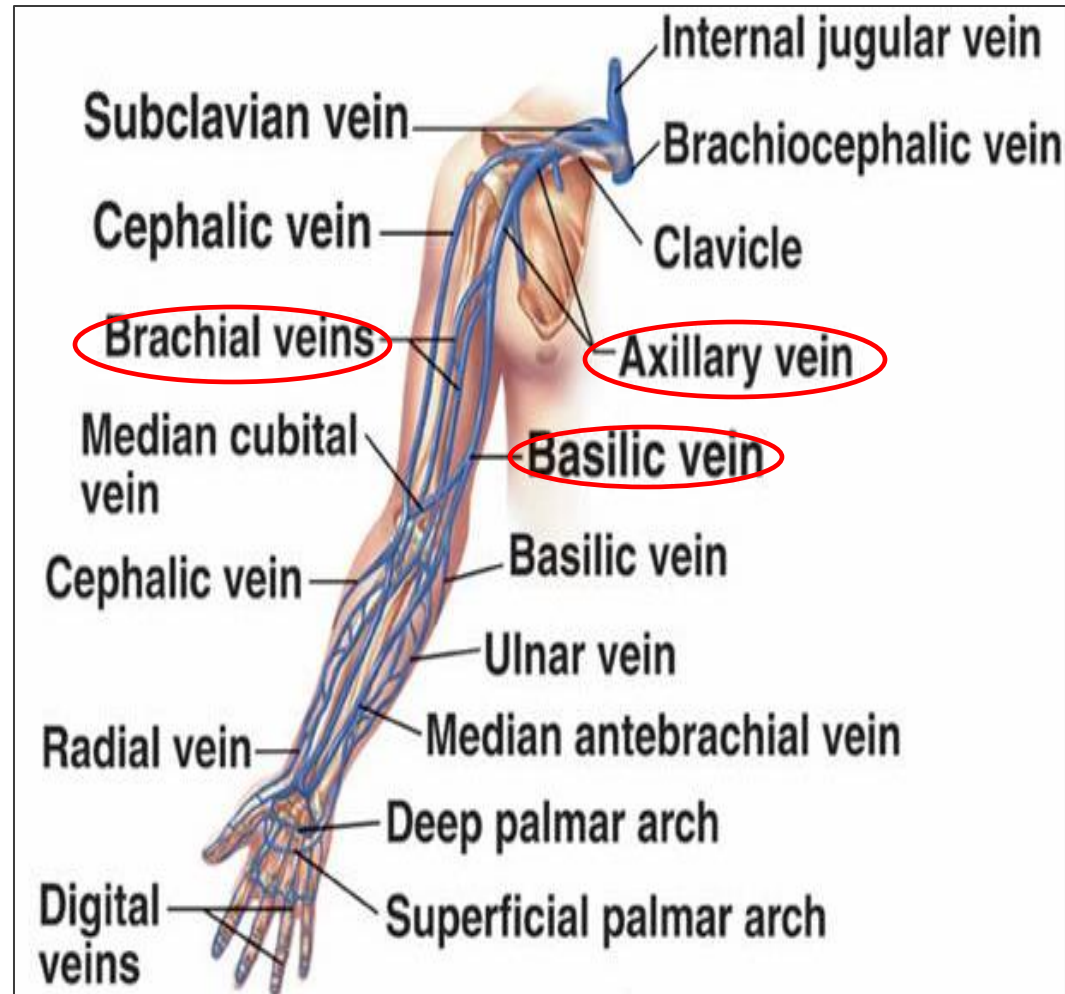
□ Deep Veins

❖ Venae comitantes

- Which accompany all the large arteries, usually in pairs.

