

# Major Blood Vessels



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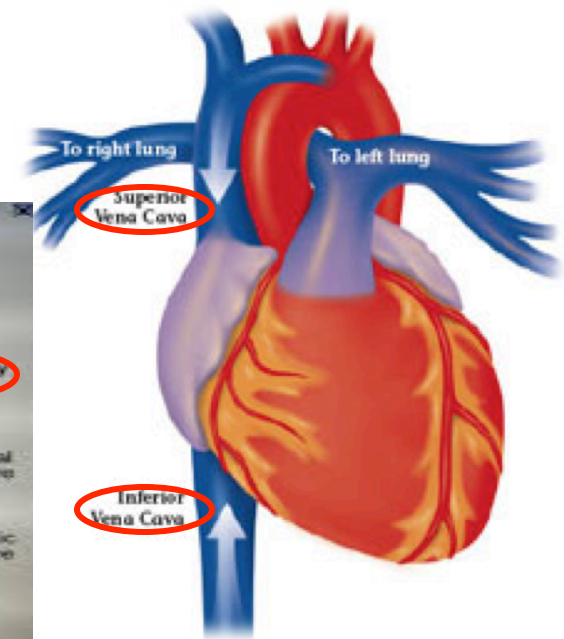
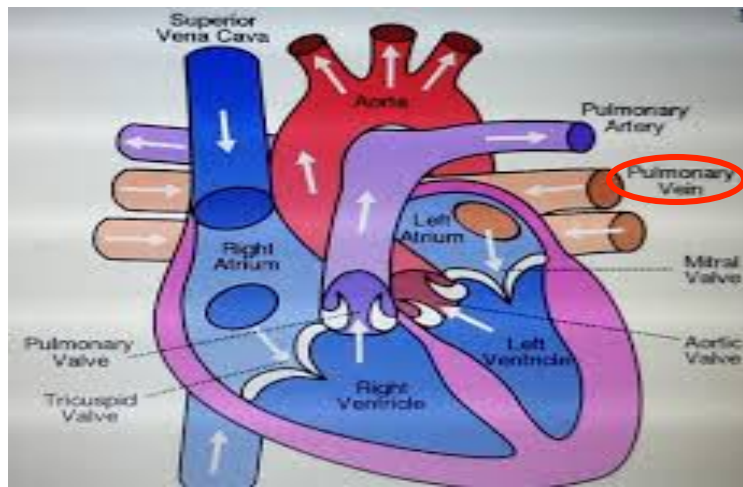
# Objectives

**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**.

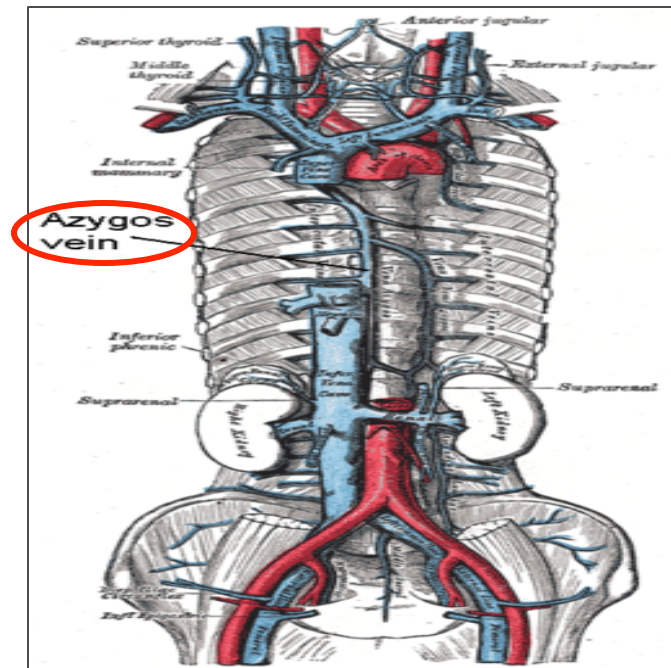
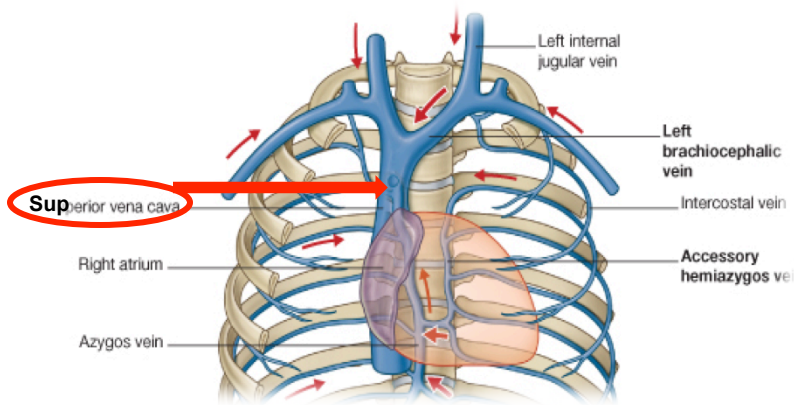
# Veins

- ❖ 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 vein** (during fetal development).
- ❖ **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

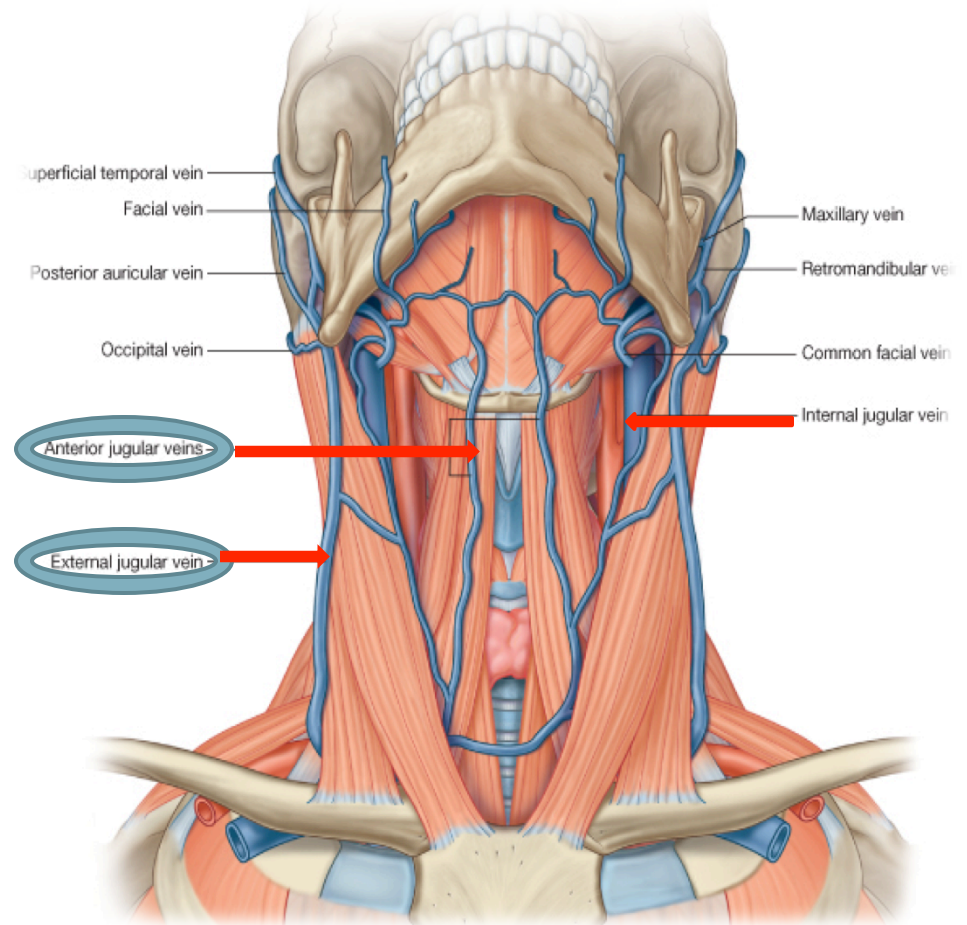
## ❖ Two divisions:

