



General Anatomy

Lecture 12: Respiratory System (1)

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The Respiratory System includes:

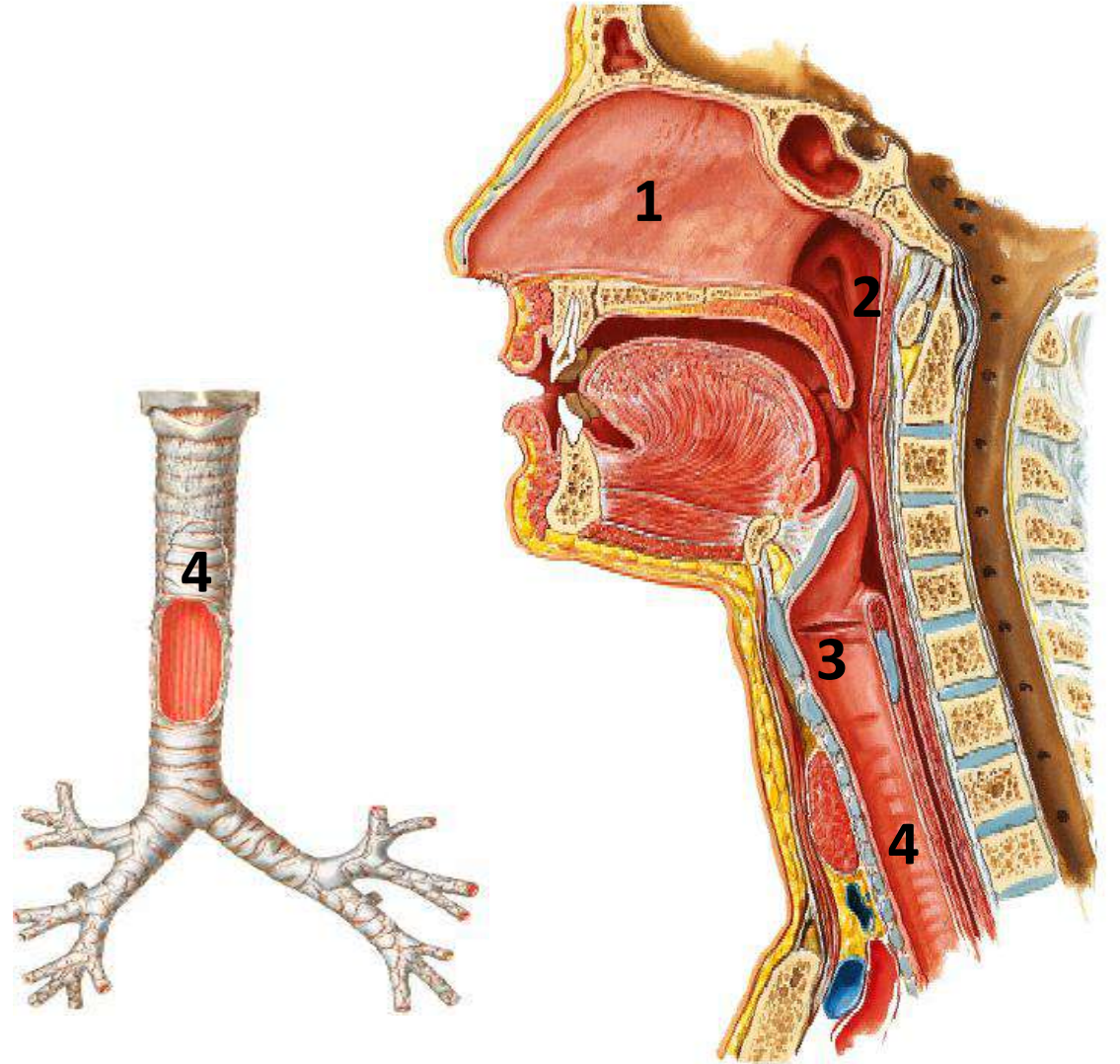
I. Respiratory Air Passages:

** Upper respiratory tract:

1. Nasal cavity.
2. Nasopharynx.

** Lower respiratory tract:

3. Larynx.
4. Trachea.
5. Bronchi.



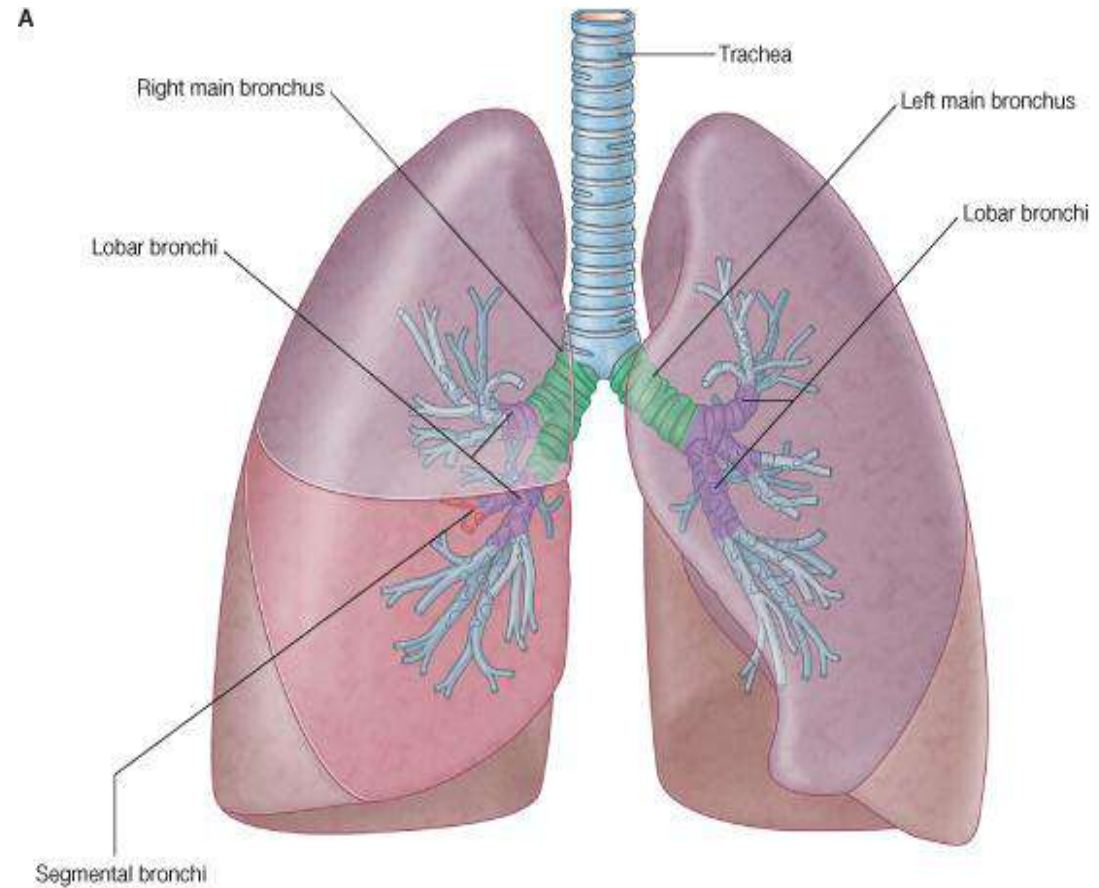
The Respiratory System includes:

II. Respiratory Organs:

The Lungs.

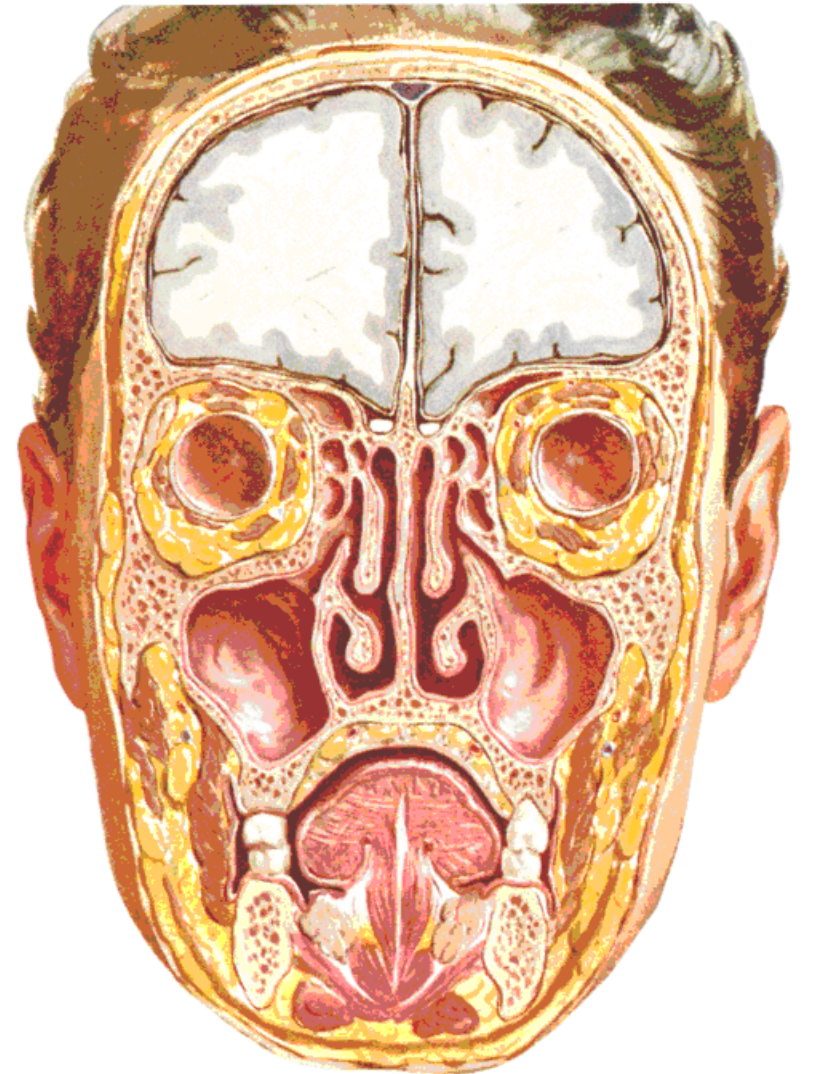
* The respiratory system functions include:

1. Air distributor.
2. Gas exchanger so that oxygen may be supplied to and carbon dioxide be removed from body's cells.



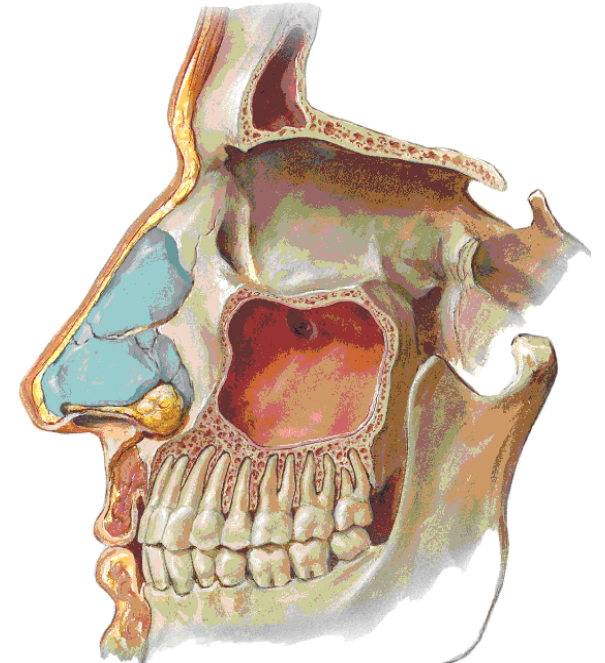
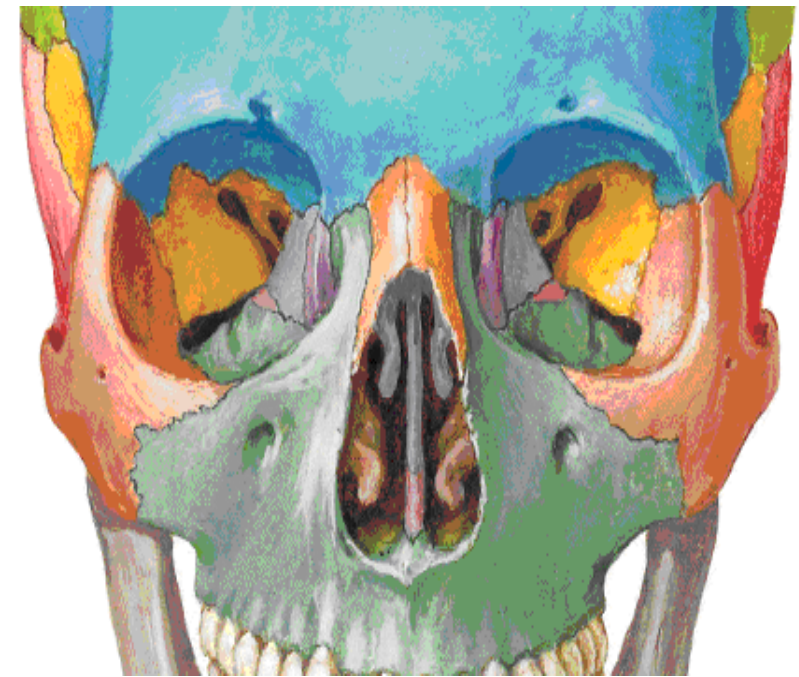
Paranasal Air Sinuses

- * **Definition** : These are air-filled spaces inside the maxillary bone, frontal bone, sphenoid bone and ethmoid bone.
- * **Function**:
 1. Lighten weight of skull
 2. Resonance of voice.
 3. Warming of air.
- * **At birth** : They are either present and small in size or they may be absent. They are fully developed in adolescence.
- * **They are lined by** : respiratory mucous membrane.
- * **All of them drain into** : the lat. wall of the nose.



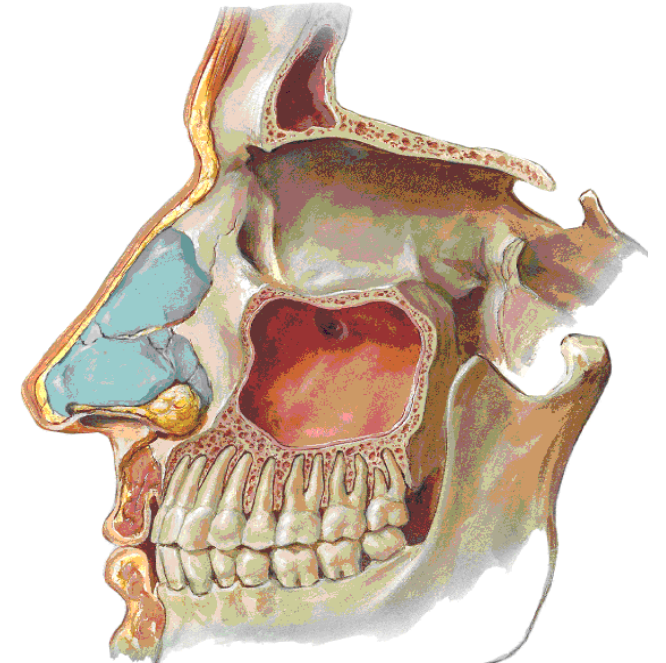
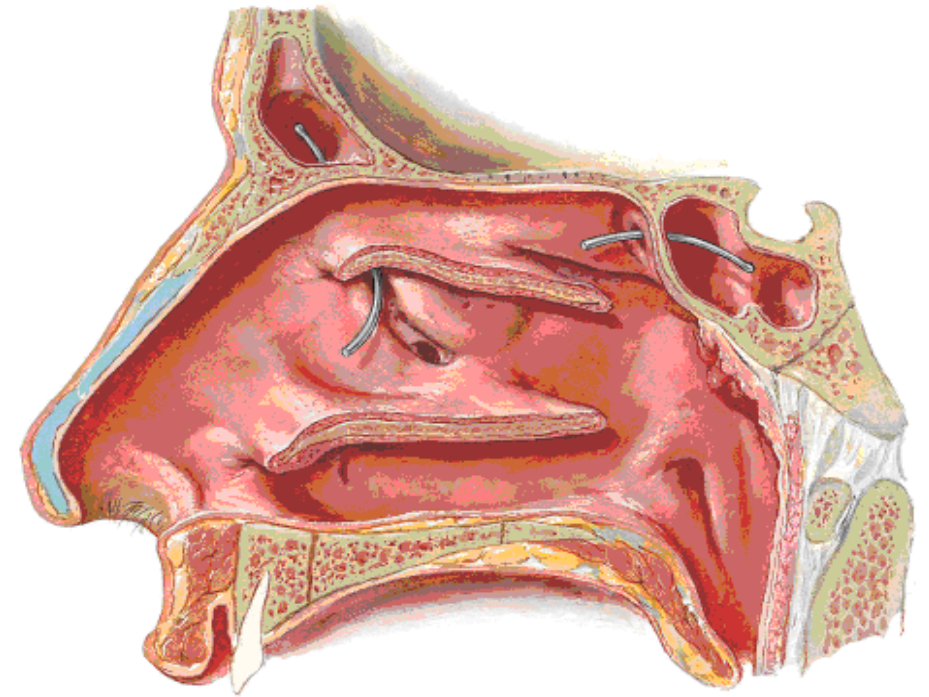
A. Maxillary Air Sinus

- * **Site** : inside the body of the maxilla.
 - * **Size** : it is the largest air sinus.
 - * **Shape** : pyramidal; with its base towards the nose and its apex towards the Zygomatic bone.
- @ **N.B.:** the roots of the maxillary teeth, particularly the first 2 molars are closely related to the floor of the maxillary air sinus.
- @ **Therefore** : extraction of a tooth may result in a fistula and an infected tooth can cause sinusitis (infection of the sinus).