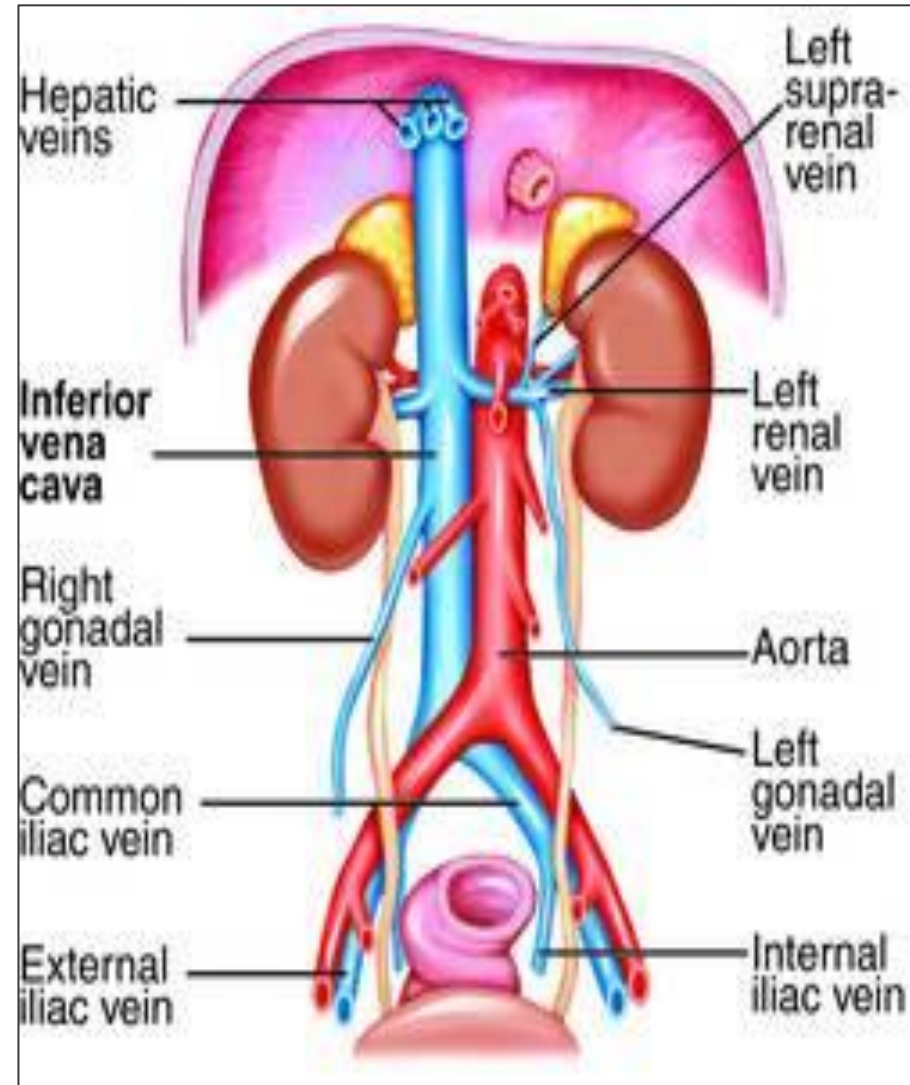
❖ Axillary vein

- **Formed by** the union of **basilic vein** and the **venae comitantes** of the **brachial artery**.



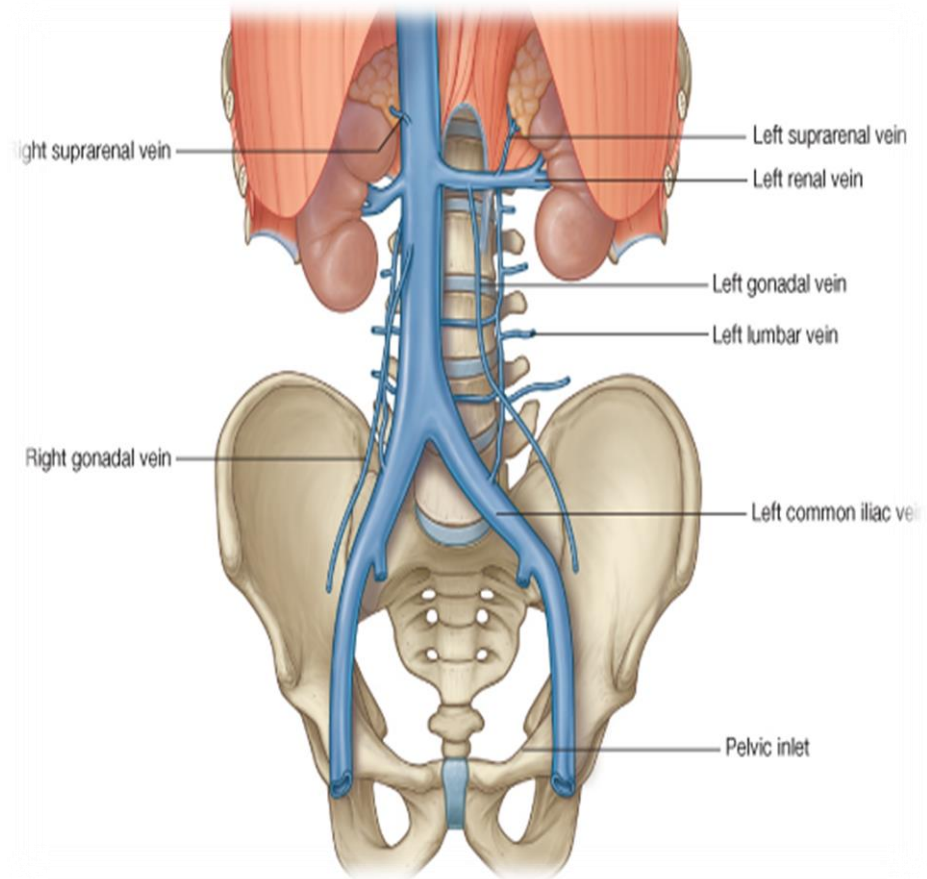
Inferior Vena Cava

- ❖ **Drains** most of the **blood** from the body below the diaphragm to the **right atrium**.
- ❖ **Formed by** the **union of** the 2 **common iliac veins** **behind** the right common iliac artery **at the level** of the **5th lumbar vertebra**.
- ❖ **Ascends** on the **right side** of the **aorta**
- ❖ **Pierces** the central tendon of **diaphragm** at the **level of** the **8th thoracic vertebra**.