### ➤ Superficial Veins

- ✓ External Jugular veins
- ✓ Anterior jugular veins

### ➤ Deep Veins

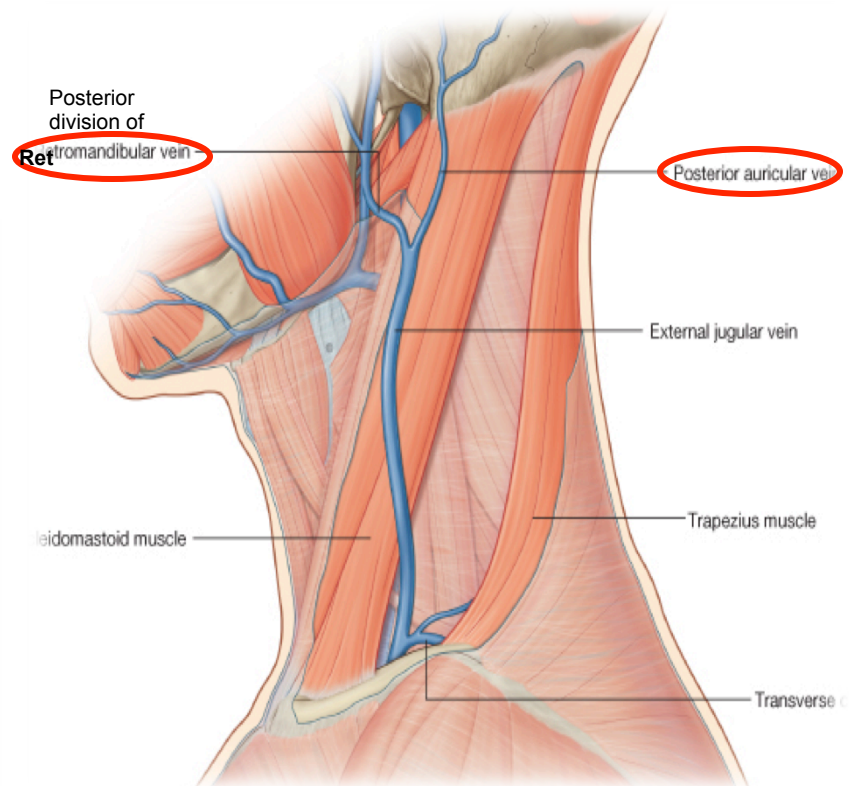
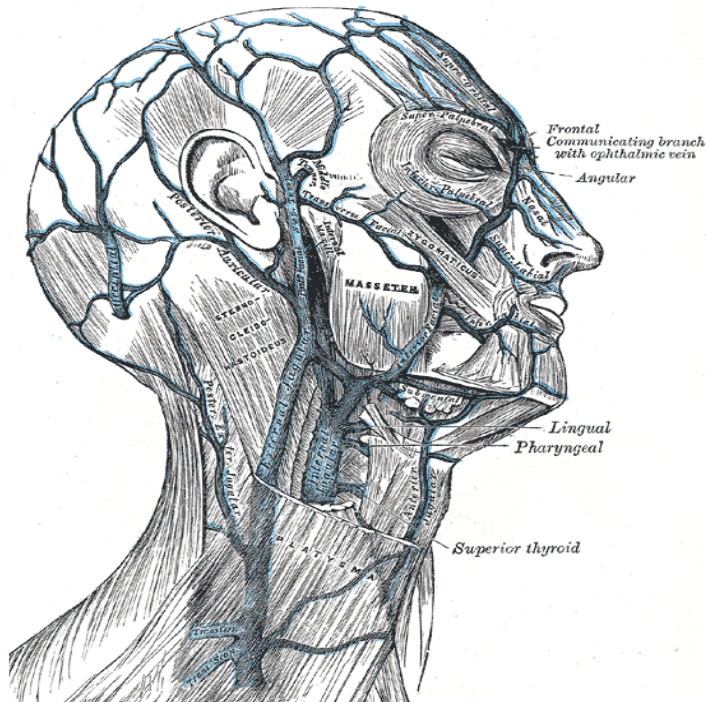
- ✓ Internal Jugulars veins.



# Superficial Veins of Head & Neck

## ❖ External Jugular Vein:

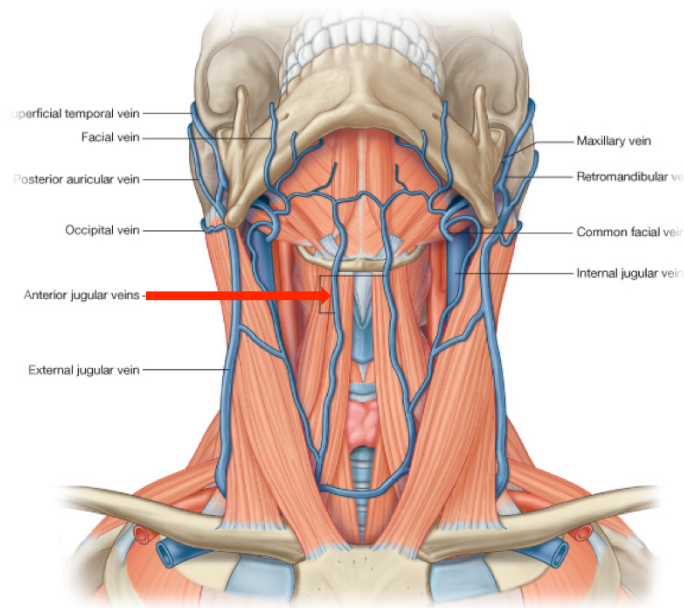
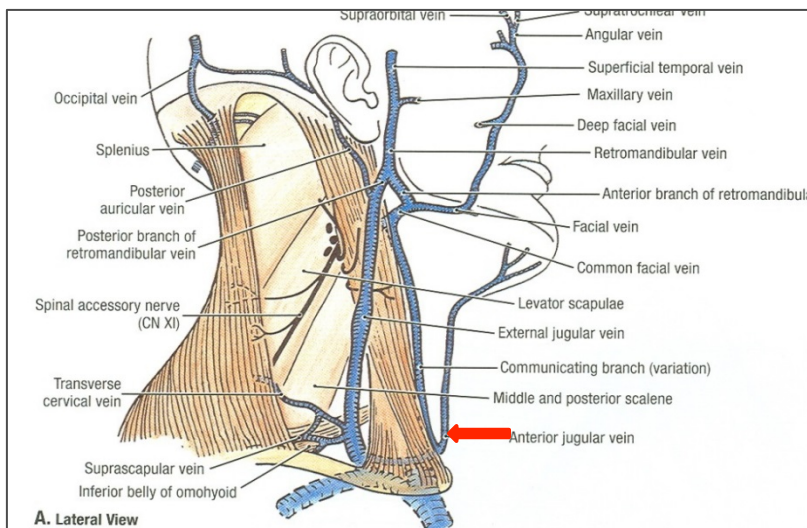
- **Lies superficial** to the **sternomastoid** muscle
- **Begins** just behind the angle of mandible **by union of posterior auricular vein** with the **posterior division of retromandibular vein**.
- It passes down the neck and it is the **only tributary of the subclavian vein**.
- **It drains** blood from:
  - ✓ **Outside of the skull**
  - ✓ **Deep parts of the face.**



# Superficial Veins of Head & Neck

## ❖ Anterior jugular veins:

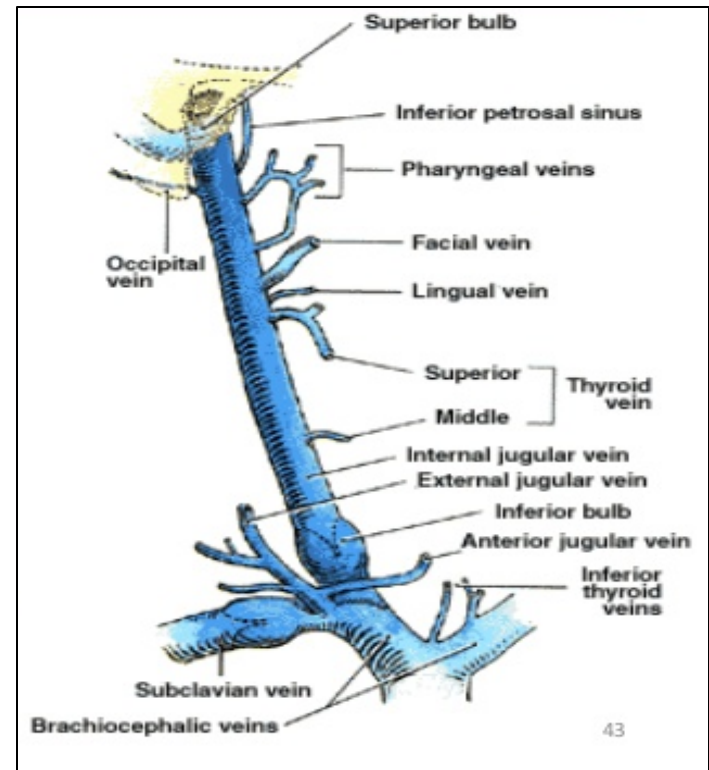
- **It begins** in the upper part of the neck by **the union of the submental veins**.
- **It descends** close to the median line of the neck, **medial to** the **sternomastoid**.
- **At the lower part of the neck**, it passes laterally **beneath** **sternomastoid** muscle to **drain into** the **external 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 Jugulars vein:

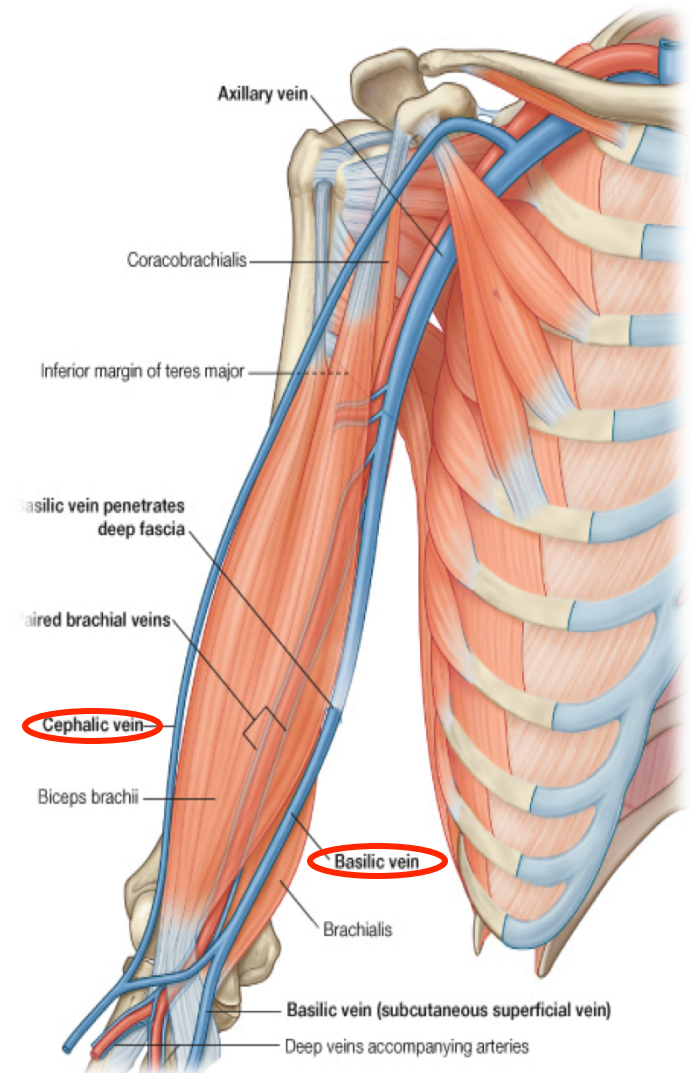
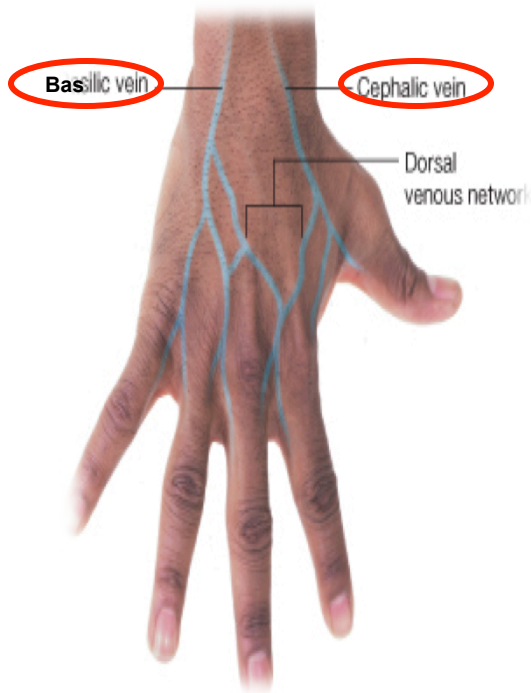
- **Drains** blood from the brain, face, head & neck.
- It descends in the neck along with the **internal** and **common carotid** arteries and **vagus nerve**, within the **carotid sheath**.
- Joins the **subclavian vein** to form the **brachiocephalic vein**.
- **Tributaries:**
  - ✓ Superior thyroid
  - ✓ 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