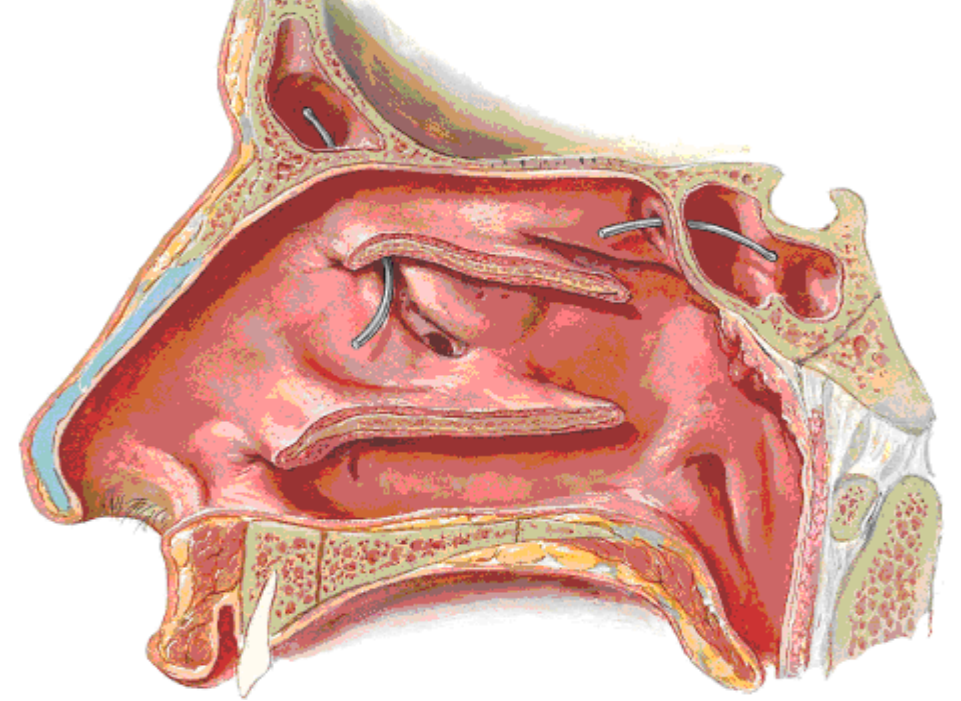
*** Maxillary air sinus is the commonest sinus to be infected due to :**

1. Its opening is high up near the roof and so it does not allow free and complete drainage since such drainage is difficult being against gravity.
2. The discharge from the frontal or ant. ethmoidal air sinuses can pass through the max. air sinus, since all of them open closely in the middle meatus of nose.
3. Spread from an infected tooth.



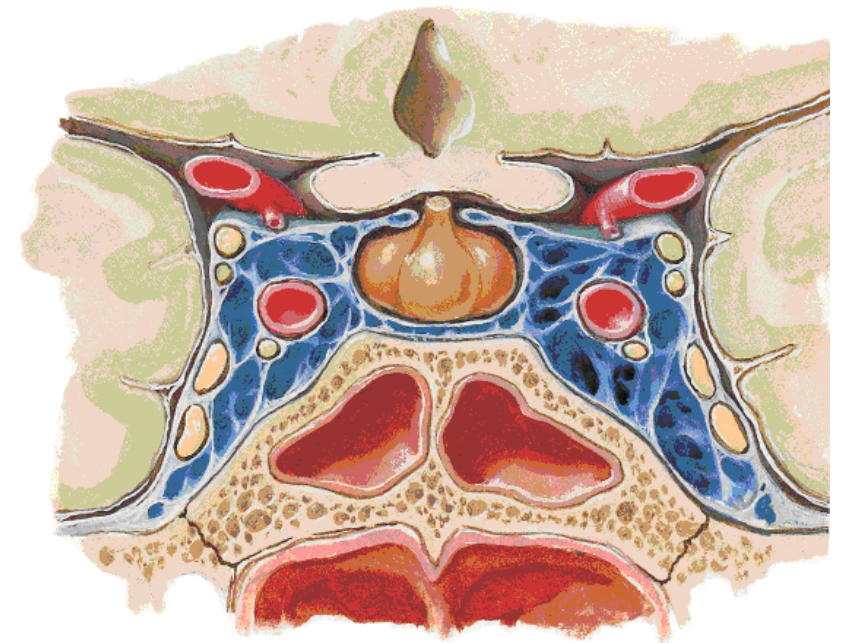
B. Frontal Air Sinus

- * They are two (right and left) which are separated from each other by a septum.
- * They lie within the frontal bone.



C. Sphenoidal Air Sinus

- * They are two (Rt. And Lt.)
- * They lie within the body of the sphenoid.
- * Related to → the pituitary gland (superiorly) & the cavernous sinus (laterally).

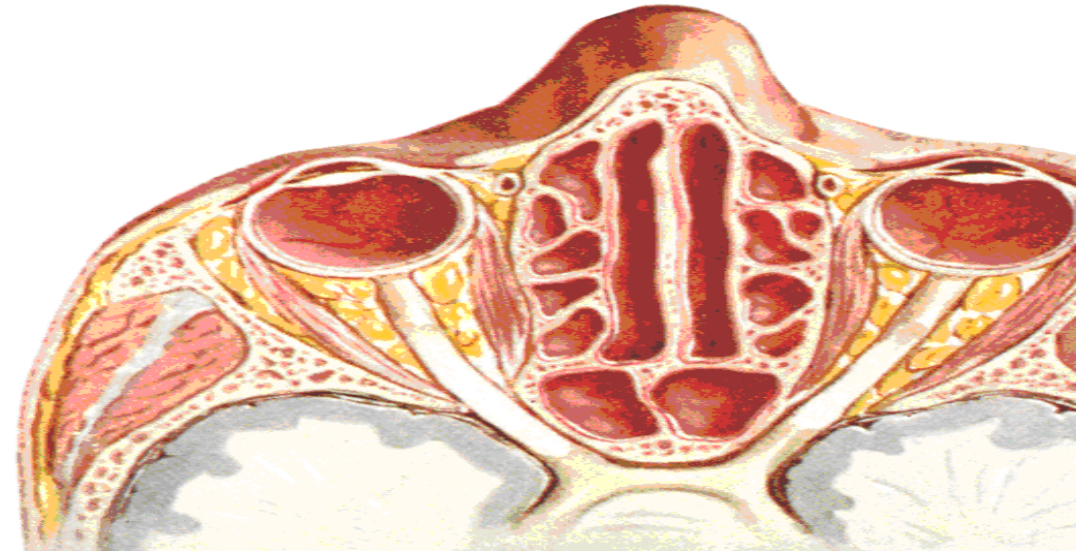
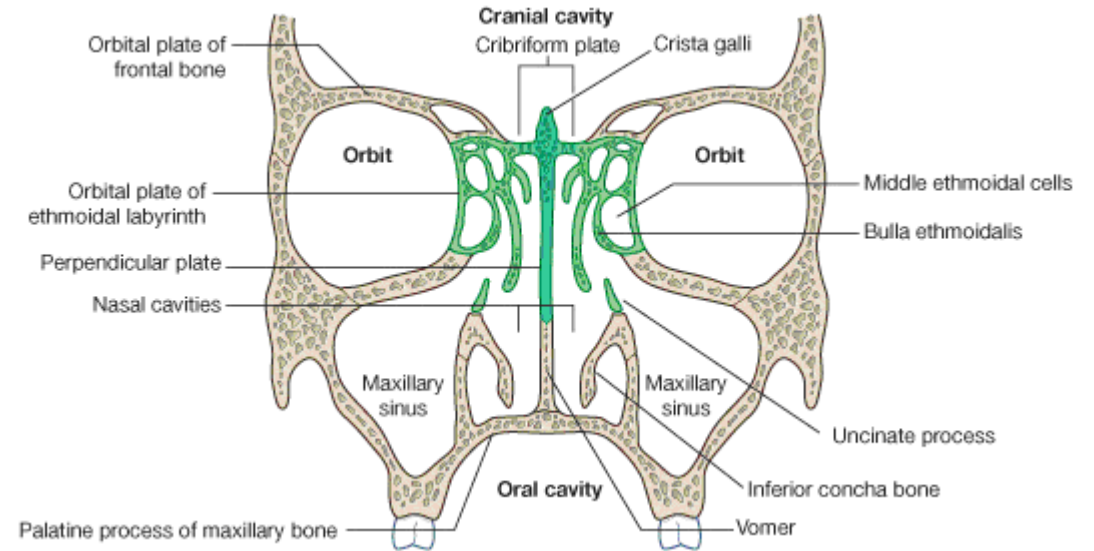


D. Ethmoidal Air Sinuses

* They lie within the ethmoidal bone (between the orbit laterally and the nose medially). Therefore, its infection can cause orbital infection.

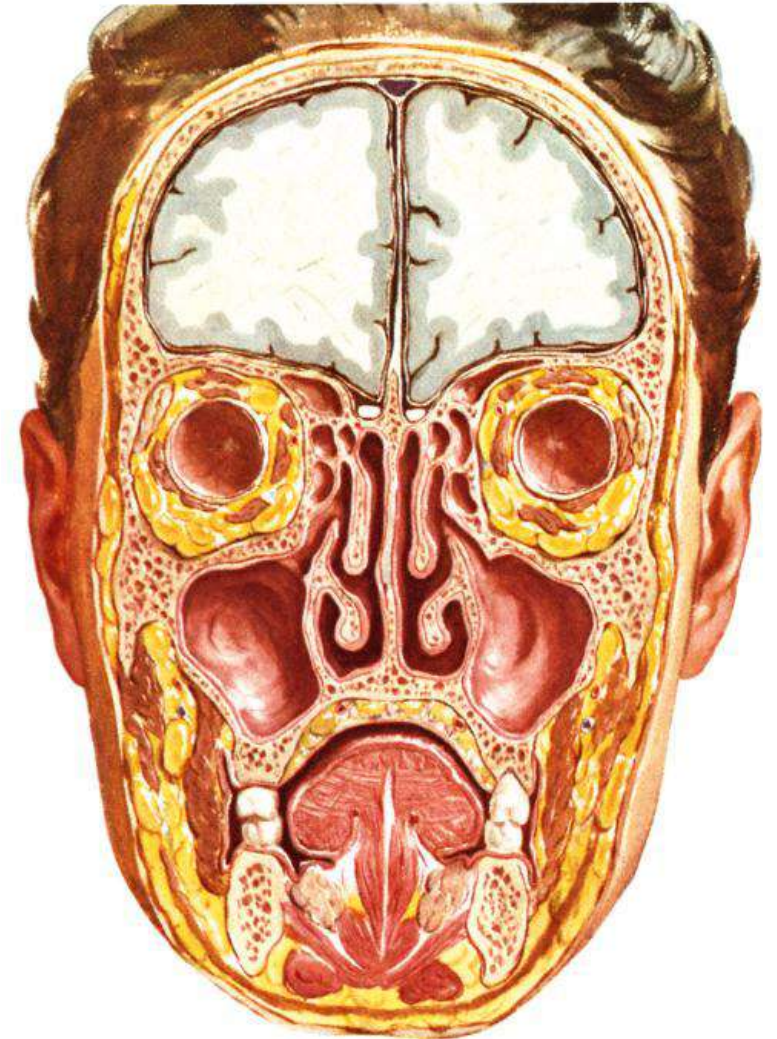
* They may be divided into 3 groups:

1. Ant. ethmoidal A.S.
2. Middle ethmoidal A.S.
3. Post. ethmoidal A.S.



Nose

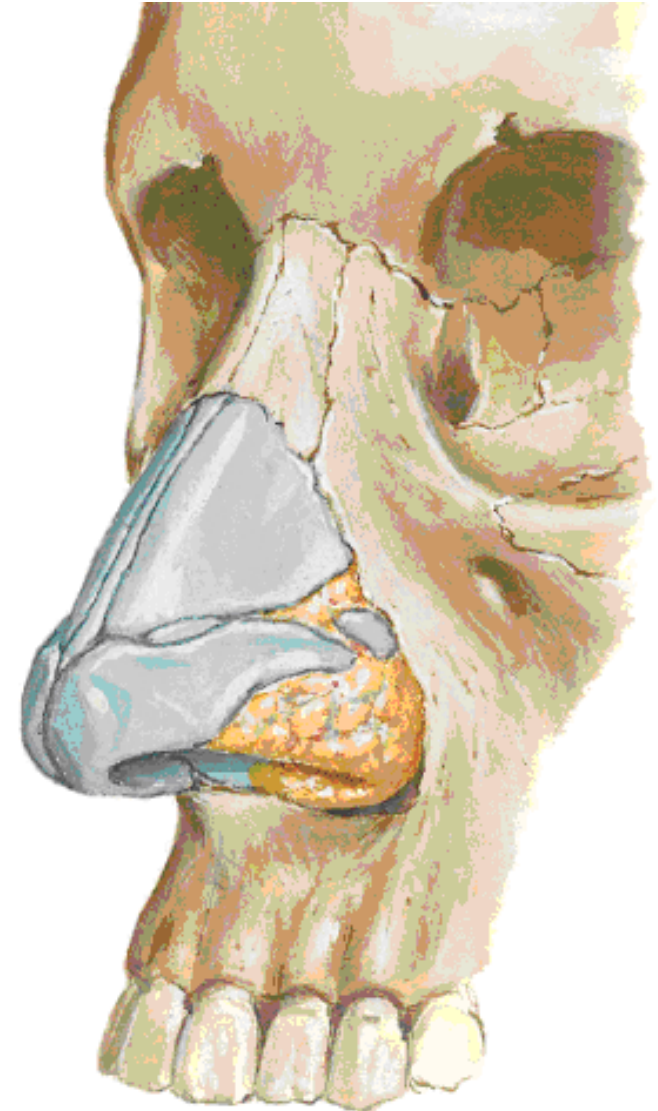
- * It is formed of 2 nasal cavities separated by a septum.**
- * It is important for warming the air & cleaning it from dust & bacteria.**
- * It is surrounded by a group of paranasal sinuses.**



A. External Nose

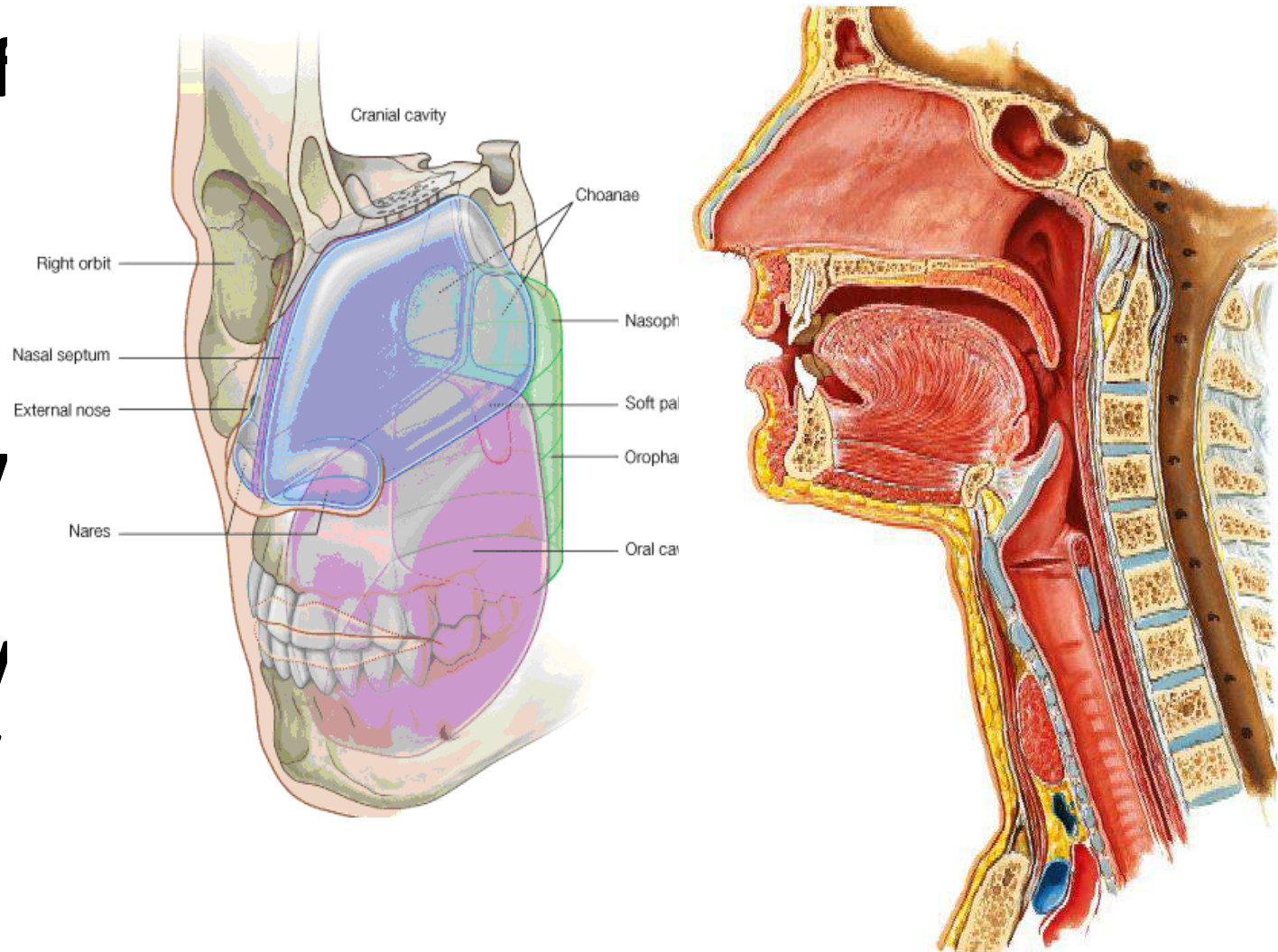
* The skeleton of the external nose is formed of :