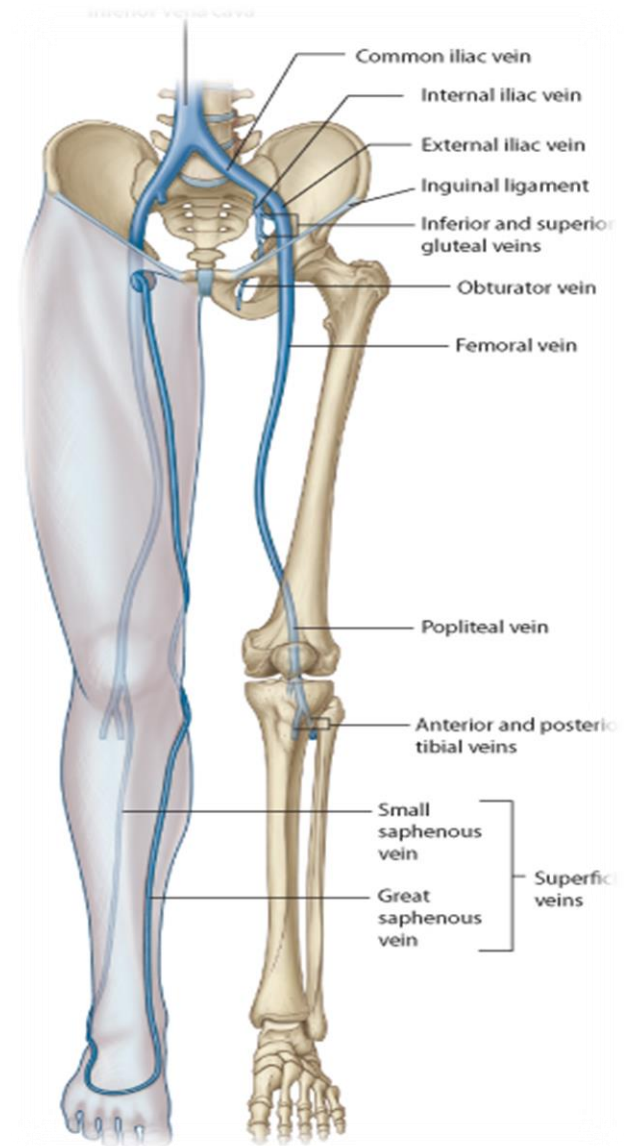
Tributaries of Inferior Vena Cava

- ❖ Two common iliac veins
- ❖ Median sacral vein
- ❖ Four paired lumbar veins
- ❖ Right gonadal vein
 - the **left vein** drains into the **left renal vein**
- ❖ Paired renal veins
- ❖ Right suprarenal vein
 - the **left vein** drains into the **left renal vein**
- ❖ Hepatic veins
- ❖ Paired inferior phrenic vein



Veins of Lower Limbs

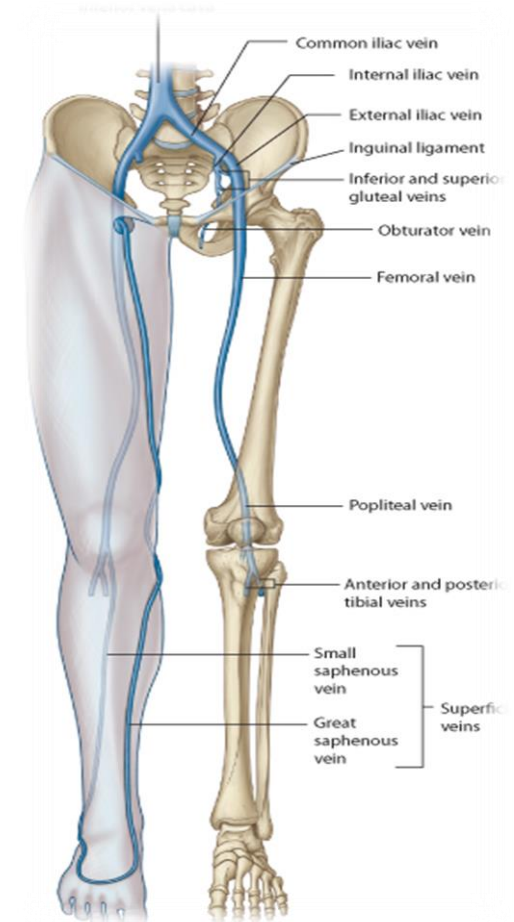
- ❖ **Two divisions:**
 - **Superficial Veins**
 - **Deep Veins**



Veins of Lower Limbs

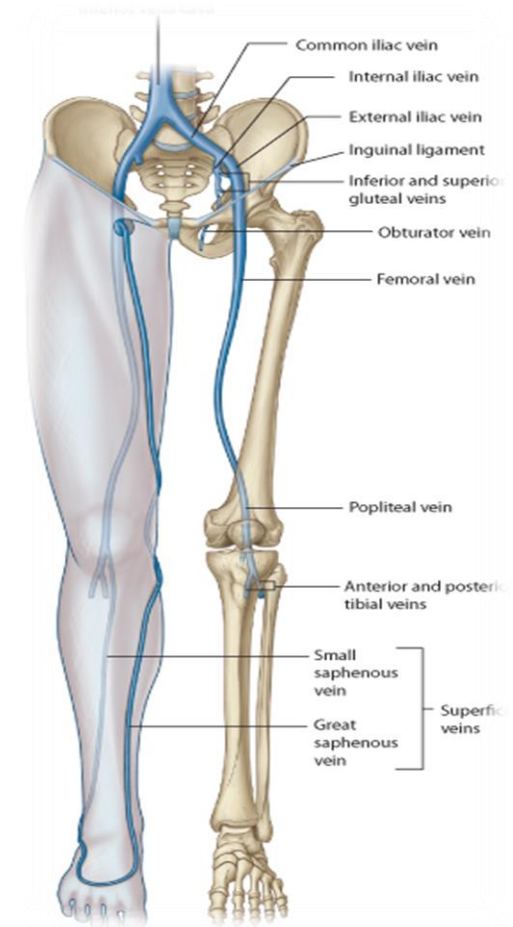
❑ Superficial Veins

- ❖ Form a network in the **subcutaneous tissue**.
- ❖ Pattern is variable
- ❖ They are the **tributaries of** the:
 - **Great (long) saphenous vein**
 - **Small (short) saphenous vein**