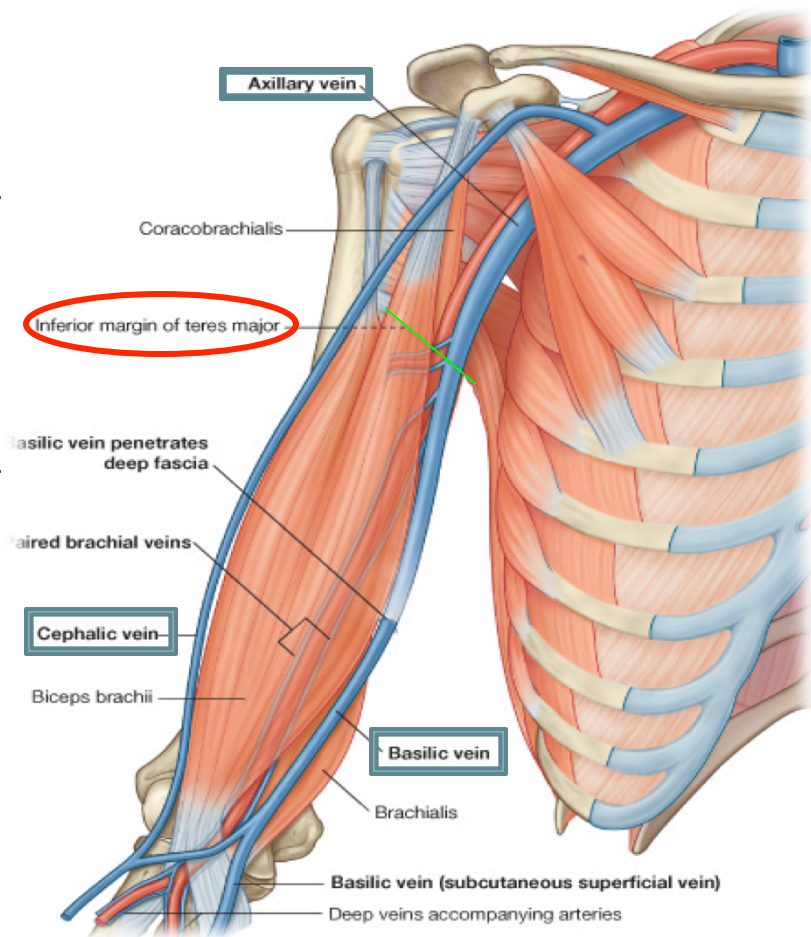
## □ Superficial Veins

### ❖ 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

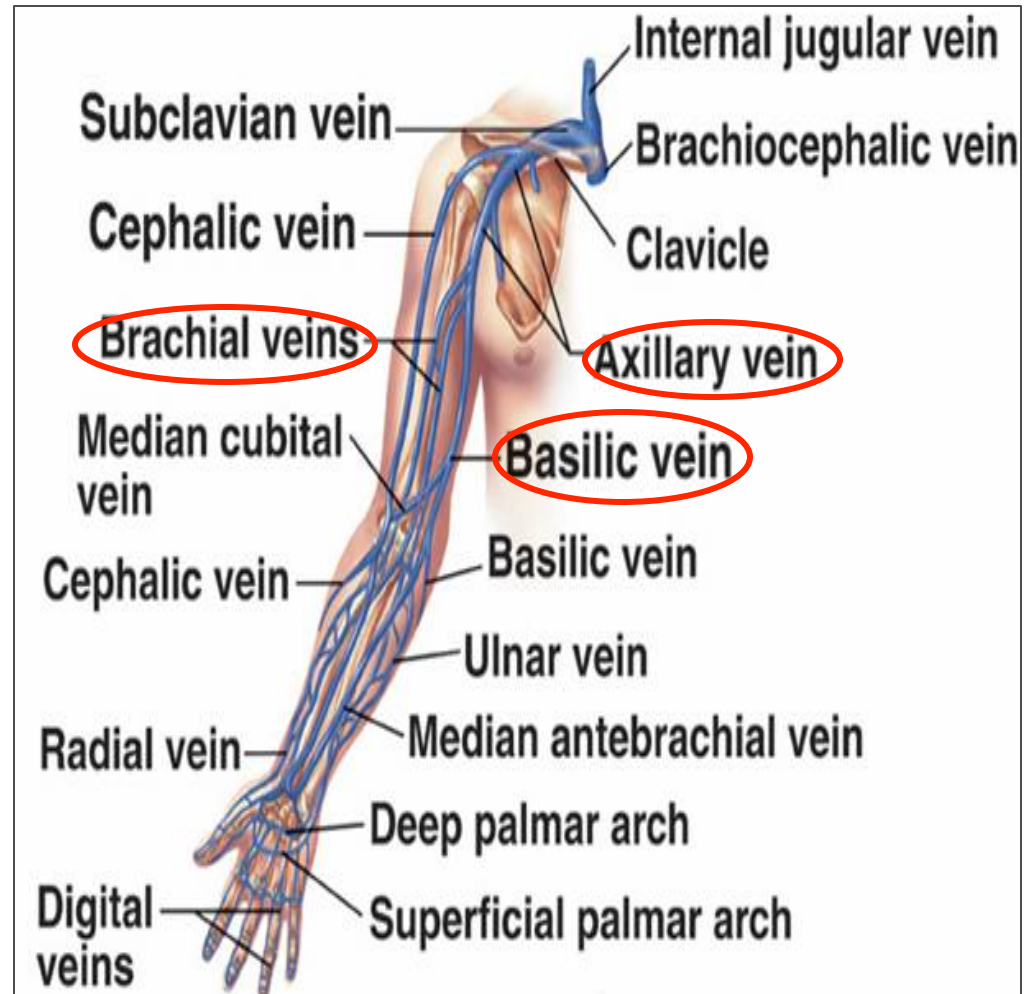
## □ Deep Veins

### ❖ Venae comitantes

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

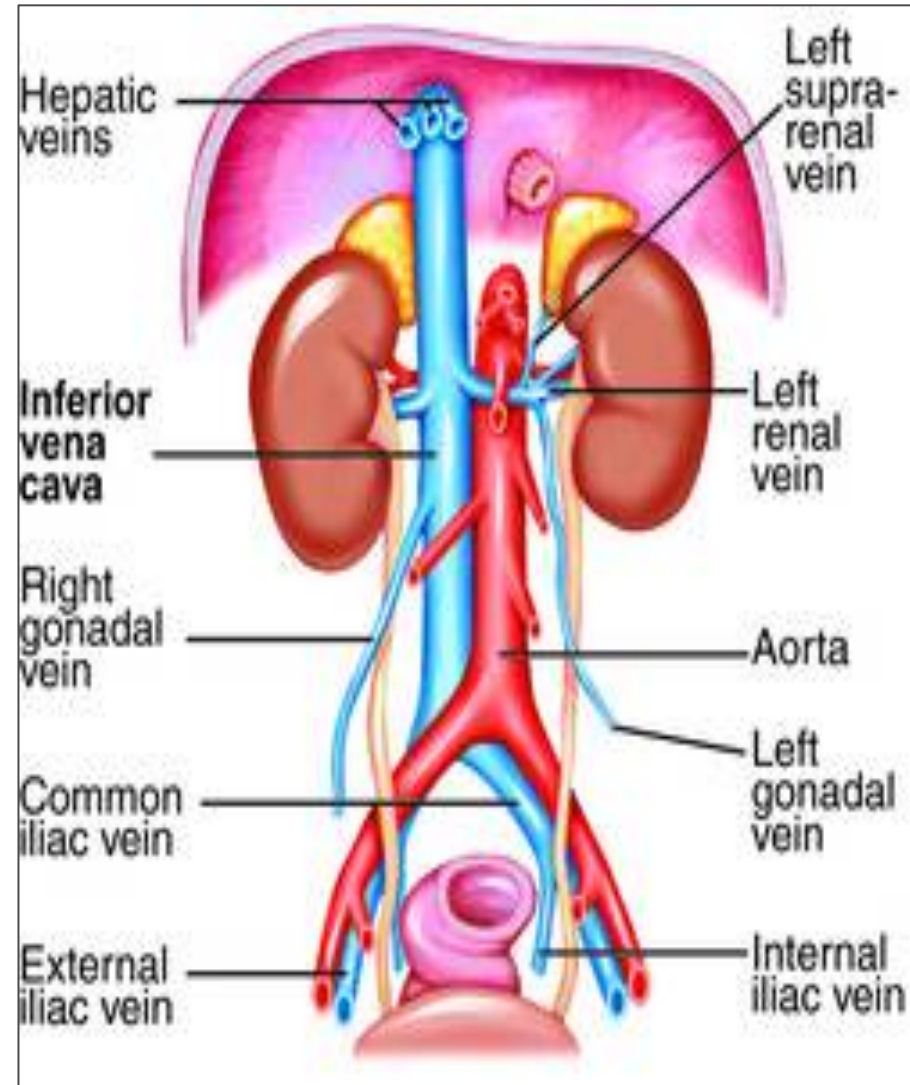
### ❖ Axillary vein

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



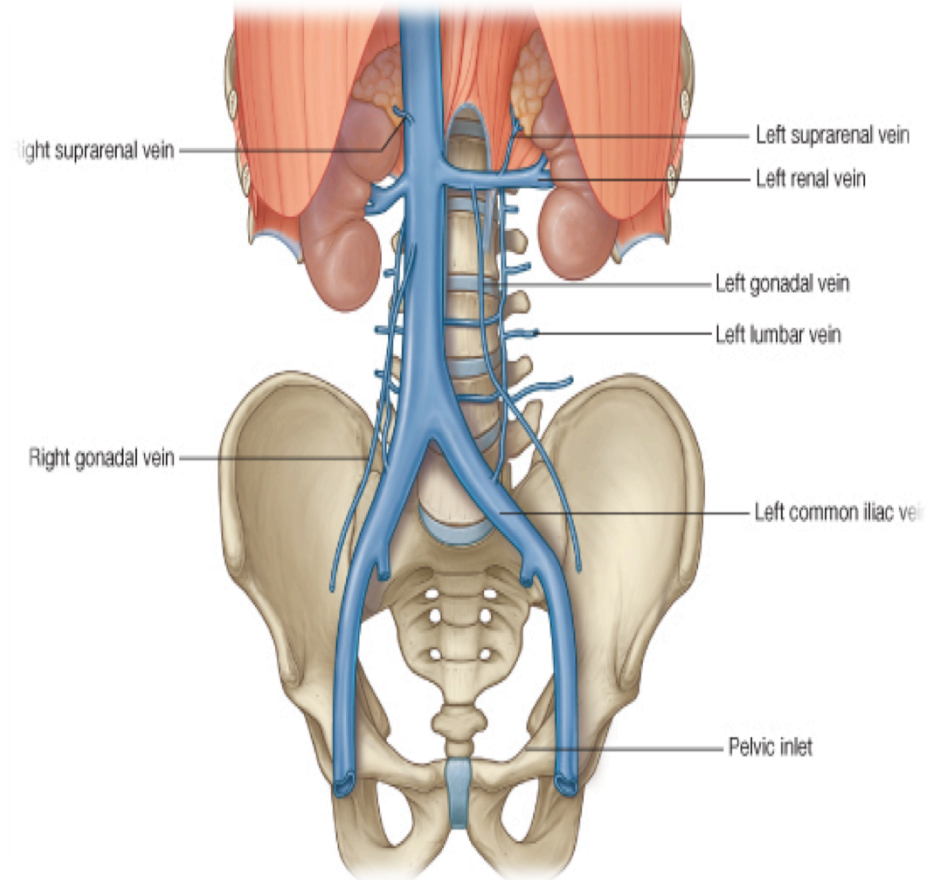
# Inferior Vena Cava

- ❖ **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.