1. Bony skeleton:
posteriorly.
2. Cartilaginous framework:
anteriorly.



B. Nasal Cavity

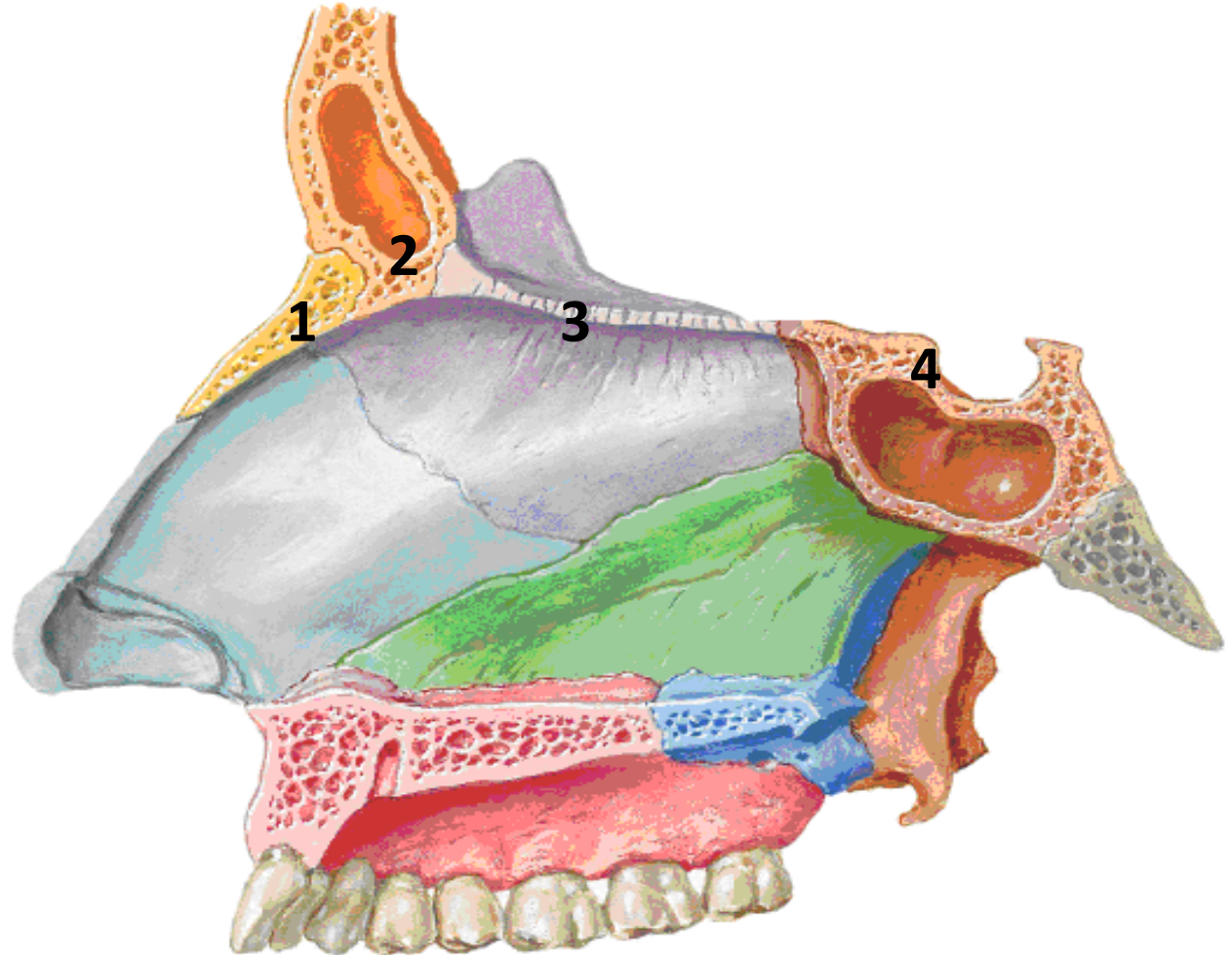
- * The nasal cavity is divided into right and left halves by the nasal septum.
- * Each cavity opens : anteriorly on the face by ant. nasal apertures (nostrils) and posteriorly into the nasopharynx by post. nasal apertures (choana).



@ Boundaries of nasal cavity:

I. Roof : is bony formed of:

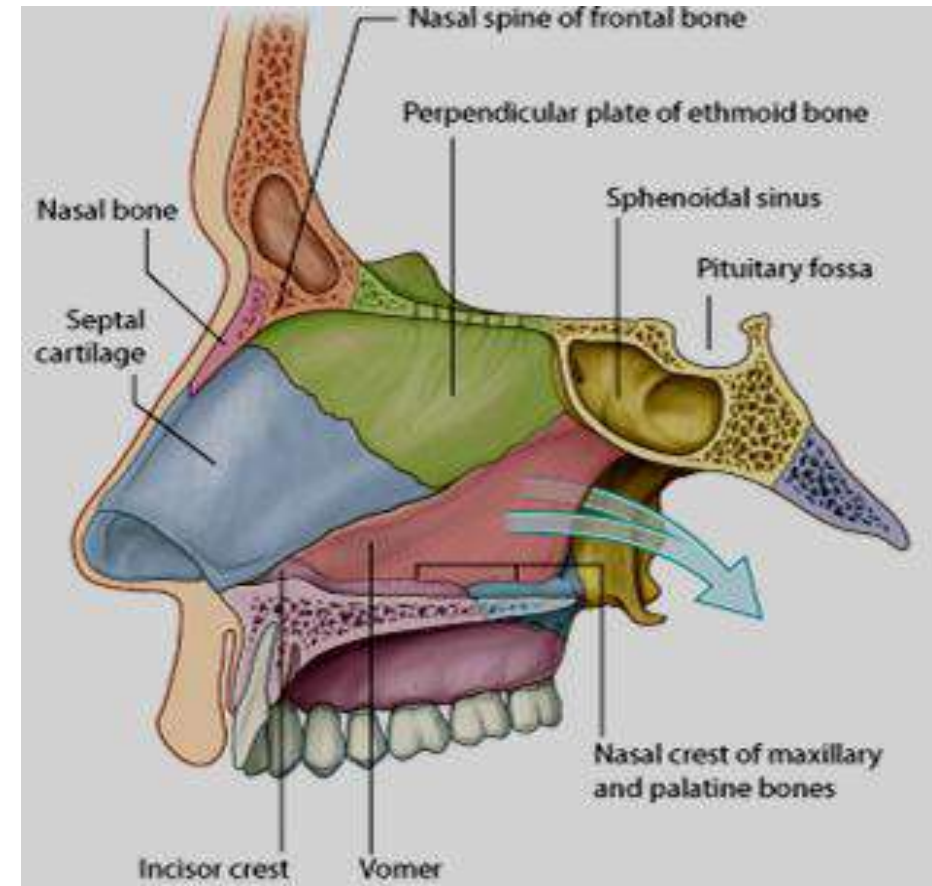
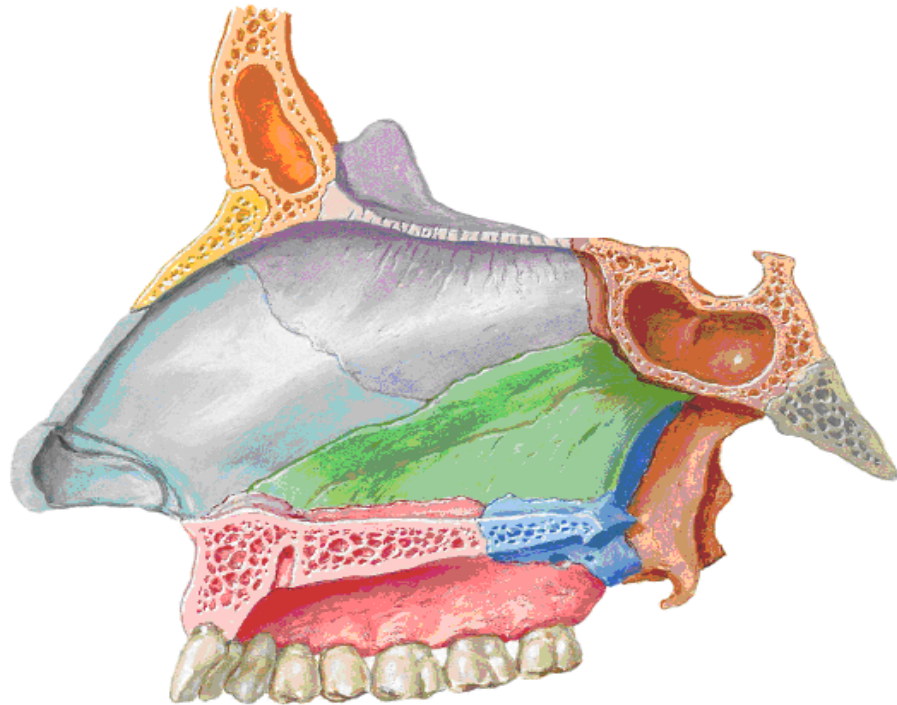
1. Nasal bone.
2. Frontal bone.
3. Ethmoid bone.
4. Body of sphenoid.



II. Floor : hard palate.

III. Medial wall : nasal septum; formed of :

1. Ethmoid (above).
2. Septal cartilage (below and in front).
3. Vomer (below and behind).



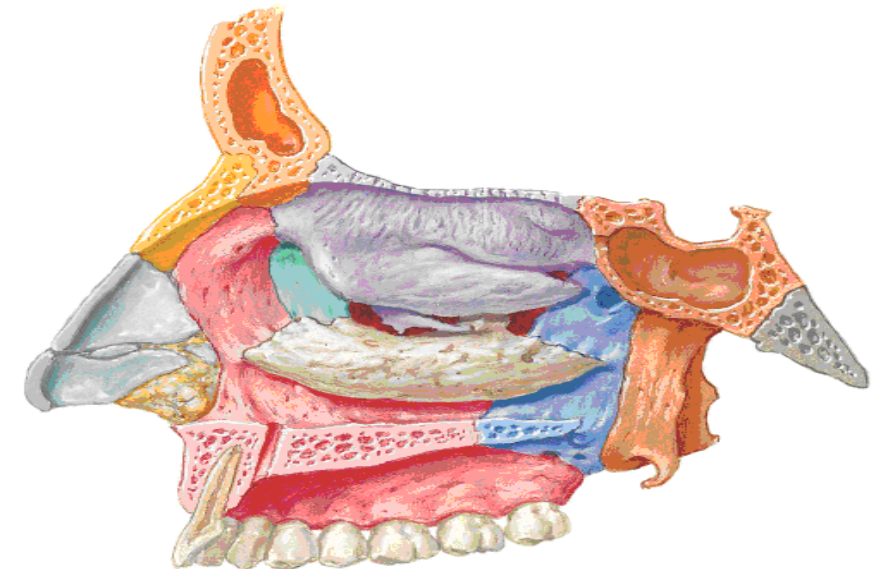
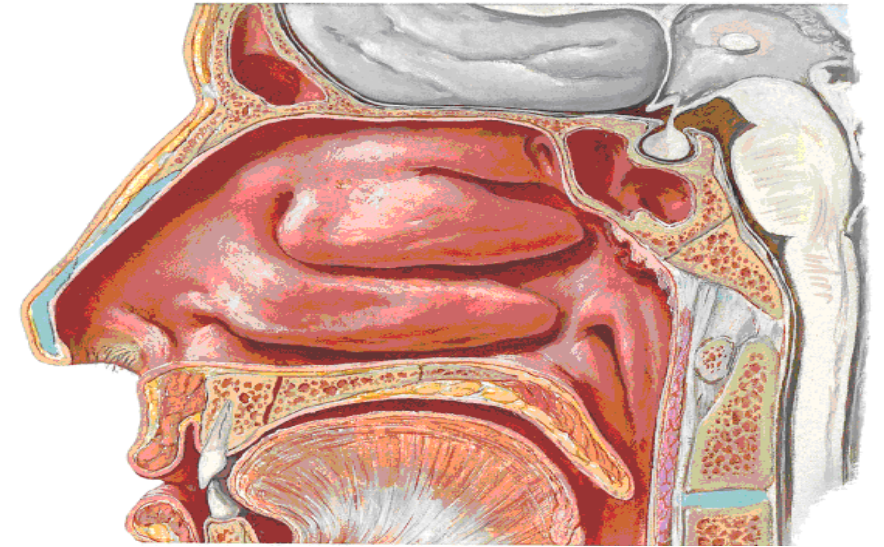
IV. Lateral wall : presents 4 elevations (conchae) and 4 depressions (recesses).

* The elevations are :