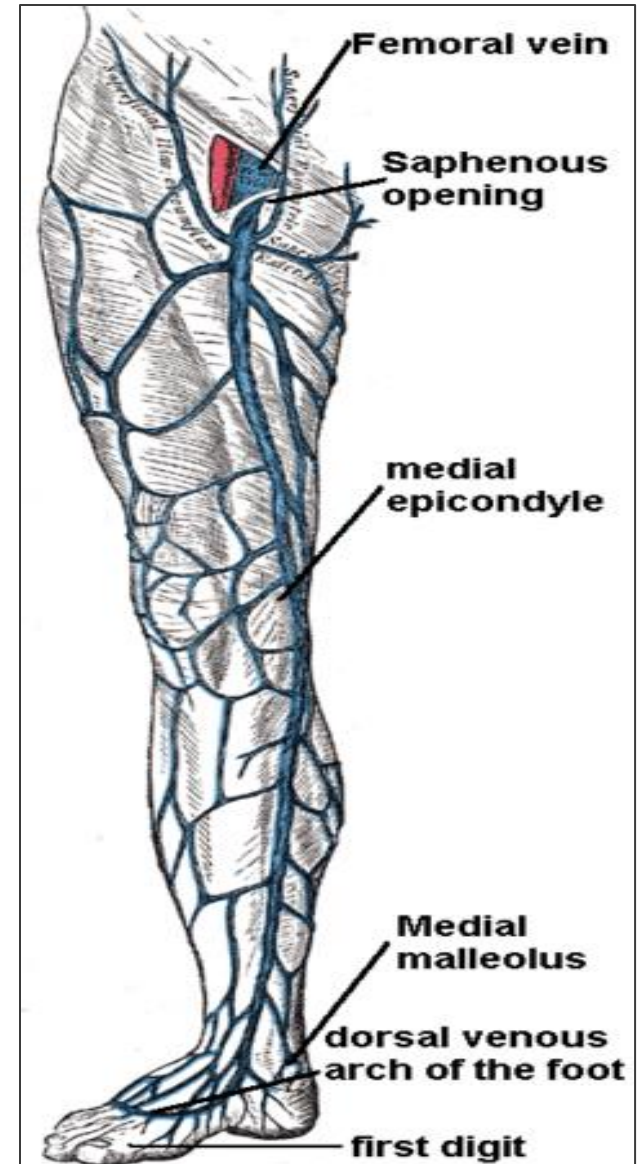
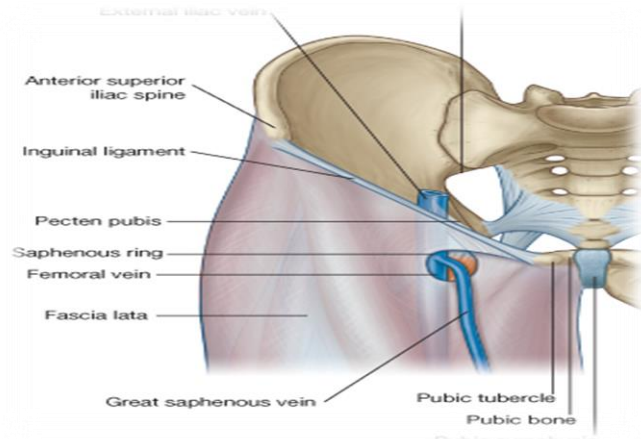
Great Saphenous Vein

- ❖ The longest vein
- ❖ **Begins** from the **medial end** of the **dorsal venous arch of the foot**.
- ❖ Passes upward **in front** of the **medial malleolus** with the **saphenous nerve**.
- ❖ Then it **ascends** in accompany with the saphenous nerve **in the superficial fascia** over the **medial side of the leg**.



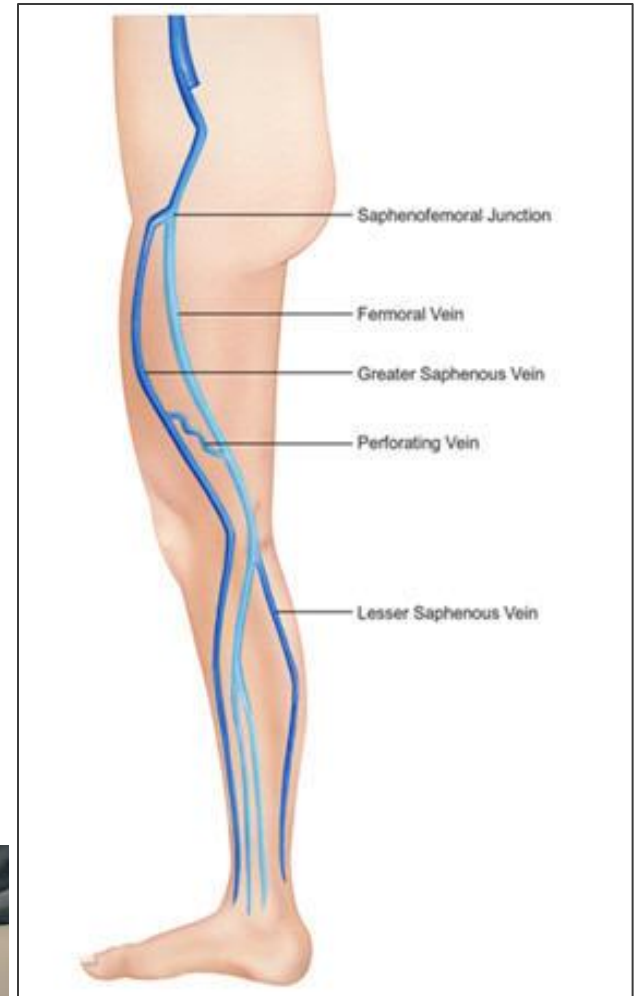
Great Saphenous Vein

- ❖ Ascends obliquely upwards, and lies behind the medial border of the patella.
- ❖ Passes behind the knee and curves forward around the medial side of the thigh.
- ❖ Hooks through the lower part of the saphenous opening in the deep fascia to join the femoral vein about 1.5 in. (4 cm) below and lateral to the pubic tubercle.