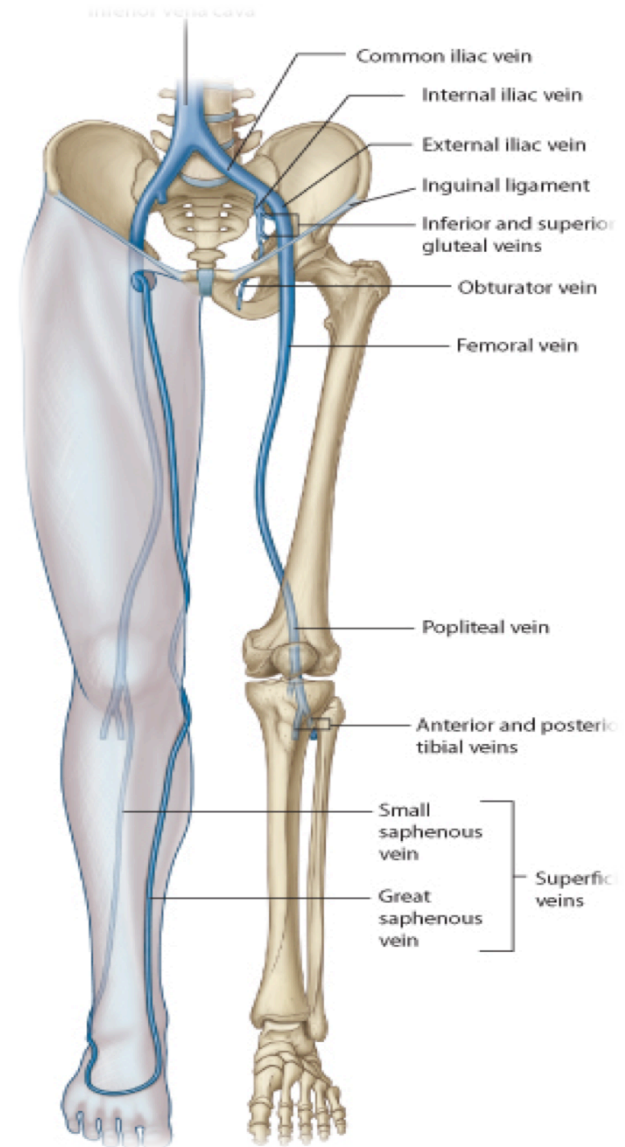
# Tributaries of Inferior Vena Cava

- ❖ 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 veins.



# Veins of Lower Limbs

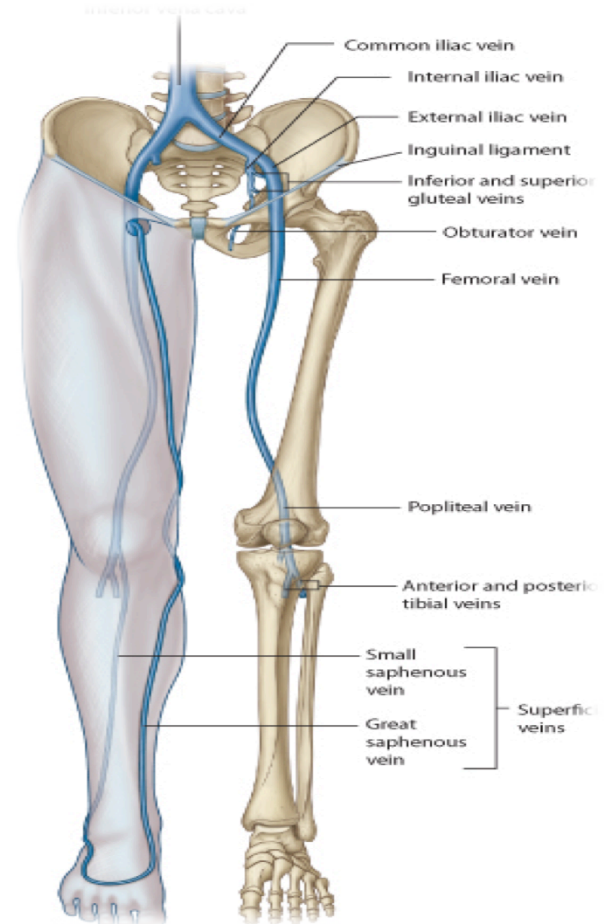
- ❖ **Two divisions:**
  - **Superficial Veins**
  - **Deep Veins**



# Veins of Lower Limbs

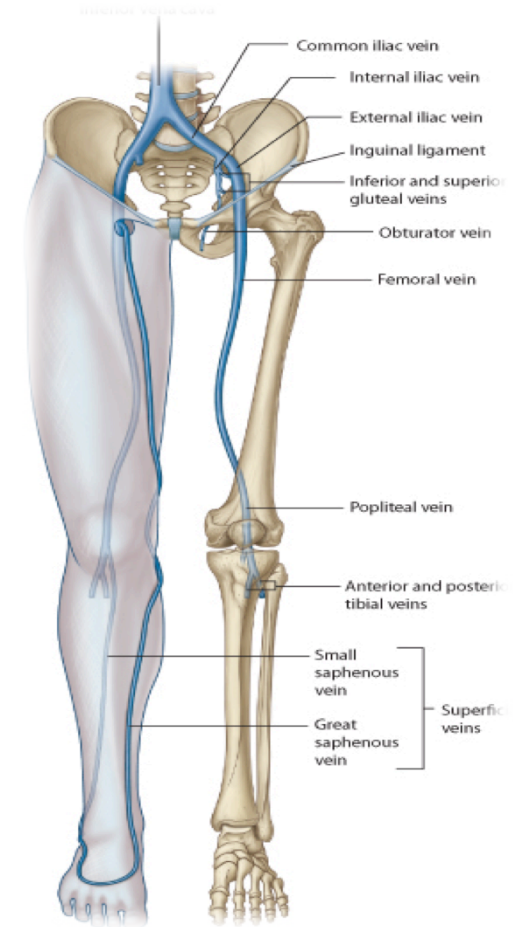
## ❑ Superficial Veins

- ❖ 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

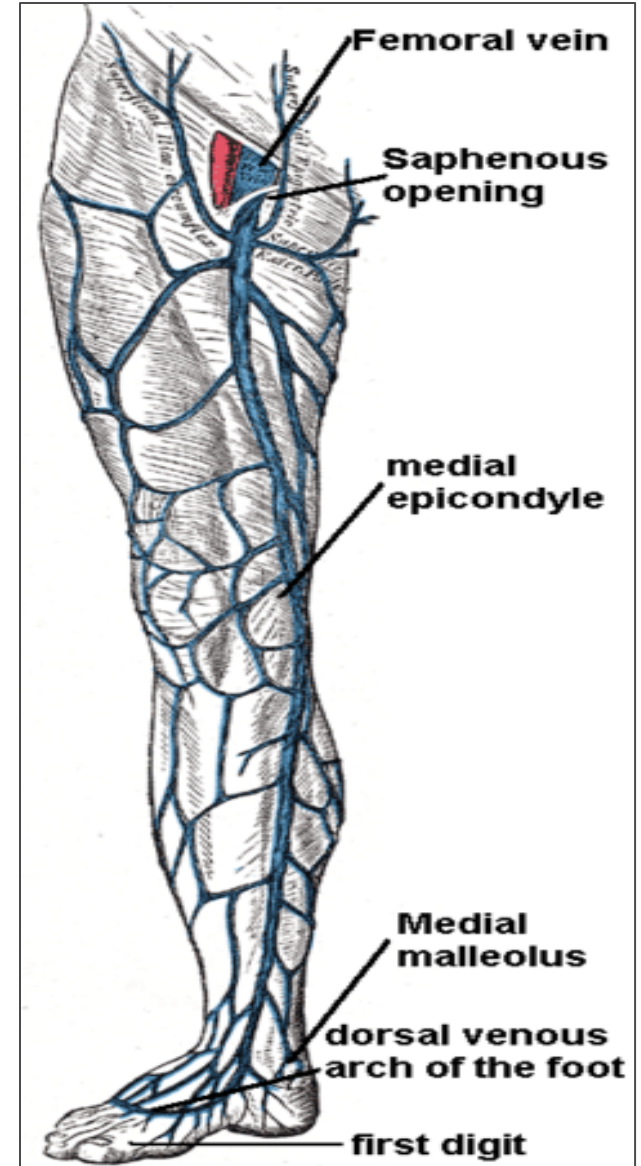
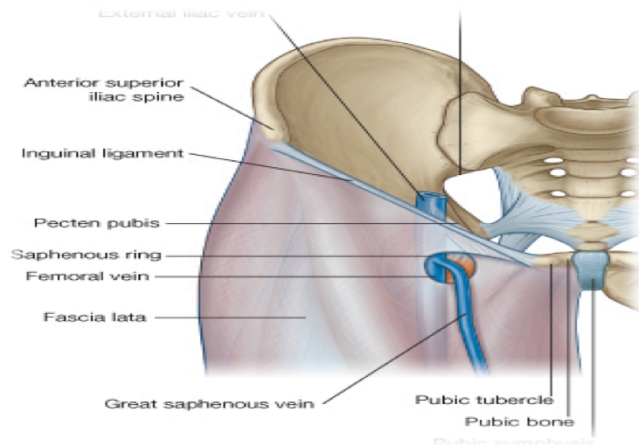
- ❖ The longest vein
- ❖ **Begins** from the **medial end** of the **dorsal venous arch of the foot**.
- ❖ Passes upward in front of the medial malleolus with the **saphenous nerve**.
- ❖ Then it ascends in accompany with the saphenous nerve in the superficial fascia over the medial side of the leg.