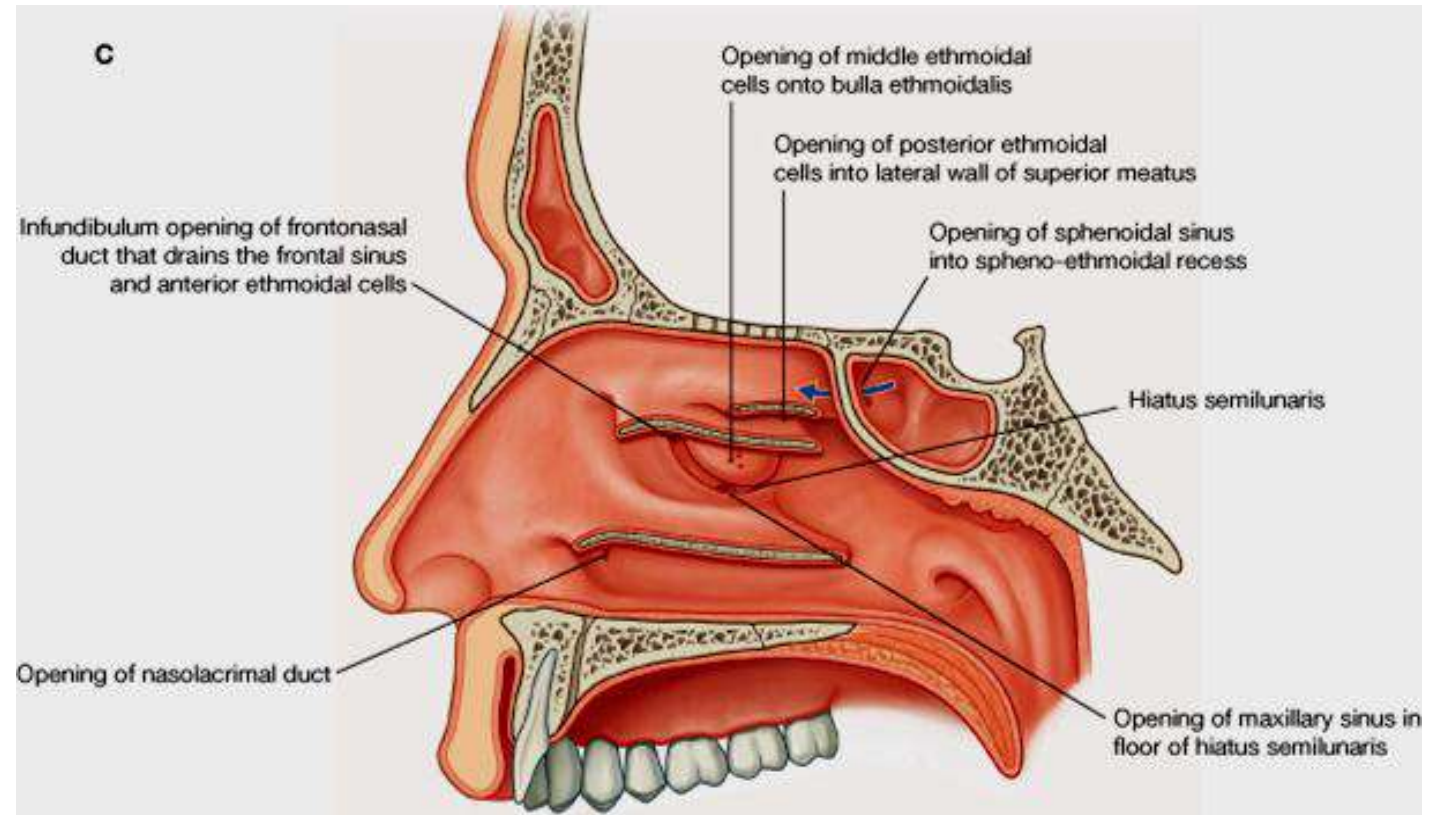
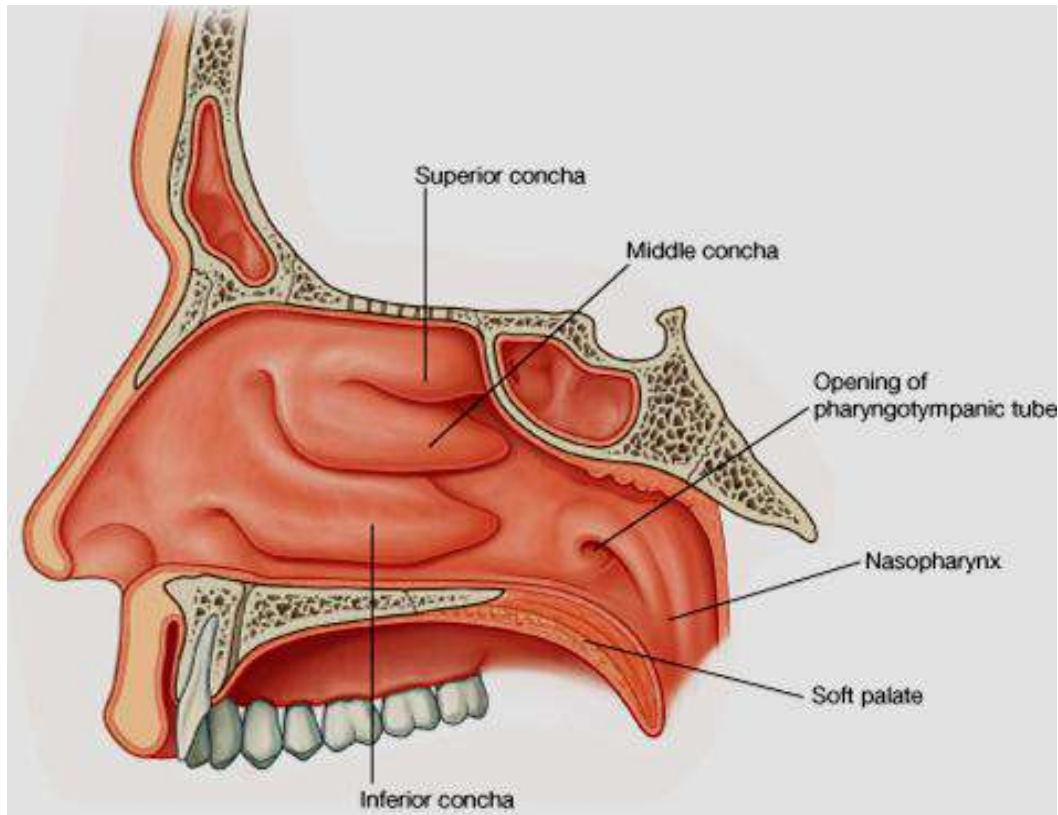
1. Highest concha. } Parts of
2. Sup. concha. } Ethmoid
3. Middle concha. } bone.
4. Inf. concha. → the largest & a separate bone of skull.

* @ The recesses are :

1. Spheno-ethmoidal recess.
2. Sup. meatus.
3. Middle meatus.
4. Inf. meatus.



1. **Spheno-ethmoidal recess** : receives opening of sphenoidal air sinus.
2. **Sup. meatus** : receives the opening of the post. ethmoidal air sinus.
3. **Middle meatus** : receives the opening of the ant. & middle ethmoidal air sinuses, maxillary air sinus & frontal air sinus.
4. **Inf. meatus** : receives opening of nasolacrimal duct.



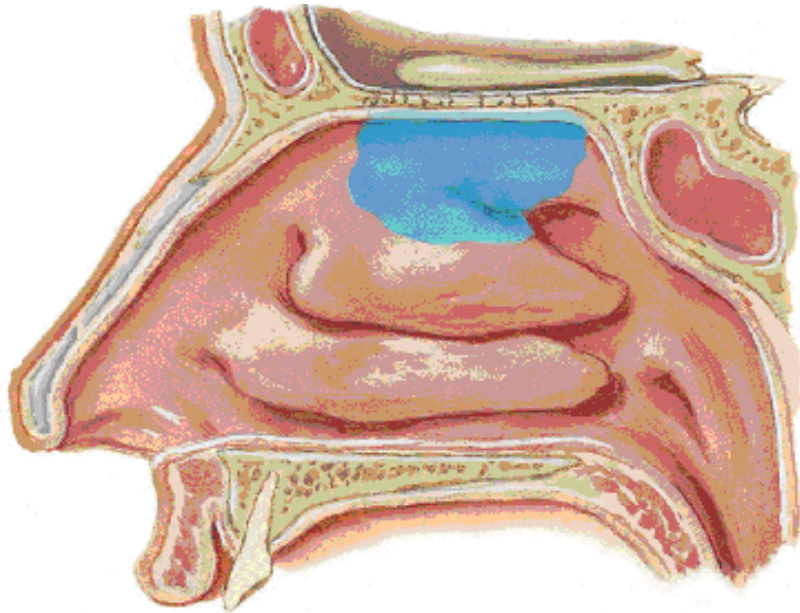
* The mucous membrane of the nasal cavity:

* The vestibule of the nose (which is a small dilatation above the nostril) is lined by modified skin with hairs.

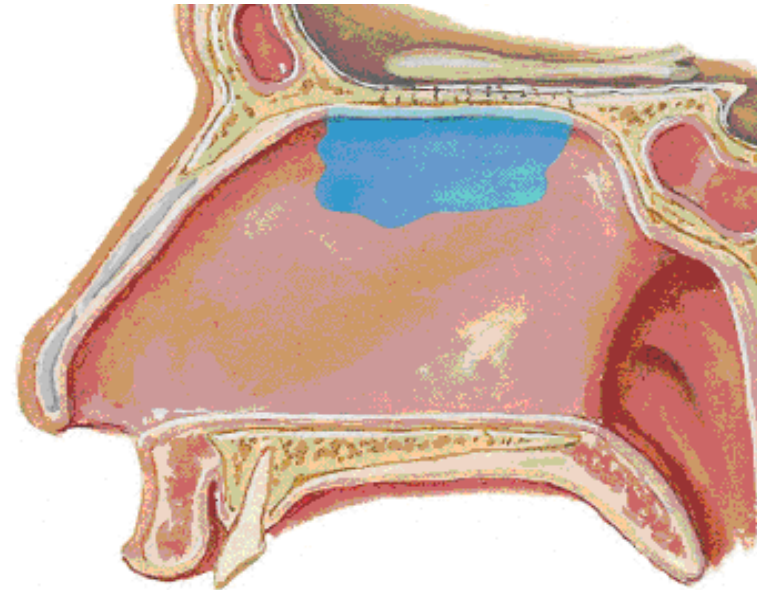
* All the other parts of the nasal cavity are lined by mucous membrane which is either:

1. Olfactory mucous membrane: In the upper 1/3 of nasal cavity.

2. Respiratory mucous membrane: lines all the other parts of the nasal cavity and cleans, warms & moistens the inspired air.



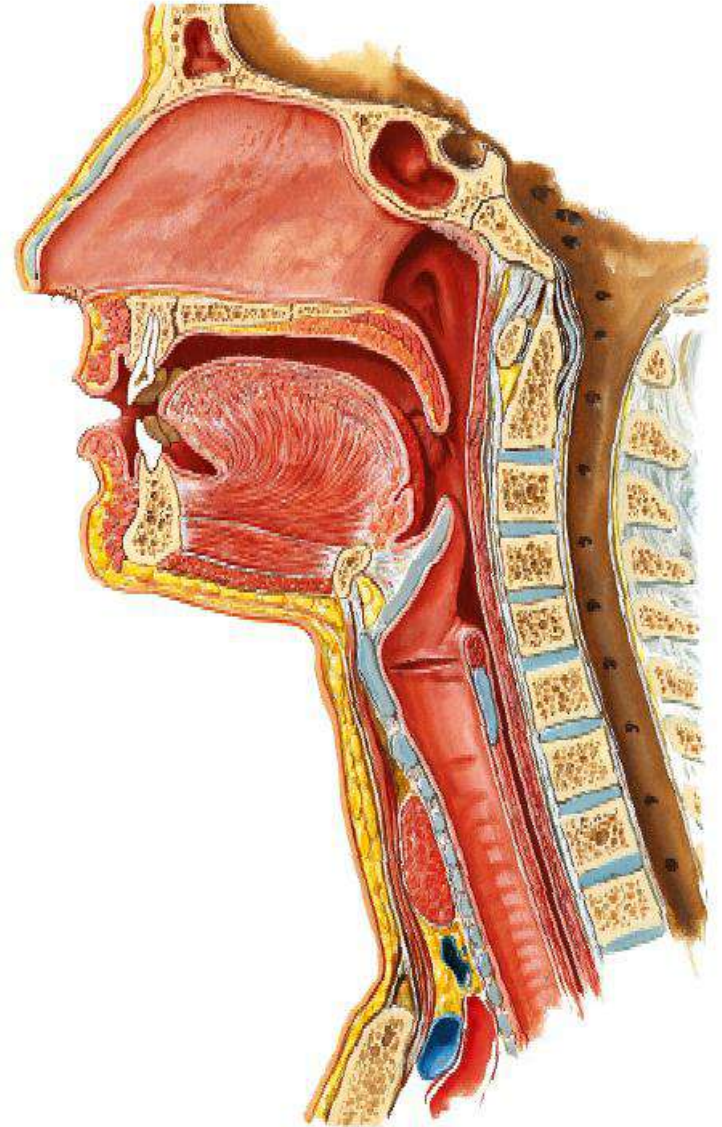
Lateral wall of nasal cavity



Nasal septum

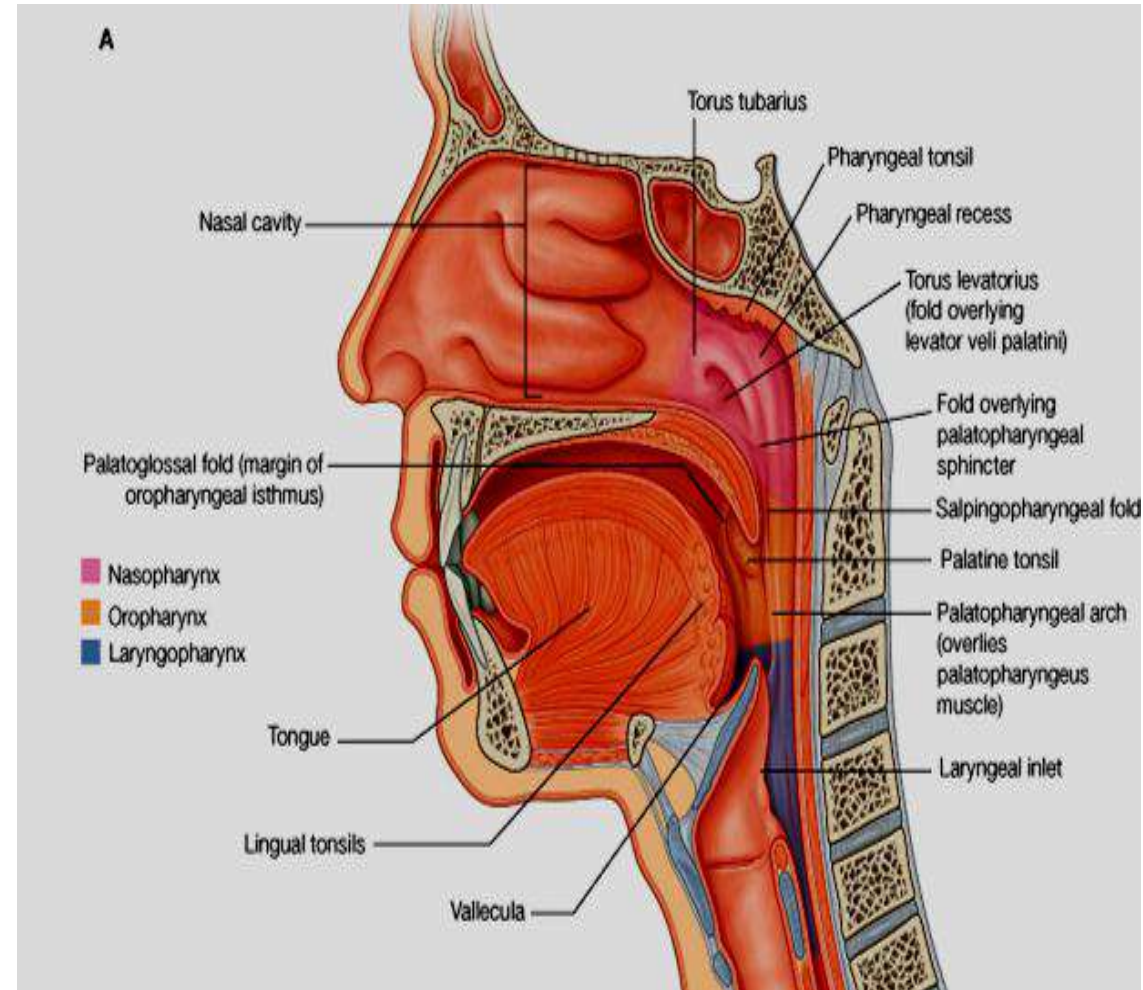
Pharynx

- * Is a funnel shaped musculo-membranous tube, about 12 – 14 cm long, and extends from the base of the skull to the level of the sixth cervical vertebra, where it becomes continuous with the esophagus.
- * It is a tube that lies behind nose, mouth & larynx.
- * Therefore, it is divided into:
 - a. Nasopharynx.
 - b. Oropharynx.
 - c. Laryngopharynx.
- * It is important for passage of air during respiration & passage of food during swallowing.