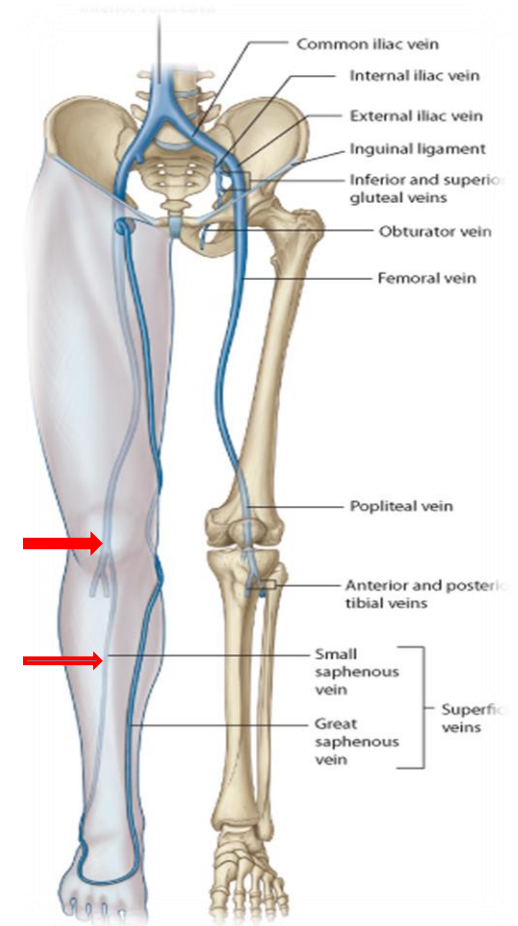
Great Saphenous Vein

- ❖ It is **connected to the small saphenous vein** by one or two branches that pass **behind the knee**.
- ❖ Numerous **perforating veins** connect the great saphenous vein **with the deep veins (femoral vein)**
- ❖ The **perforating veins** have **valves** which allow blood flow from superficial to deep veins.
- ❖ The great saphenous vein is **used in venous grafting** and **saphenous vein cutdown** (take care of the saphenous nerve)
- ❖ **Surgically**, the great saphenous vein can be harvested and **used as** a vessel in **coronary artery bypasses**.



Small Saphenous Vein

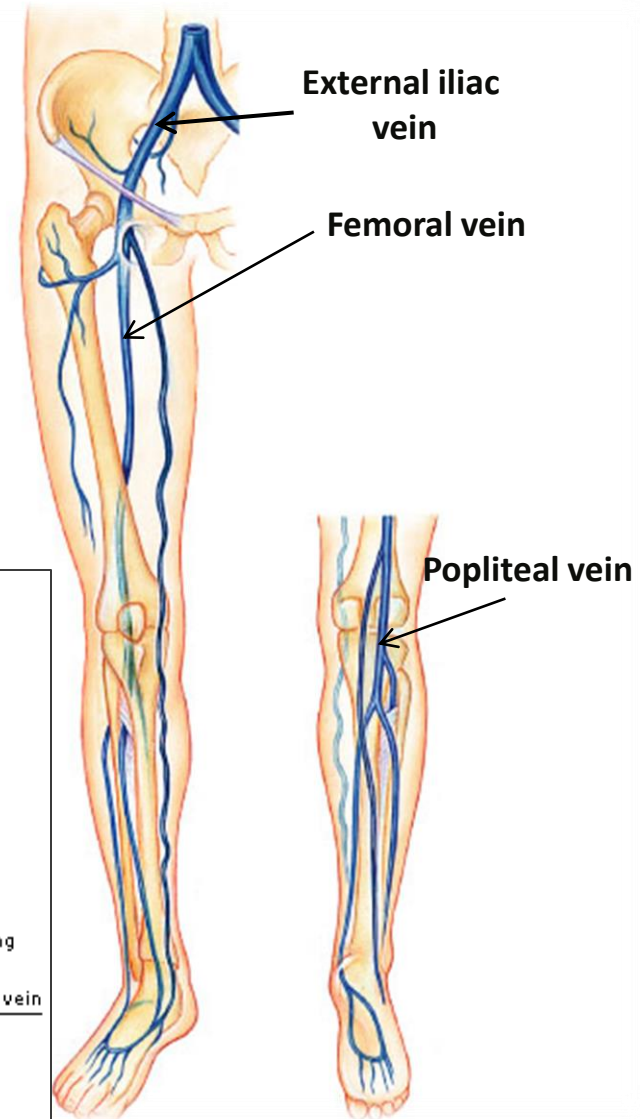
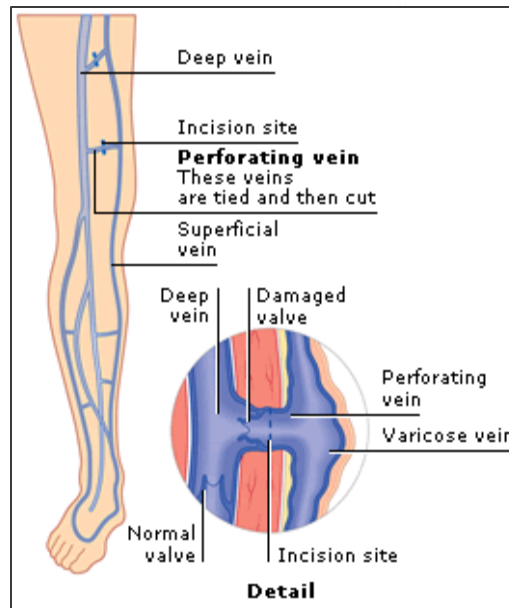
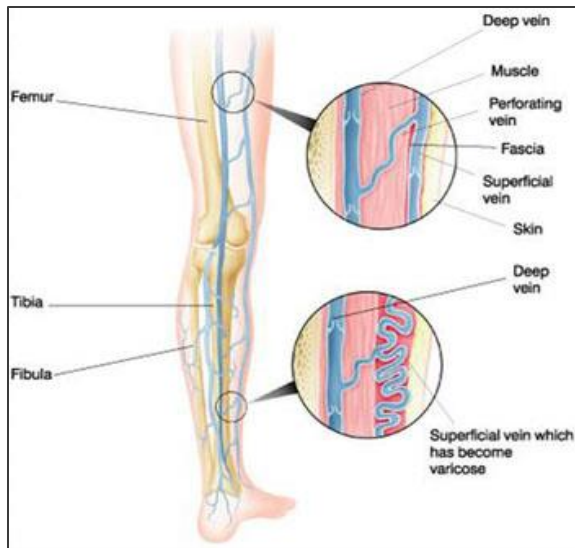
- ❖ **Arises** from the **lateral end** of the **dorsal venous arch**.
- ❖ **Ascends behind** the **lateral malleolus** in company with the **sural nerve**.
- ❖ Follows the lateral border of the tendocalcaneus and then **runs up** to the **middle** of the **back** of the **leg**.
 - **Pierces** the **deep fascia** in the **lower part** of the **popliteal fossa**
 - **Drains** into the **popliteal vein**
 - Has **numerous valves** along its course.
 - Anastomosis freely with great saphenous vein.