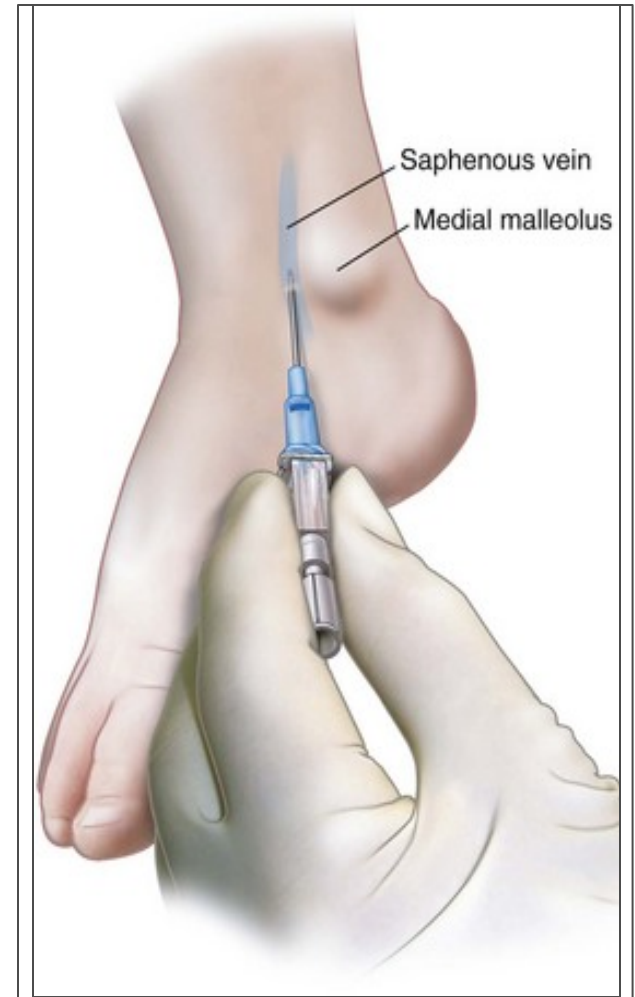
# Great Saphenous Vein

- ❖ **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**.



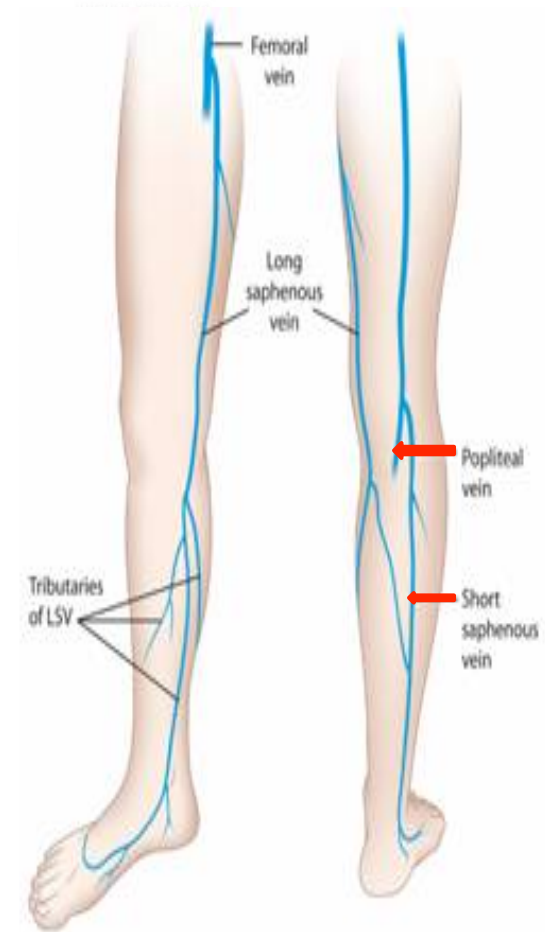
# Great Saphenous Vein

- ❖ It is connected to the **small saphenous vein** **by one or two branches** that pass behind the knee.
- ❖ It is connected to the **deep veins** **by** numerous **perforating veins**.
- ❖ 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** may be necessary for inserting the needle or canula (take care of the saphenous nerve).



# Small Saphenous Vein

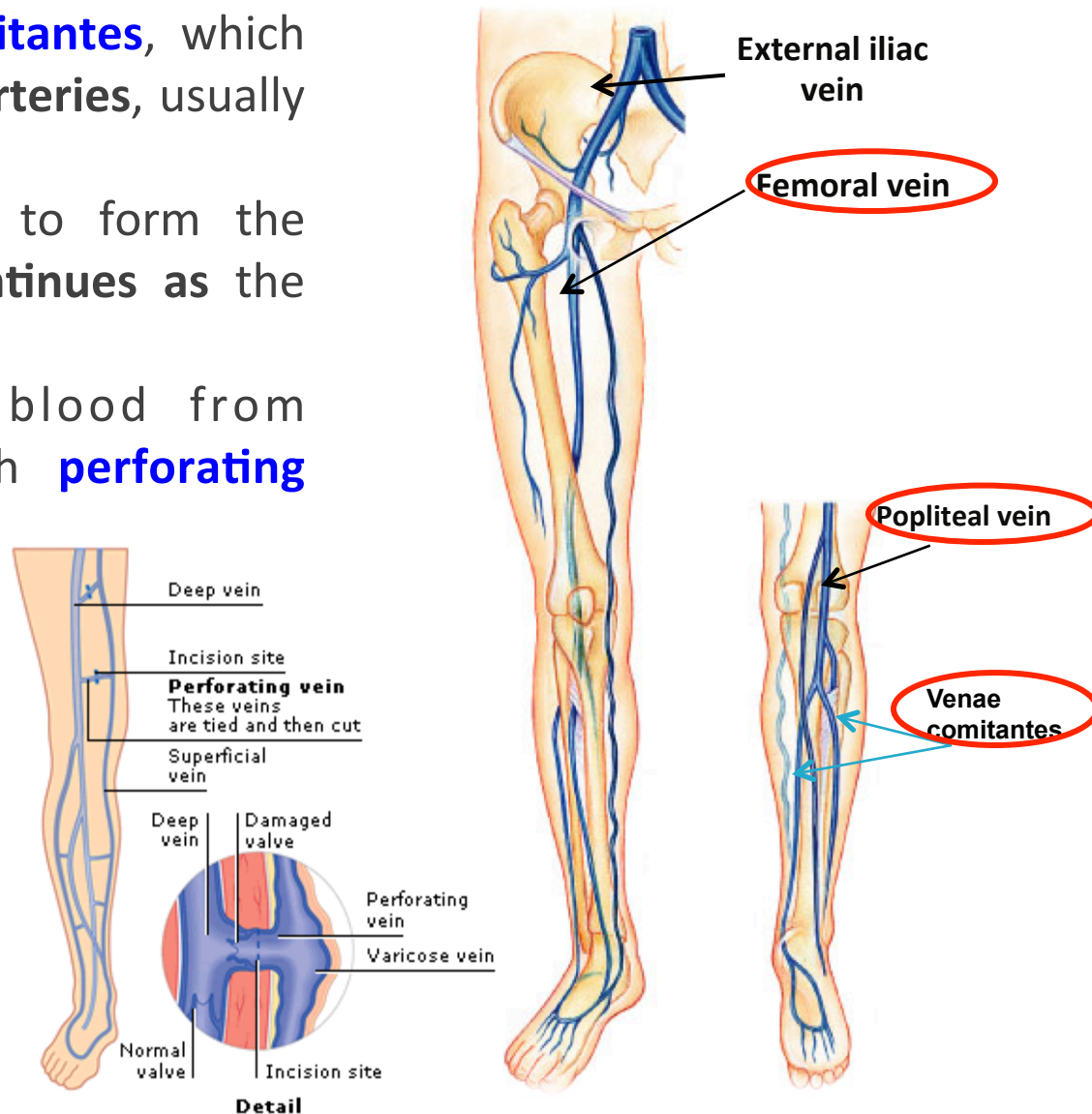
- ❖ **Arises** from the **lateral end** of the **dorsal venous arch**.
- ❖ **Ascends behind** the **lateral malleolus** in company with the **sural nerve**.
- ❖ **Ascends** along the lateral border of the **tendocalcaneus** and then **runs up** to the middle of the **back of the leg**.
  - **Pierces** 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