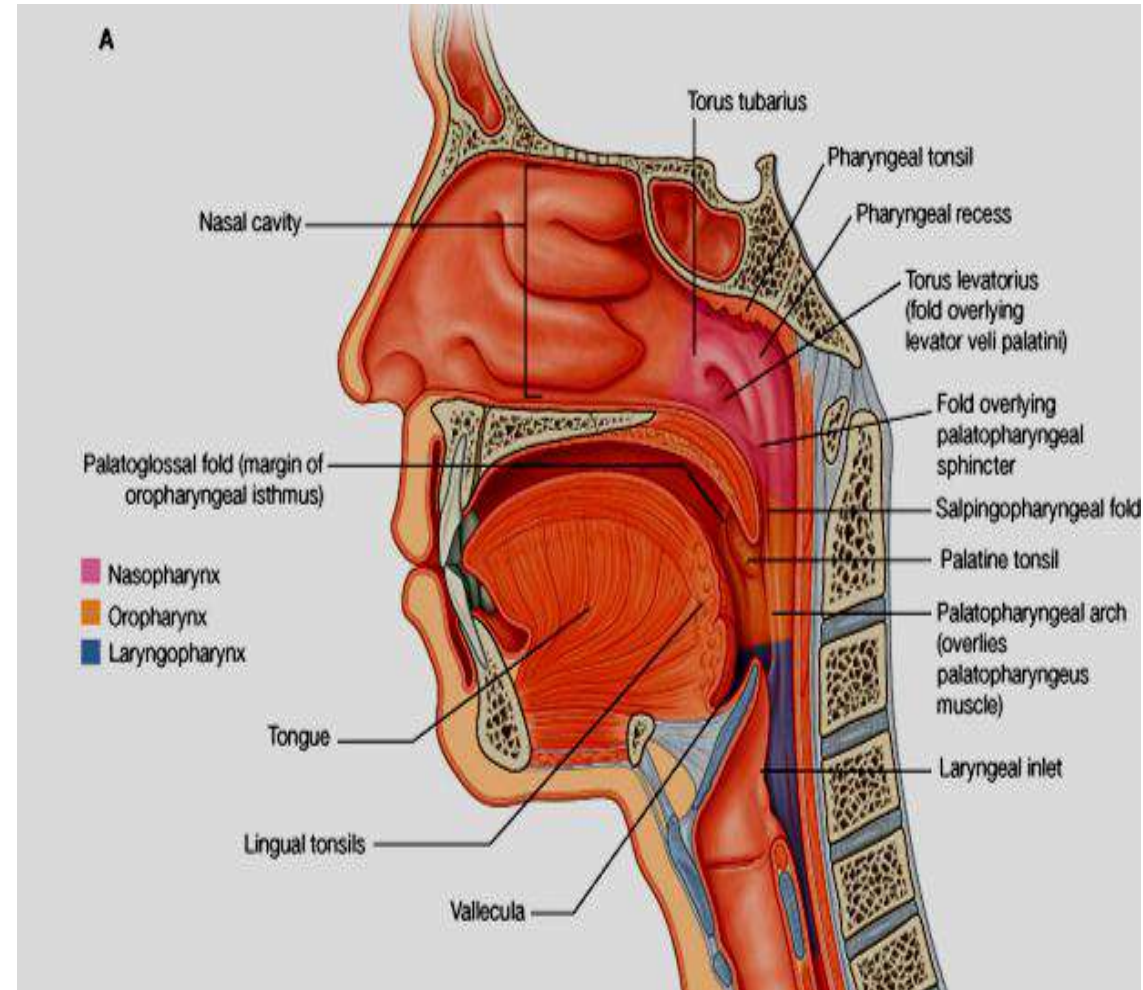
A. Nasopharynx

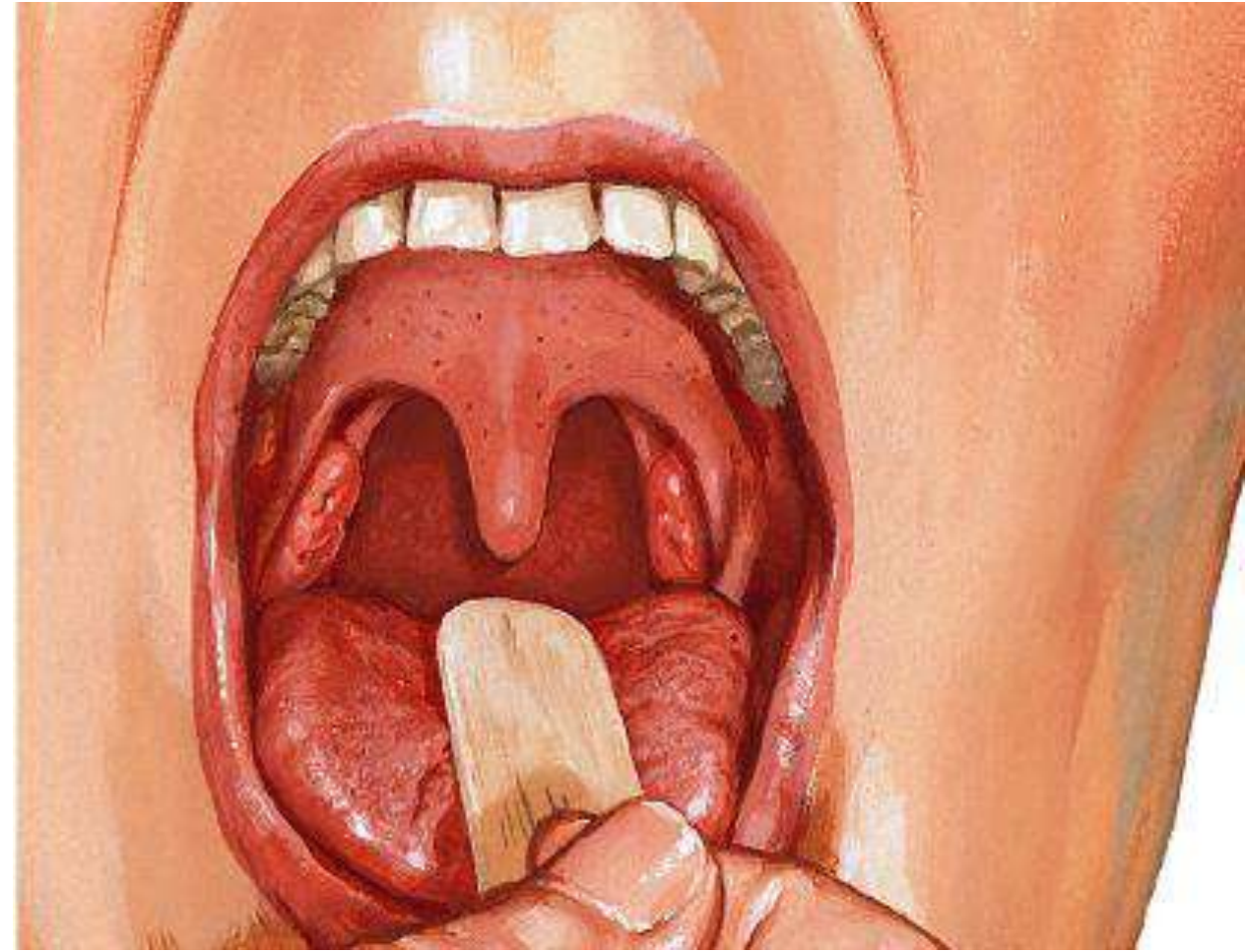
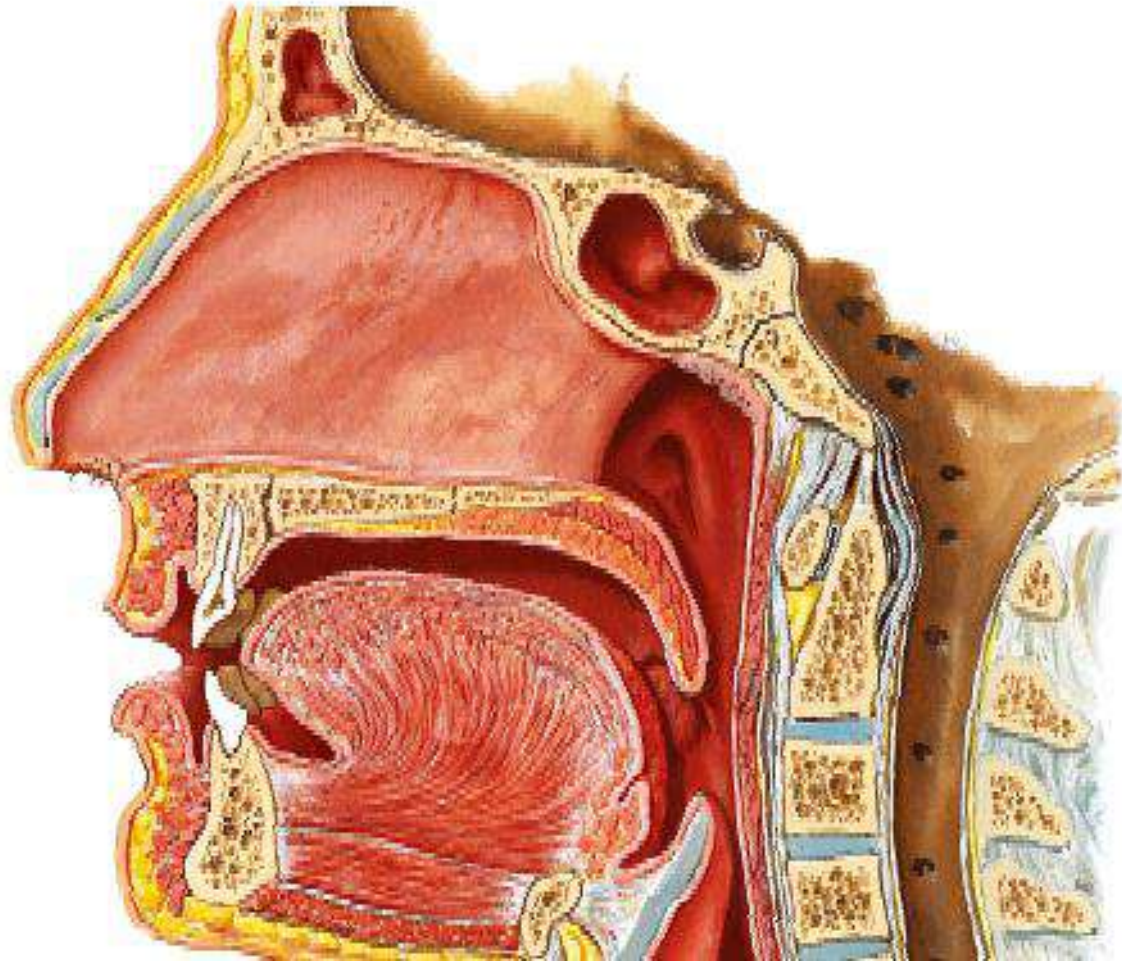
- * Lies behind the nasal cavity and communicates anteriorly with this cavity through the posterior nasal openings (choanae).
- * Inferiorly, it becomes continuous with the oropharynx behind the soft palate through the pharyngeal isthmus.
- * The pharyngeal opening of the auditory tube lies on the lateral wall, through which the pharynx communicates with the middle ear (tympanic cavity).
- * The roof contains a collection of lymphoid tissue called the pharyngeal tonsil (adenoid).
- * In infants, adenoid may enlarge to cause complete obstruction of the tube.



B. Oropharynx

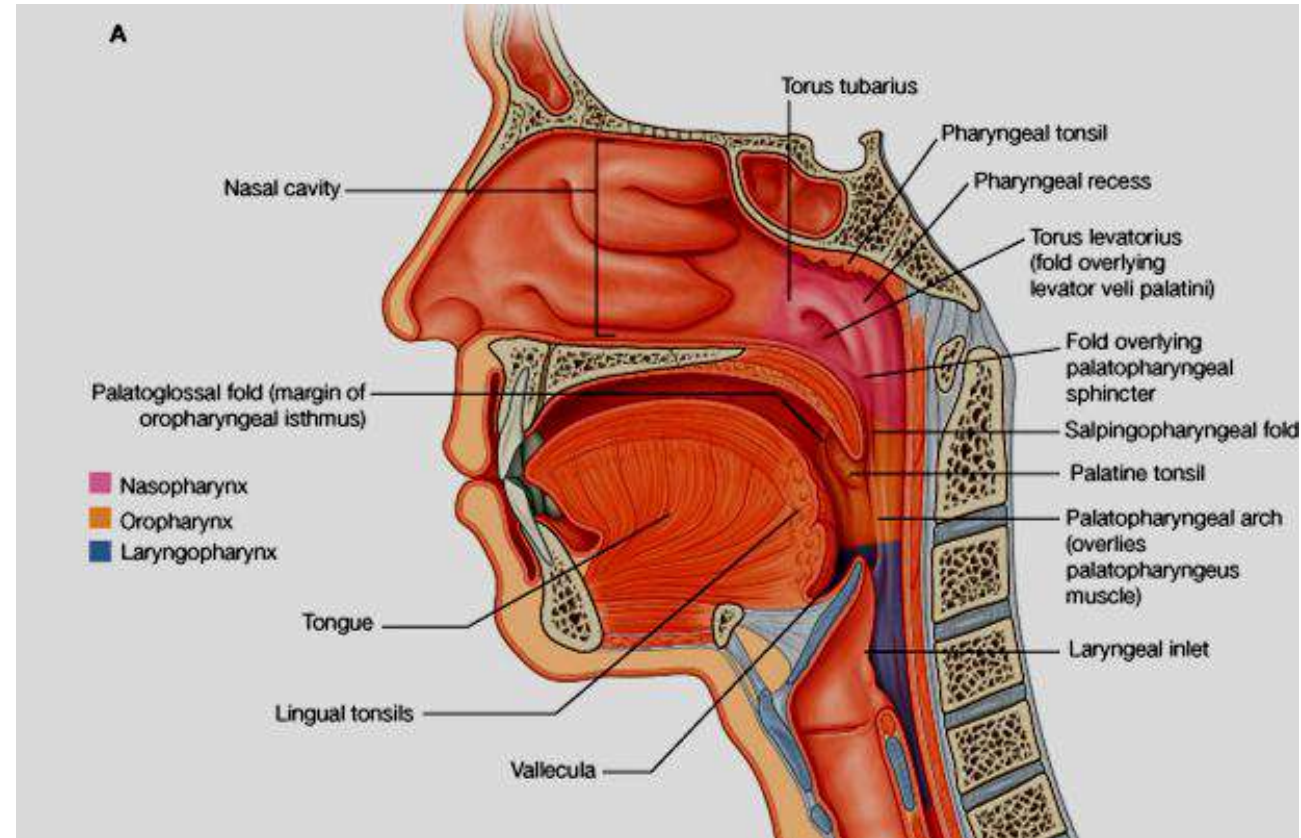
- * Lies behind the mouth cavity and communicates anteriorly with this cavity through the oropharyngeal isthmus.
- * It is continuous superiorly with the nasal part and inferiorly with the laryngeal part.
- * It contains the palatine tonsils.
- * Anteriorly, the epiglottis stands up behind the posterior third of the tongue.





C. Laryngopharynx

- * Lies behind the larynx.
- * It communicates anteriorly with the cavity of the larynx through the inlet of the larynx.
- * It is continuous superiorly with the oral part & inferiorly with the esophagus.



Larynx

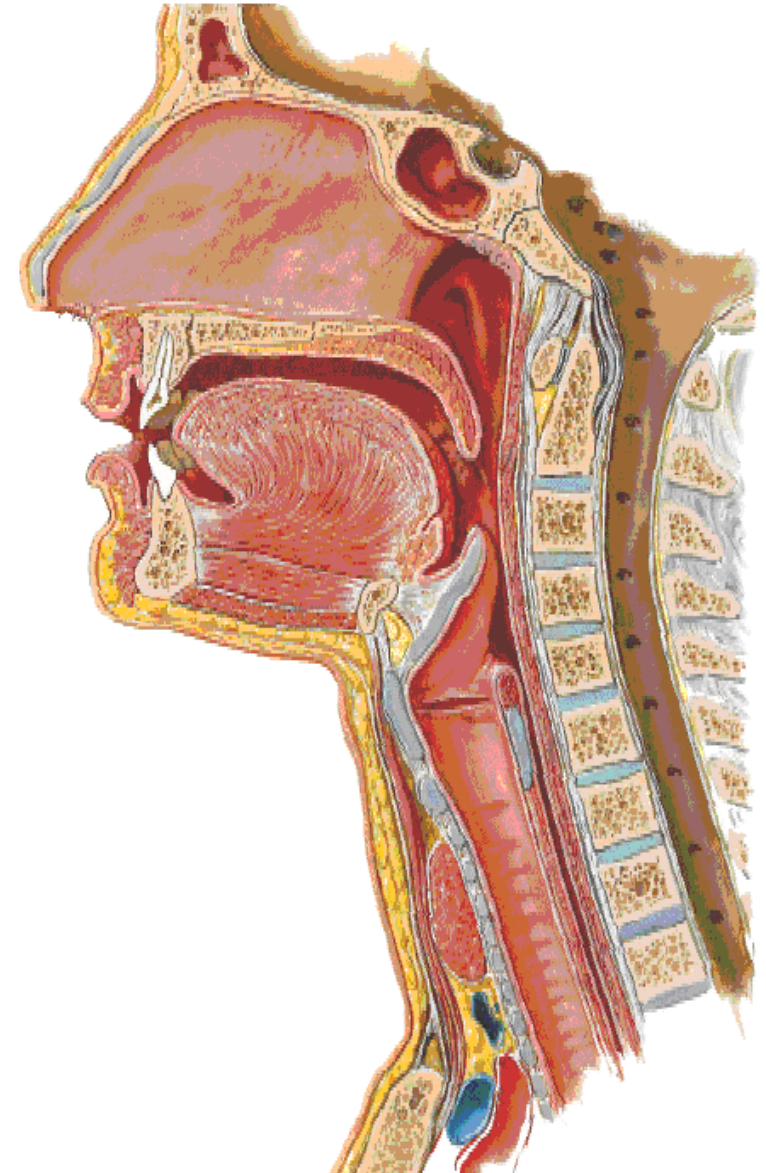
**** Definition:** part of respiratory tract that acts as organ of phonation (voice production) & it has a sphincteric function to prevent passage of food and foreign bodies through its inlet.

**** Extent:** Lies in midline of neck extending from the root of tongue to trachea. It lies in front of **C3-C6** vertebrae

**** Size:**

a- In adult male its length is: 44 mm.

b- In adult female its length is: 36 mm.