Veins of Lower Limbs

□ Deep Veins

- ❖ Comprise the **venae comitantes**, which accompany all the large arteries, usually in pairs.
- ❖ **Venae comitantes** unite to form the **popliteal vein**, which continues as the **femoral vein**.
- ❖ **Receive** blood from **superficial veins** through **perforating veins**.



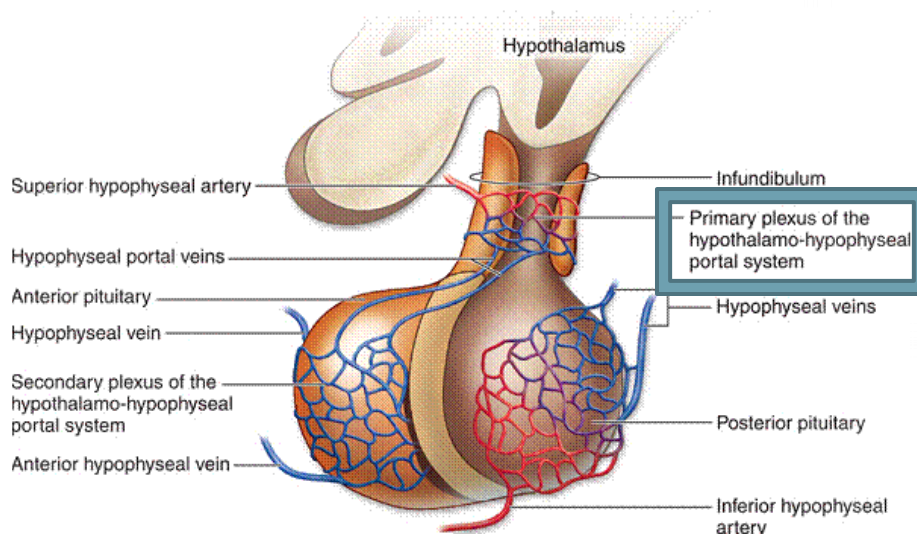
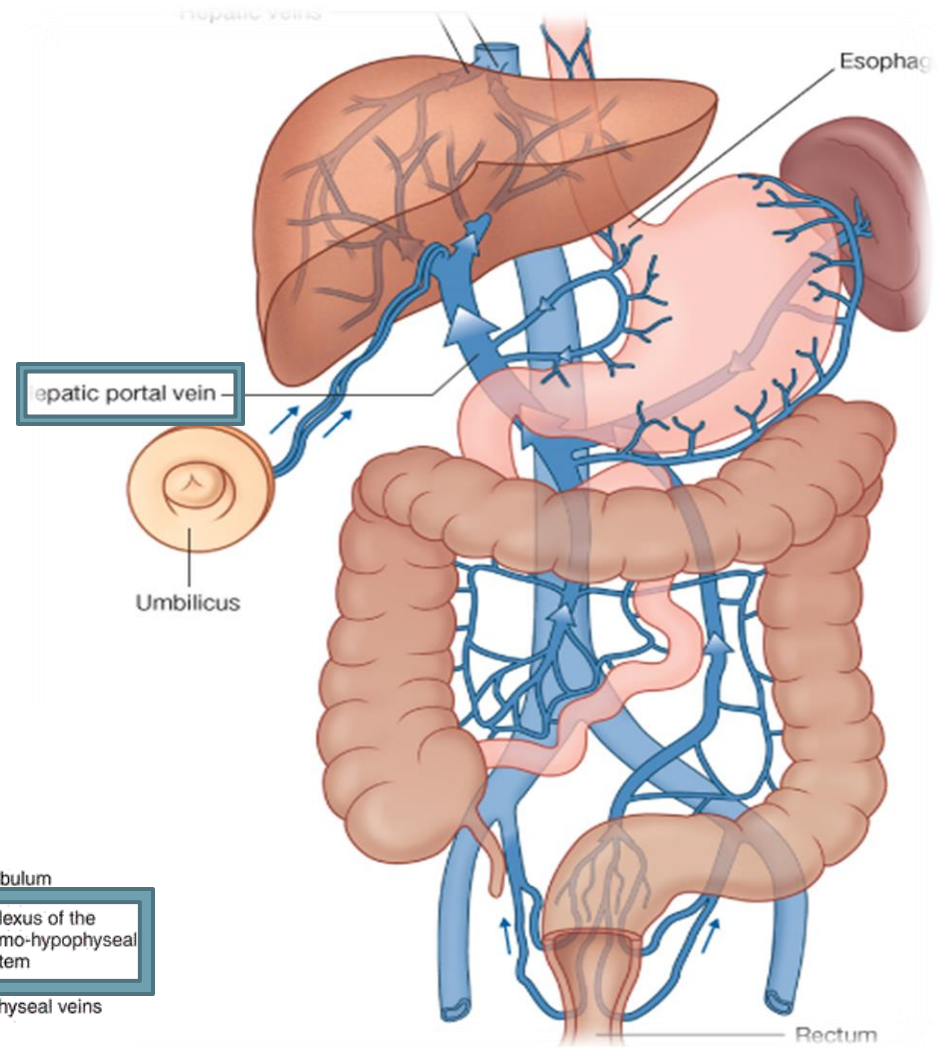
Mechanism of Venous Return from Lower Limb (FYI)