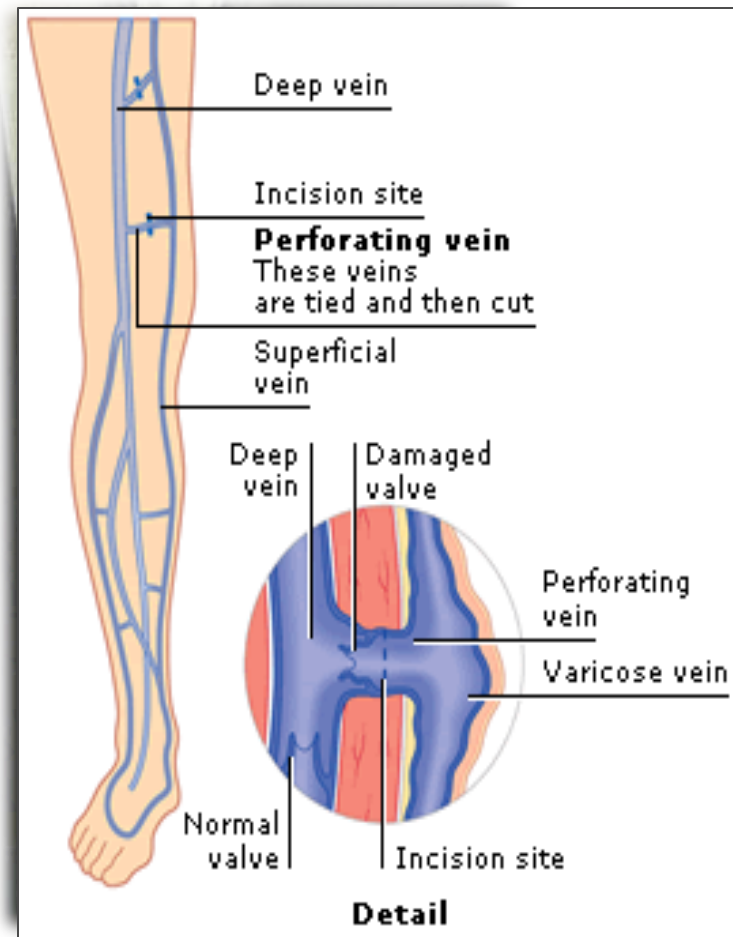
- ❖ Comprise the **venae comitantes**, which accompany all the large arteries, usually in pairs.
- ❖ **Venae comitantes** unite to form the **popliteal vein**, which continues as the **femoral vein**.
- ❖ **Deep veins** **Receive** blood from **superficial veins** through **perforating veins**.



# Mechanism of Venous Return

## from Lower Limb (FYI) (For Your Information)

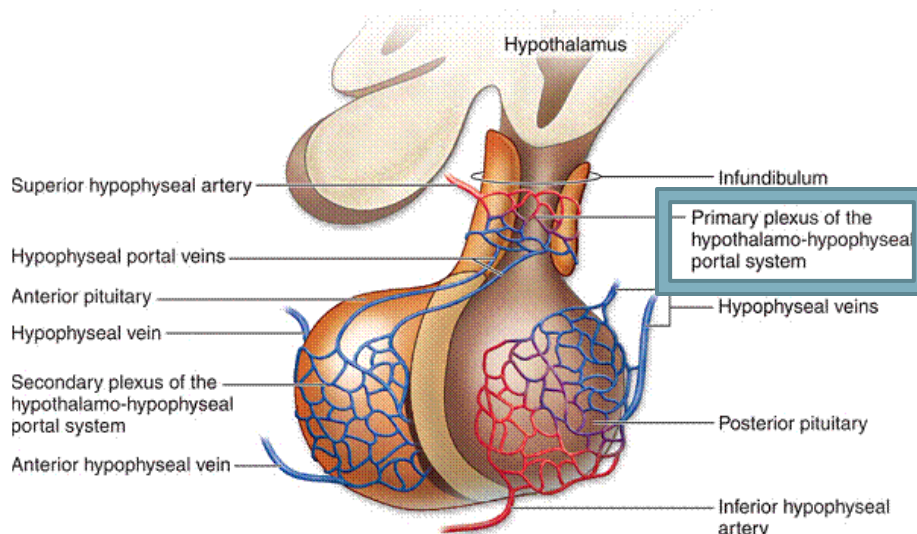
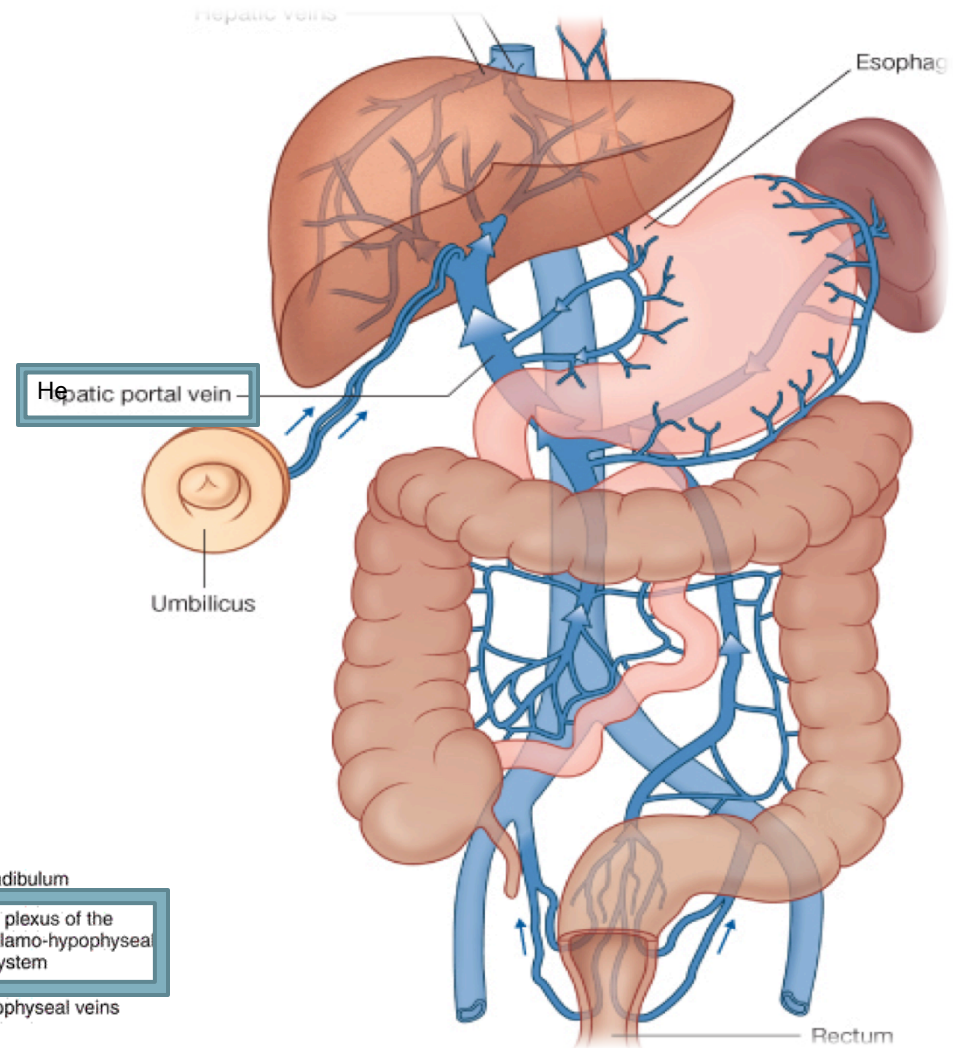
- ❖ Much of the **saphenous blood** passes from **superficial to deep veins** through the **perforating veins**
- ❖ The **blood is pumped upwards** in the **deep veins** by the **contraction of the calf muscles (calf pump)**.
- ❖ This action of '**calf pump**' is **assisted by the tight sleeve of deep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