**** Constructions:**

- * A frame of cartilages.**
 - * Connected by membranes.**
 - * Moved by muscles.**
 - * Lined by mucous membrane.**
- ** Therefore the skeleton of the larynx is formed by a number of cartilages but with no bones.**



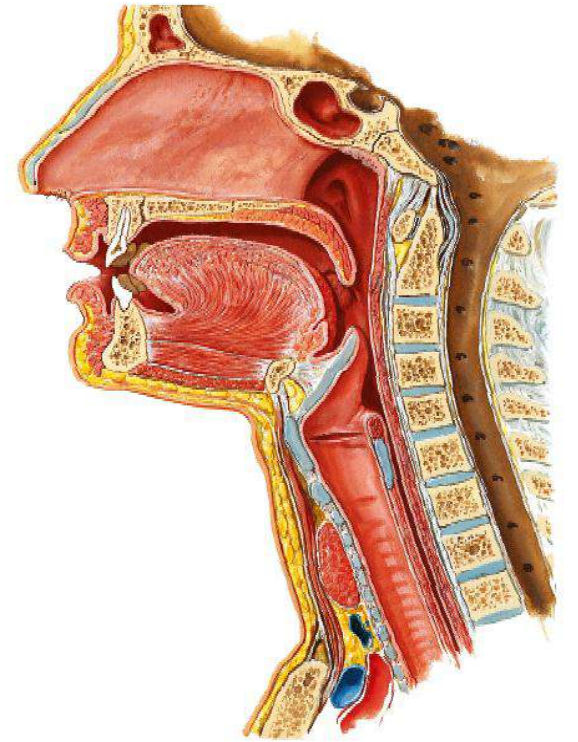
** Cartilages of Larynx:

A. Single : Thyroid, cricoid & epiglottis.

B. Paired: Arytenoid, corniculate and cuneiform.

1. Epiglottis:

- * Leaf like. → ورقة الشجر
- * projects behind the tongue and hyoid bone.
- * It has an upper free broad end and a narrow lower end.
- * Its posterior surface shows pits for mucous glands.



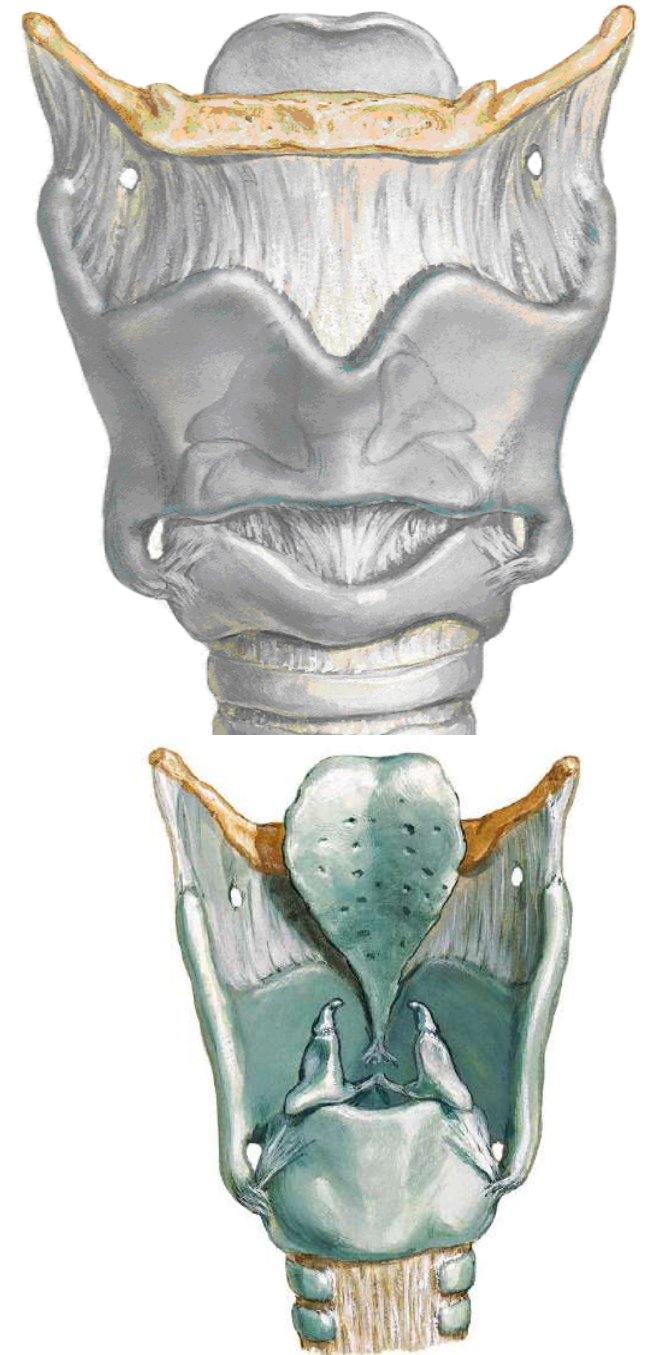
2. Thyroid cartilage :

****Looks like an open book having 2 lamina, united ant. but separated post.**

****Its upper border shows the thyroid notch.**

****The angle between the lamina is 120° in females and 90° in males ; forming Adam's apple.**

**** The anterior border forms the laryngeal prominence "Adam's apple" in the male.**



3. Cricoid cartilage :

****signet-ring in shape, having an ant. narrow arch and a post. broad lamina.**

****N.B.: It is the only complete ring in the respiratory system.**

*** Paired Cartilages:**

1. Arytenoids:

****3 sided pyramid with its base sitting on the upper border of the lamina of cricoid cartilage.**

2. Corniculates : lies at the apex of the arytenoid cartilages.

3. Cuneiforms





General Anatomy

Lecture 12: Respiratory System (2)

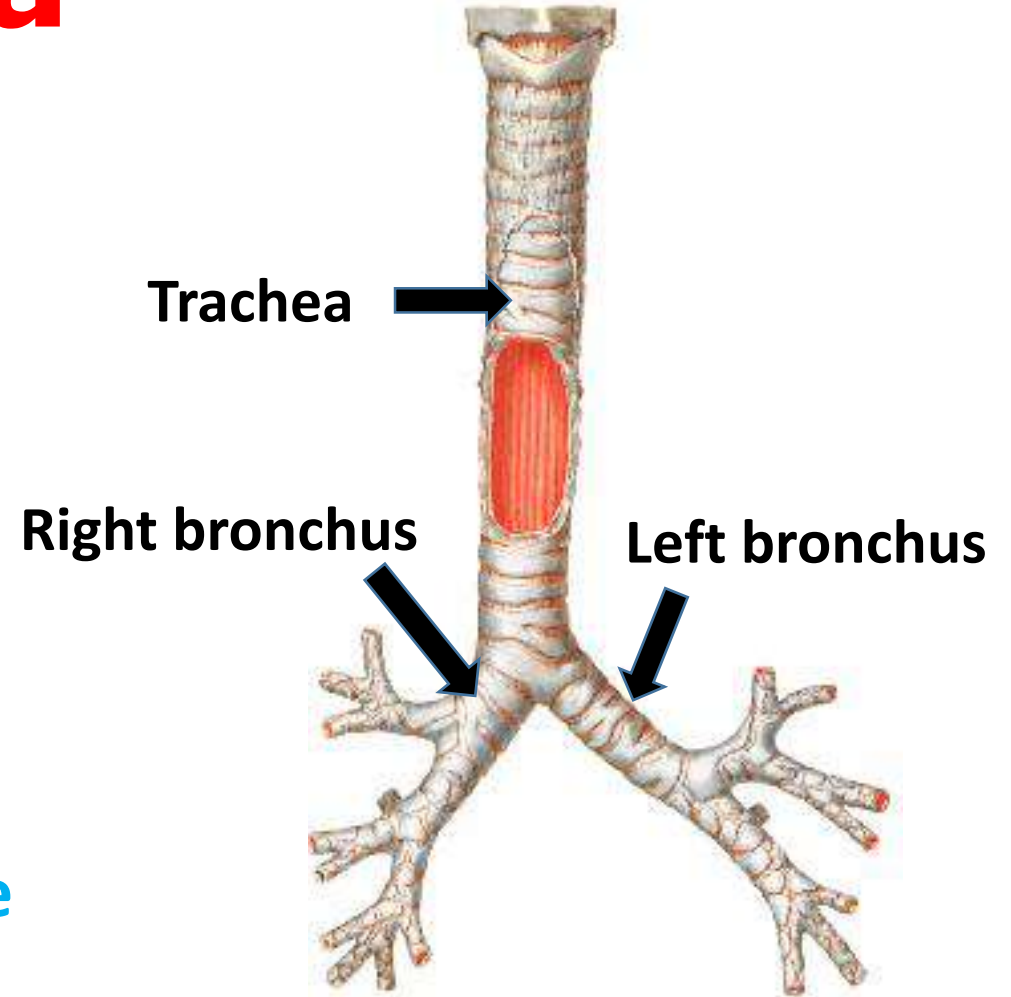
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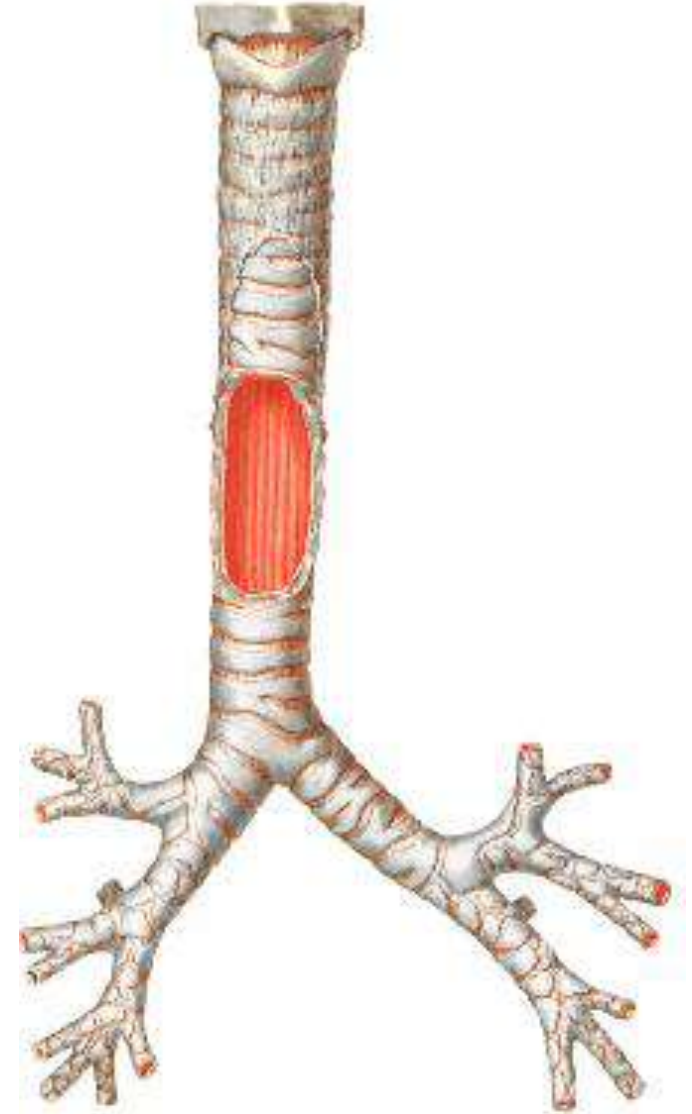
Trachea

- * It is a **fibroelastic tube** which begins in the lower part of the neck & ends in the thorax (extending from **C6 till T4**).
- * **Length: 11 cms.**
- * **Diameter: 2.5 cms.**
- * **Connected upwards** with the larynx.
- * **Ends in the thorax** by dividing into 2 main bronchi.
- * It is formed of a number of **C-shaped hyaline cartilages (15-20) to be kept opened** all the time & prevent its collapse.
- * It lies anterior to esophagus.



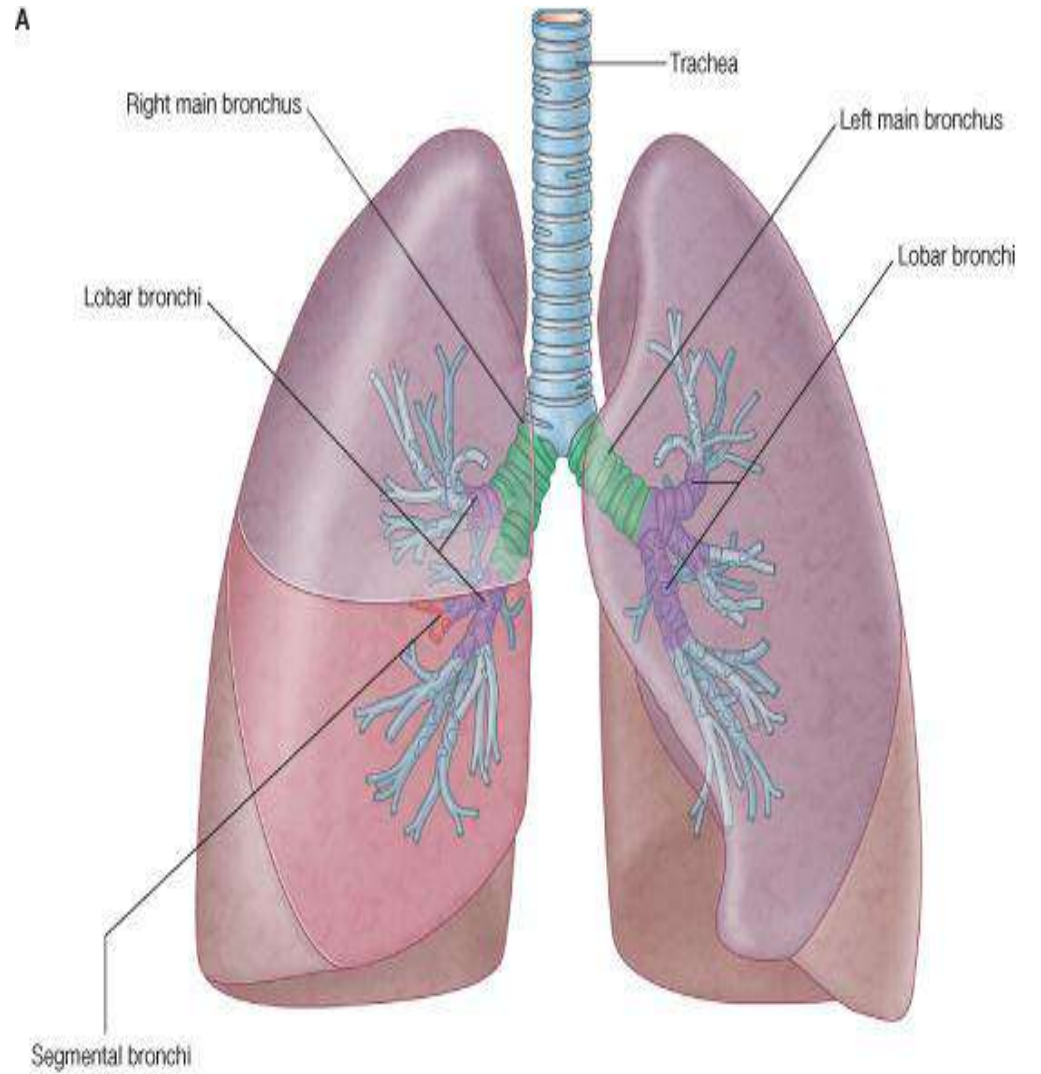
Bronchi

- * The trachea ends by dividing into 2 main bronchi; **right bronchus which enters the right lung** & left bronchus which enters the left lung.
- * The right bronchus is shorter, wider & more in line with the trachea; that is why foreign bodies which pass through the trachea usually passes through the right bronchus.