- ❖ Much of the **saphenous blood** passes from **superficial to deep veins** through the **perforating veins**
- ❖ The **blood is pumped upwards** in the **deep veins** by the **contraction of the calf muscles (calf pump)**.
- ❖ This action of '**calf pump**' is **assisted by the tight sleeve of deep fascia** surrounding these muscles.
- ❖ **Varicose veins:** If the **valves** in the **perforating veins** become **incompetent**, the direction of **blood flow is reversed** and the superficial veins become **varicosed**. Most common in **posterior & medial** parts of the **lower limb**, particularly in old people.



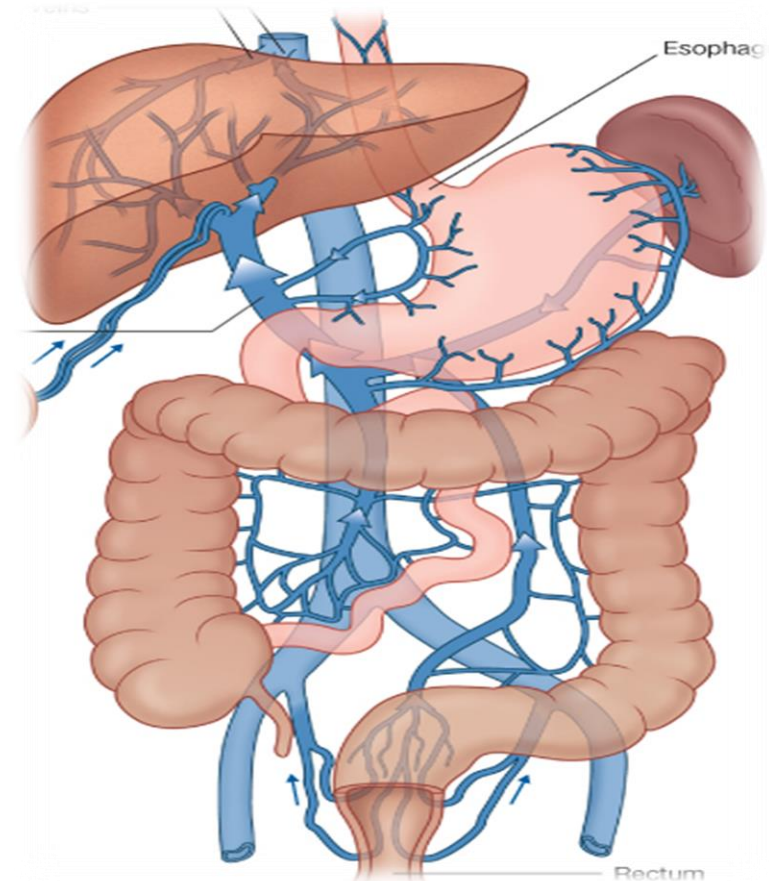
Portal Circulation

- ❖ A **portal venous system** is a series of veins or venules that directly connect two capillary beds.
- ❖ **Examples** of such systems include the **hepatic portal system** and **hypophyseal portal system**.