# Portal Circulation

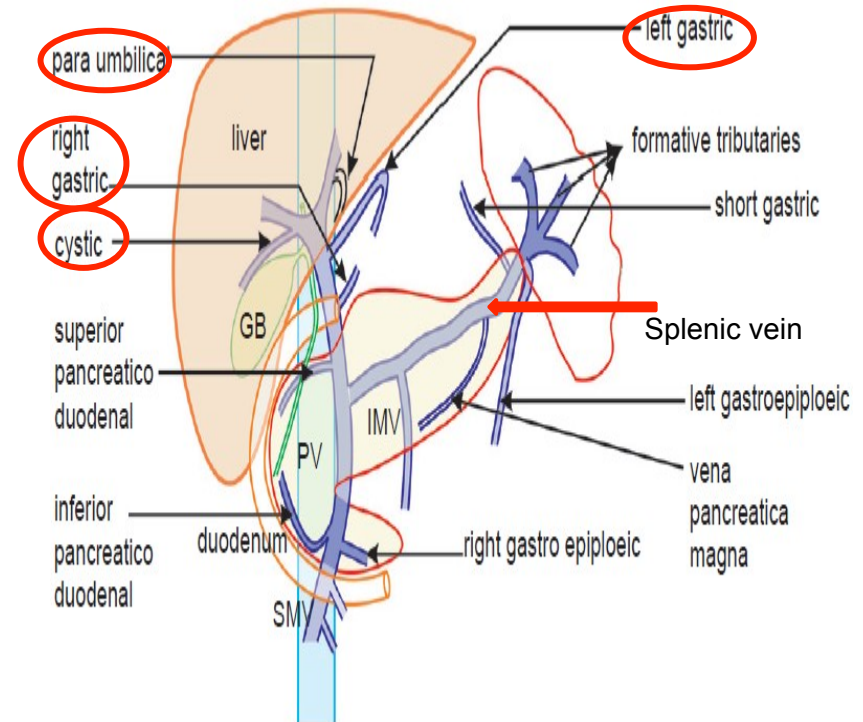
- ❖ A **portal venous system** is a series of veins or venules that directly **connect two capillary beds** (of arteriole & venule).
- ❖ Examples of such systems include the **hepatic portal vein** and **hypophyseal portal system**.





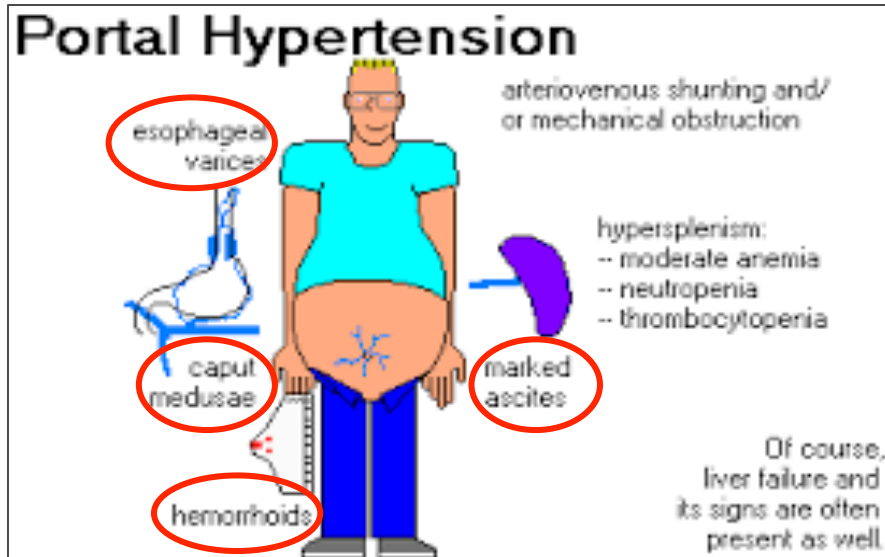
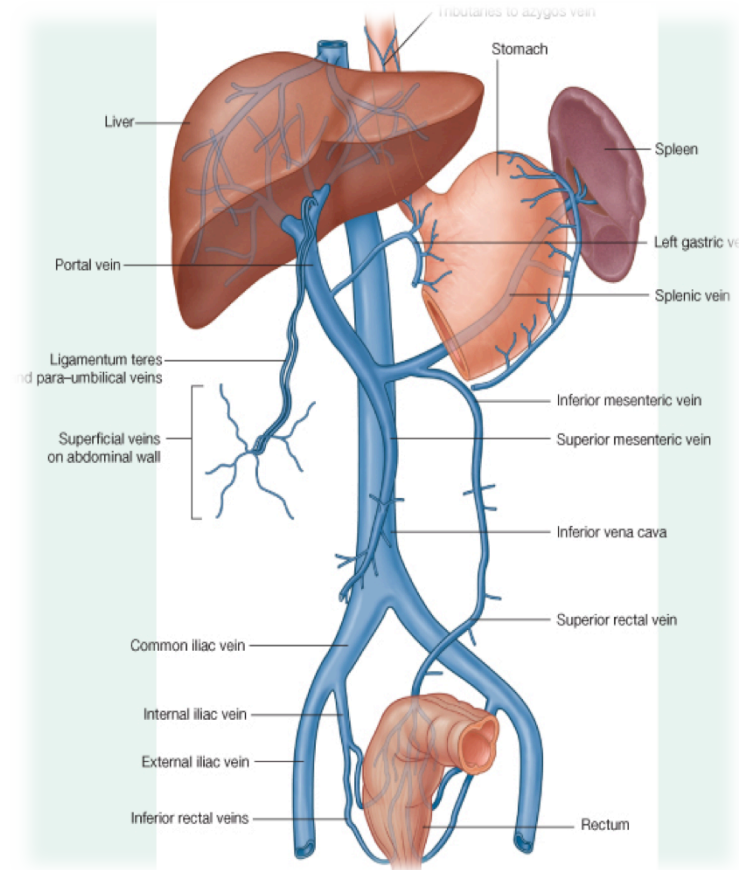
# Hepatic Portal Vein

- ❖ Drains blood from the **gastrointestinal tract** and **spleen to the liver**.
- ❖ It is formed by the union of the **superior mesenteric** and **splenic veins** **behind the neck of pancreas**.
- ❖ 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** from the gall bladder joins its right branch..
- ❖ **Para-umbilical veins** that drain veins from anterior abdominal wall to the hepatic portal vein.



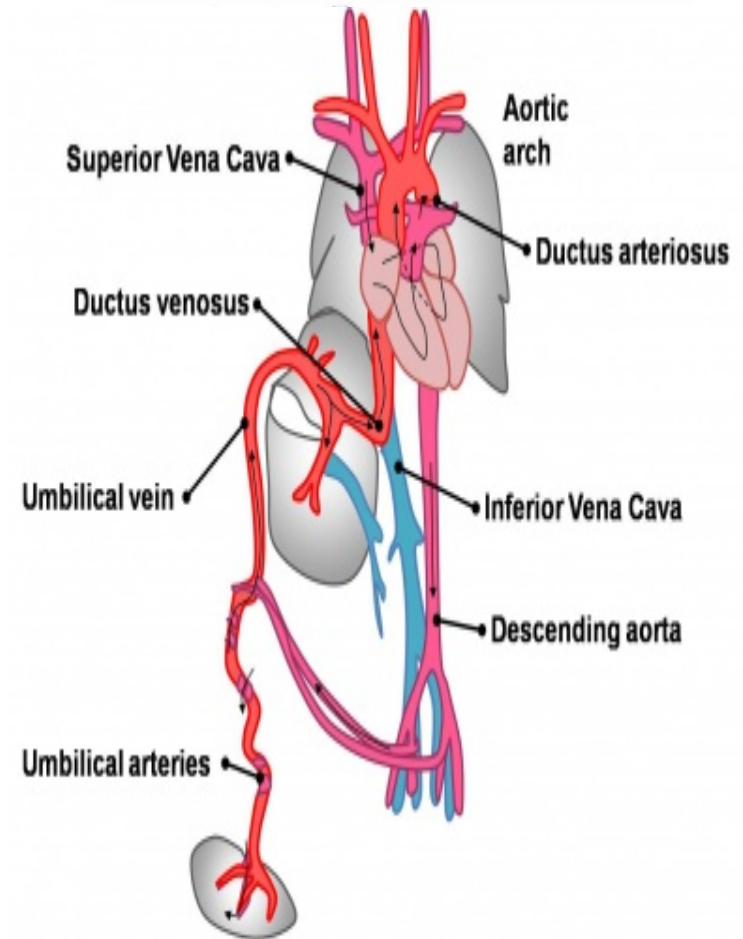
# Portocaval Anastomosis

- ❖ 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 (IVC)**.
- ❖ The anastomotic channels become **dilated (varicose)** in case of **portal hypertension**.



# Sites of Portocaval Anastomosis

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





**THANK YOU**