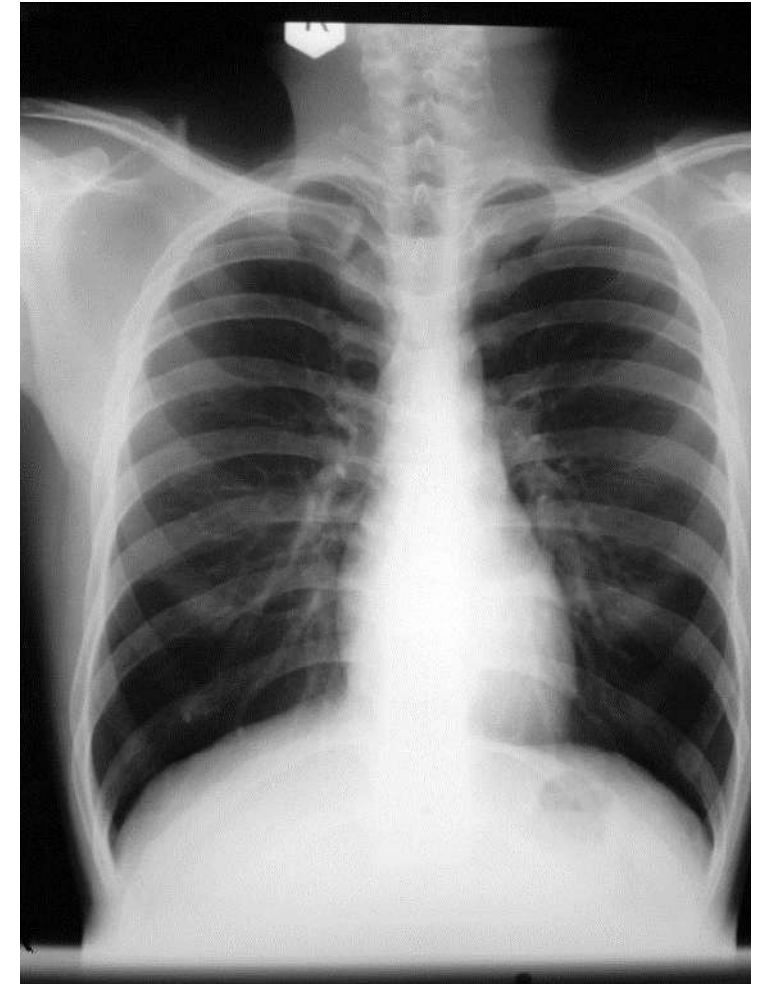
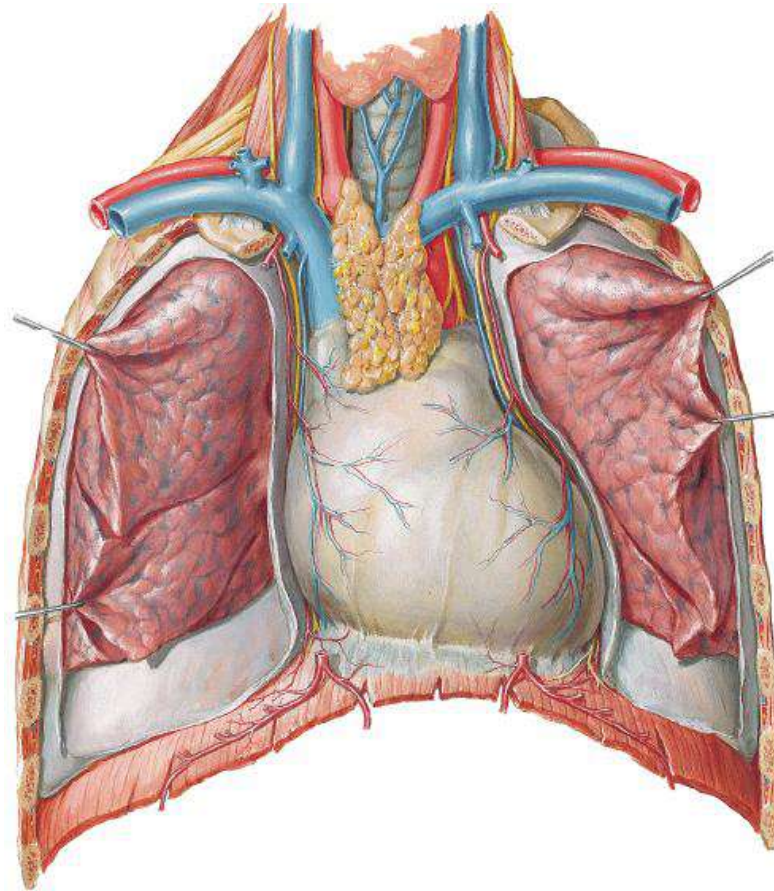
THE LUNGS

- * Lungs (Pulmones) are the chief respiratory organs.
- * Lungs are pink at birth but become dark grey in adults due to deposition of inhaled carbon particles.
- * Normal adult lung is spongy & can float if placed in water.
- * In fetuses, lung is hard & sinks if placed in water → **WHY?** → This is because its alveoli were not used in respiration & are not distended with air & are filled with secretions.



THE LUNGS (Contd)

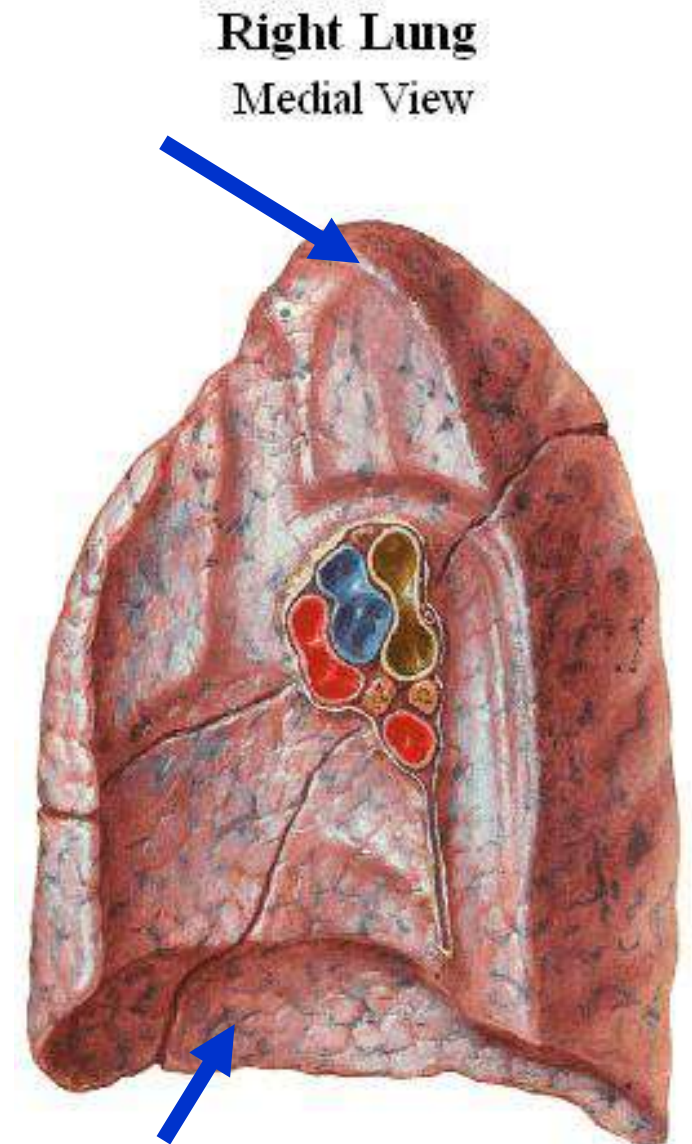
- * Lungs lie in the thoracic cavity on either side of heart.
- * Each Lung is covered with pleura.
- * Rt. Lung = 625 gms
- * Lt. Lung = 550 gms



Normal adult x-ray chest

Shape, Surfaces & Borders of lungs

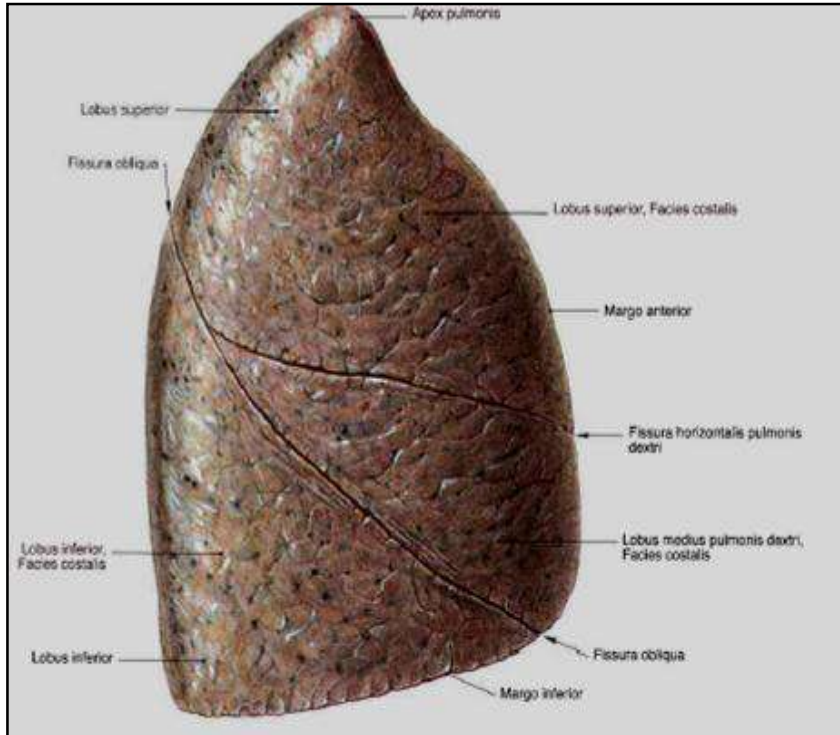
- * Shape → like half a cone.
- * Has: an **apex (above) & a base (below)**.
- * **Apex is:** rounded in shape, directed superiorly & extends to the root of the neck.
- * **Base is:** concave, directed inferiorly, bounded by sharp inferior border. It rests on diaphragm, that separates it from liver, stomach & spleen.



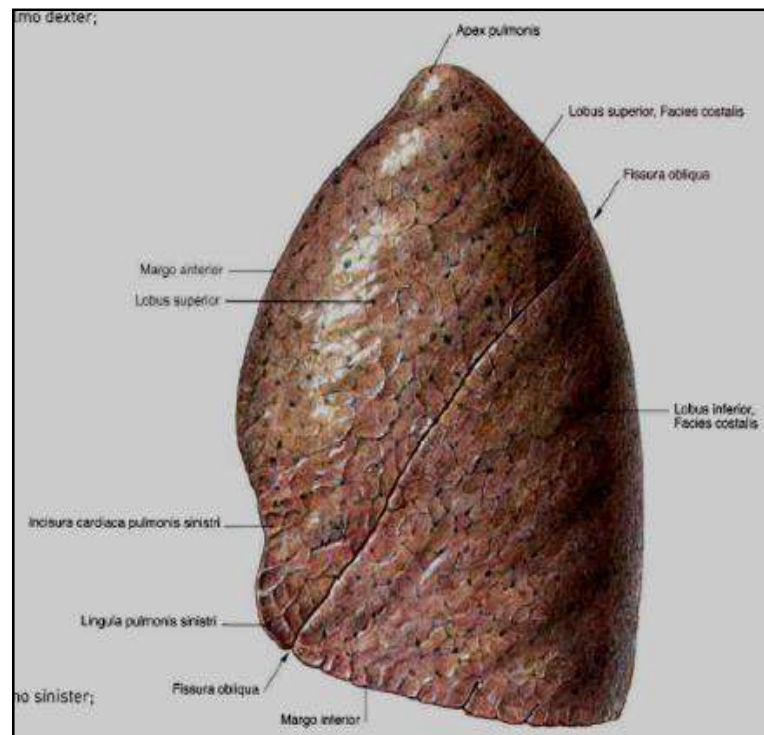
Shape, Surfaces & Borders of lungs

- * The lung has a costal surface & a medial surface.
- * Has a sharp anterior, a rounded posterior & a sharp inferior border.

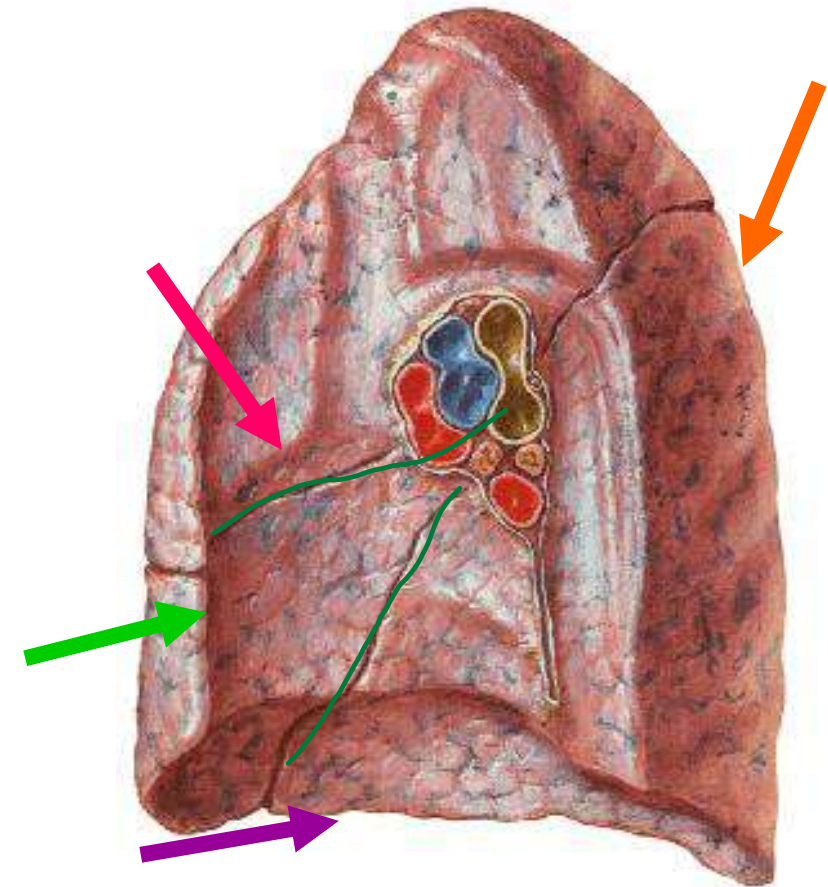
Right Lung
Medial View



Costal surface of right lung

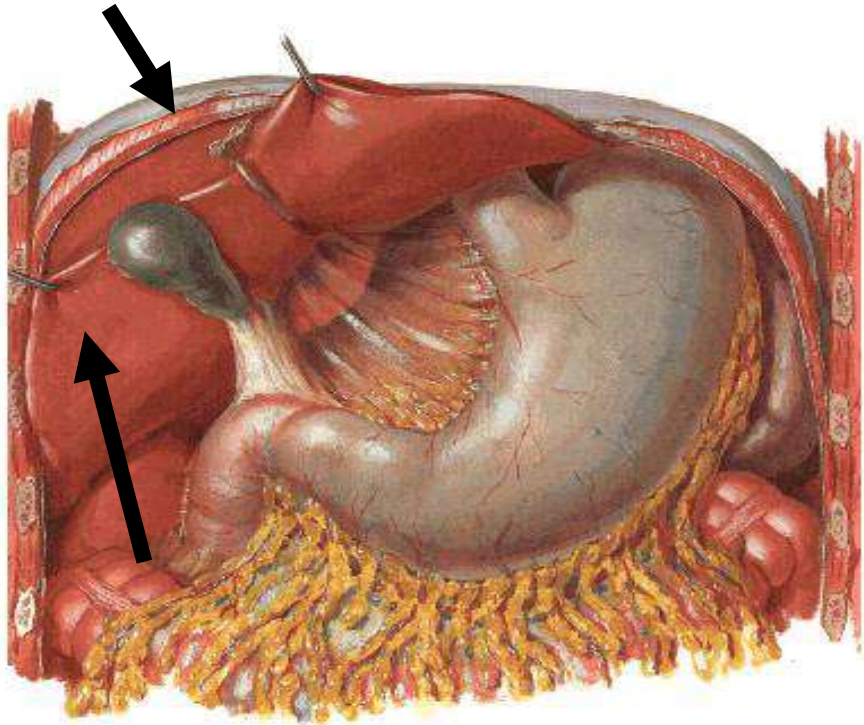


Costal surface of left lung

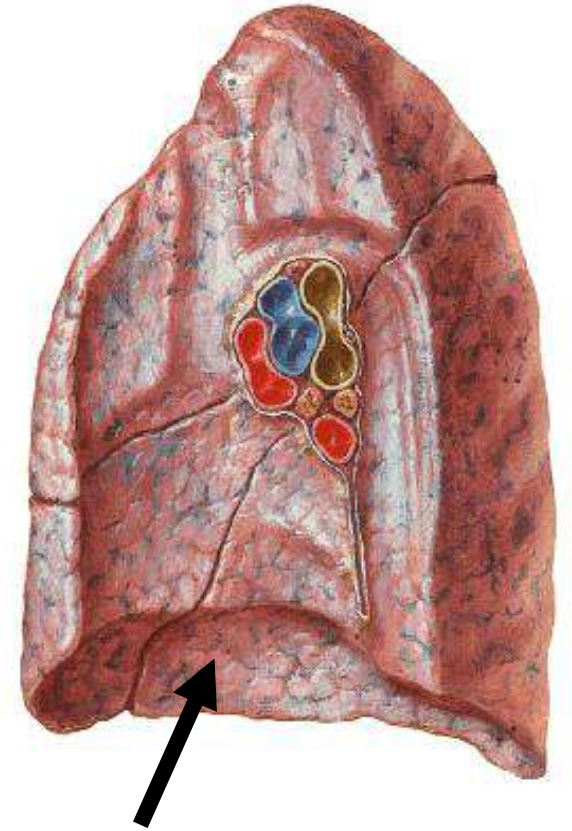


Base of right lung

* More concave on right lung which lies over right $\frac{1}{2}$ of diaphragm that separates right lung from right lobe of liver.