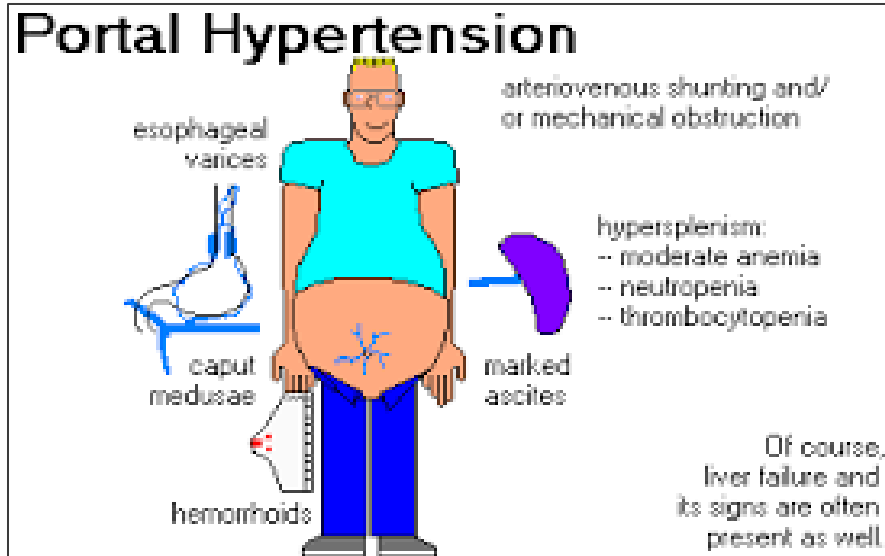
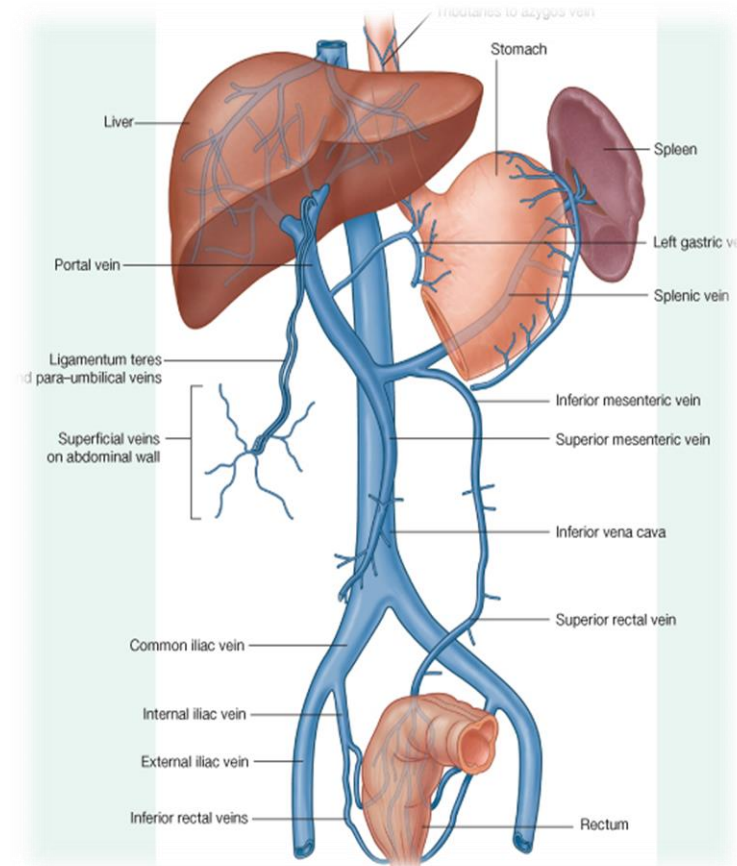
Hepatic Portal Vein

- ❖ **Drains blood** from the **gastrointestinal tract** and **spleen**
- ❖ **It is formed by** the union of the **superior mesenteric** and **splenic veins**.
- ❖ Immediately before reaching the liver, the portal vein **divides** into **right** and **left** that enter the liver.
- ❖ **Tributaries:**
- ❖ **right and left Gastric veins.**
- ❖ **cystic vein.**
- ❖ **para-umbilical veins**



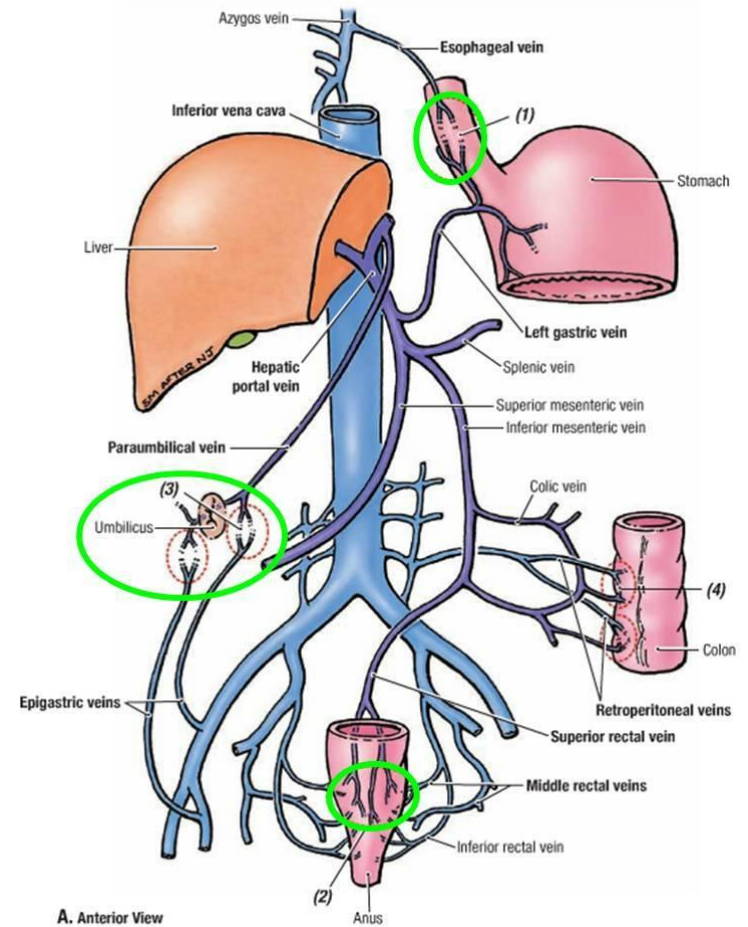
Portocaval Anastomosis

- ❖ A portacaval anastomosis (also known as portal systemic anastomosis) is a specific type of **anastomosis** that occurs between the **veins of portal circulation** and those of **systemic circulation**.
- ❖ The **anastomotic channels** become **dilated (varicosed)** in case of **portal hypertension**.



Sites of Portocaval Anastomosis

- ❖ **Lower end of esophagus:**
- ❖ **(esophageal varices)** left gastric vein & azygos vein.
- ❖ **Lower part of rectum: (Hemorrhoids)** superior rectal vein & middle rectal and inferior rectal veins.
- ❖ **Para umbilical region: (Caput Medusae)** Para umbilical veins & superficial epigastric vein
- ❖ **Retroperitoneal:** colic Veins & veins of the posterior abdominal wall
- ❖ **Patent ductus venosus: (intrahepatic)** Left branch of portal vein & inferior vena cava.



QUESTION?