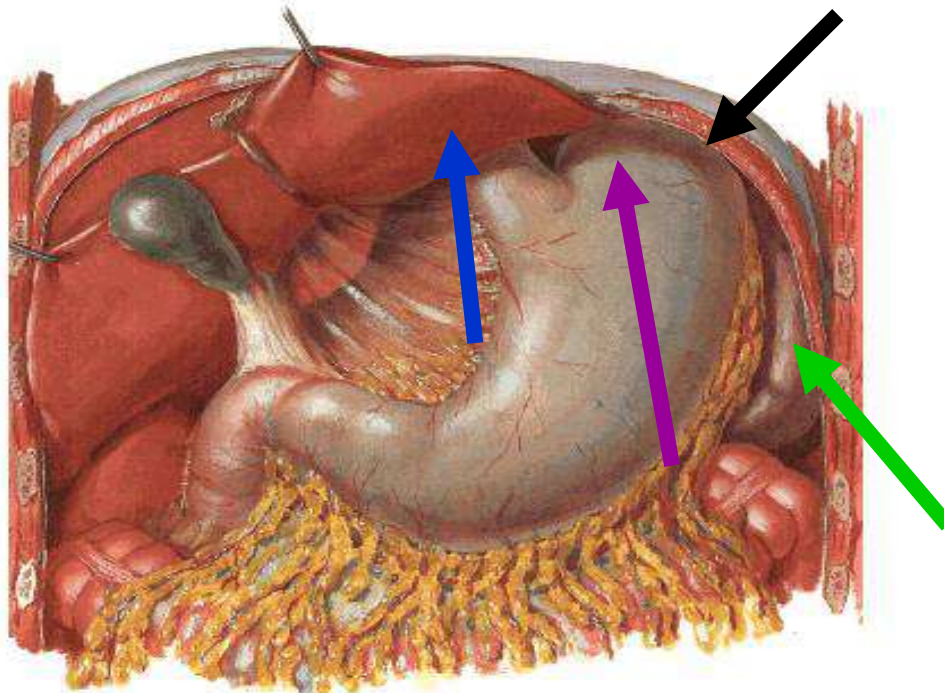


Right Lung
Medial View

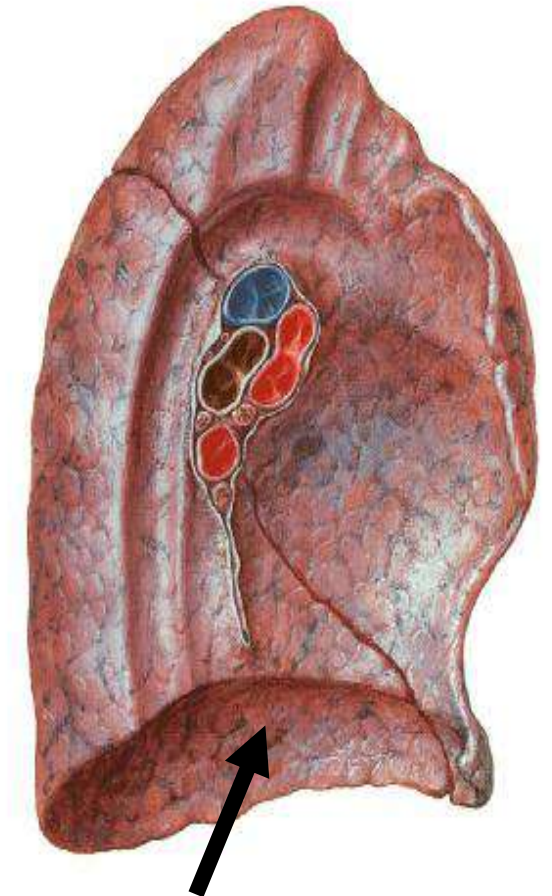


Base of left lung

* Less concave on left lung which lies over left 1/2 of diaphragm that separates left lung from **left lobe of liver**, **stomach** & **spleen**.

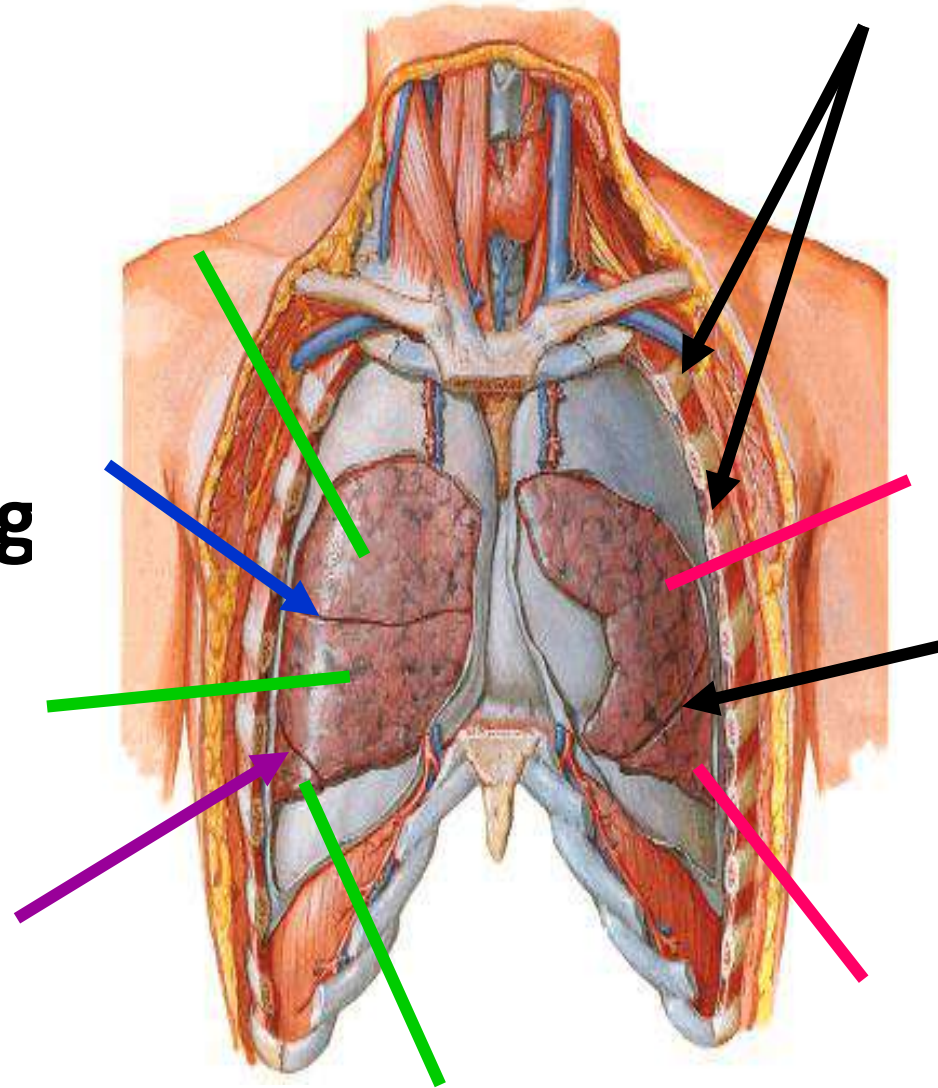


Left Lung
Medial View



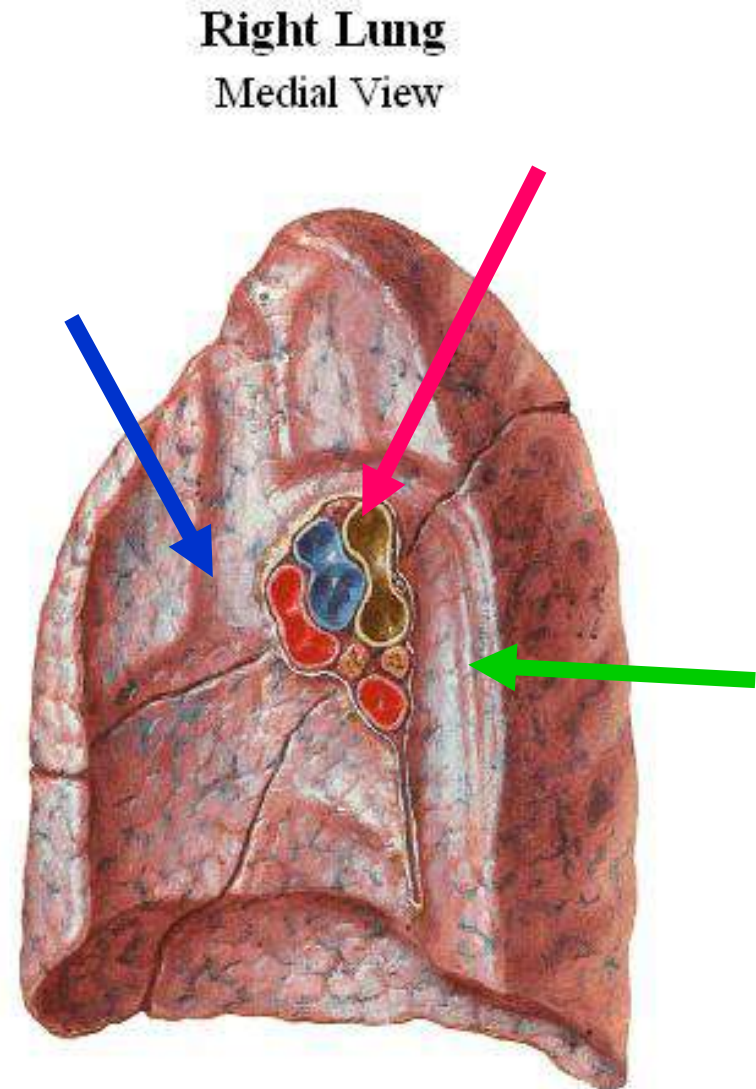
Costal (lateral or outer) surface of lung

- * Convex & related to chest wall (ribs & intercostal muscles) & costal pleura.
- * Right lung has 2 fissures → **horizontal** & **oblique** dividing lung into 3 lobes : **upper, lower & middle lobes.**
- * Left lung has one oblique fissure dividing lung into **upper & lower lobes.**



Medial (inner or mediastinal) surface of lung

- * Related to all mediastinal structures.
- * Its middle part contains the **hilum of the lung** (area which gives passage to structures forming root of lung).

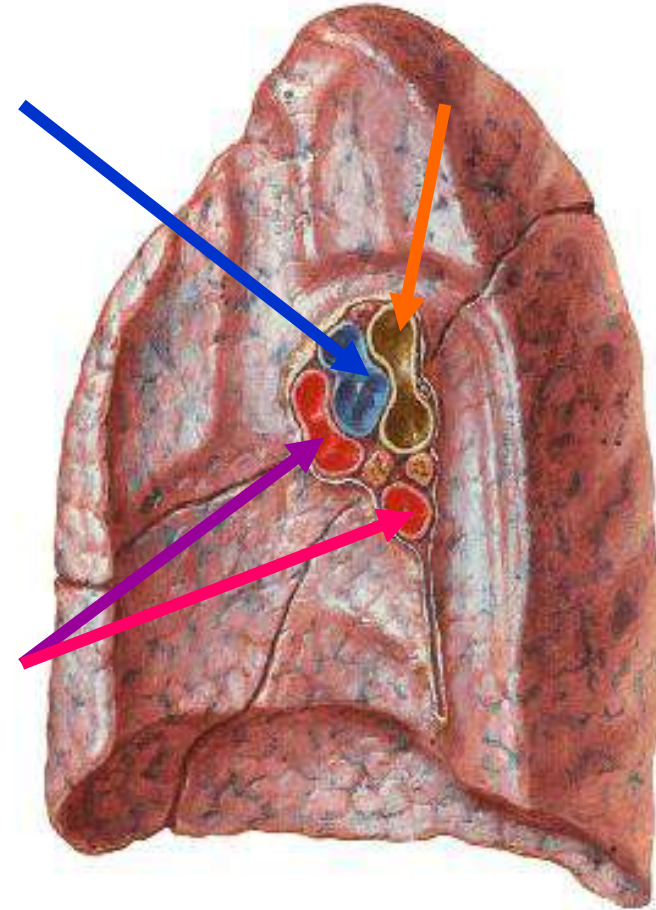


Root of right lung

* Contains 3 major structures → two bronchi, one pulmonary artery & 2 pulmonary veins.

* Contains 3 minor structures → bronchial vessels, autonomic nerves & lymphatics.

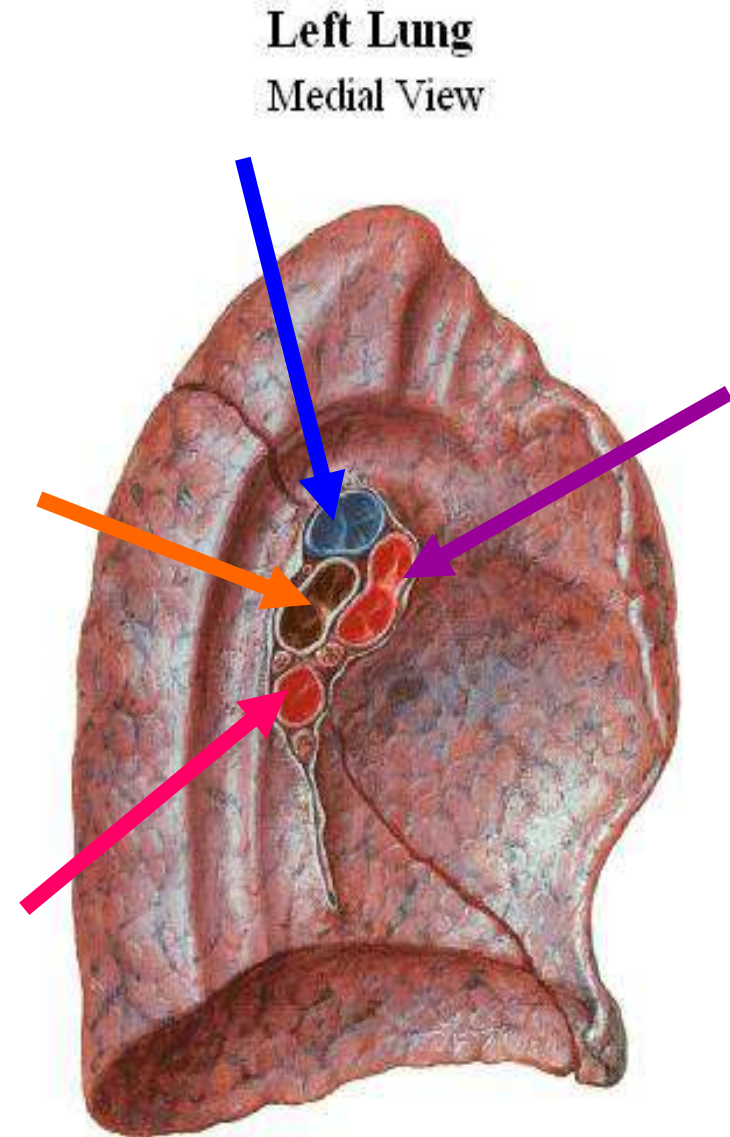
Right Lung
Medial View



Root of left lung

* Contains 3 major structures → **one main bronchus**, **one pulmonary artery** & **2 pulmonary veins**.

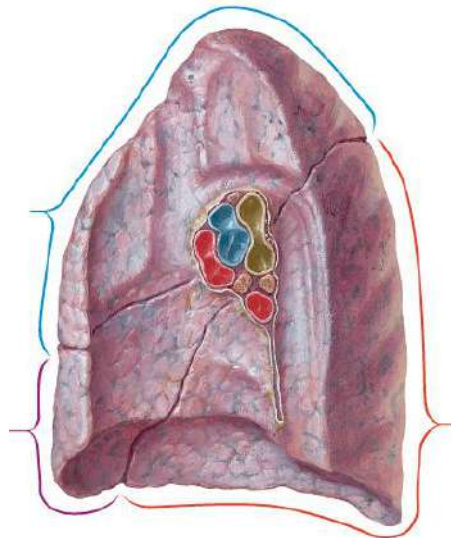
* Contains 3 minor structures → **bronchial vessels**, **autonomic nerves** & **lymphatics**.



Differences between Right & Left Lungs

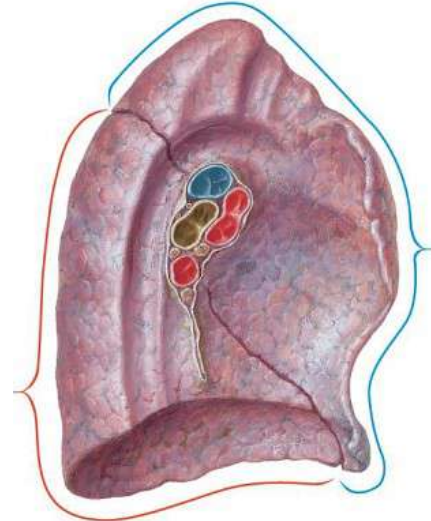
Right Lung

1. Shorter & heavier.
2. Wider.
3. Anterior border is straight.
4. Has 3 lobes.
5. Has 2 fissures.
6. Root has 2 bronchi.
7. One bronchial artery.



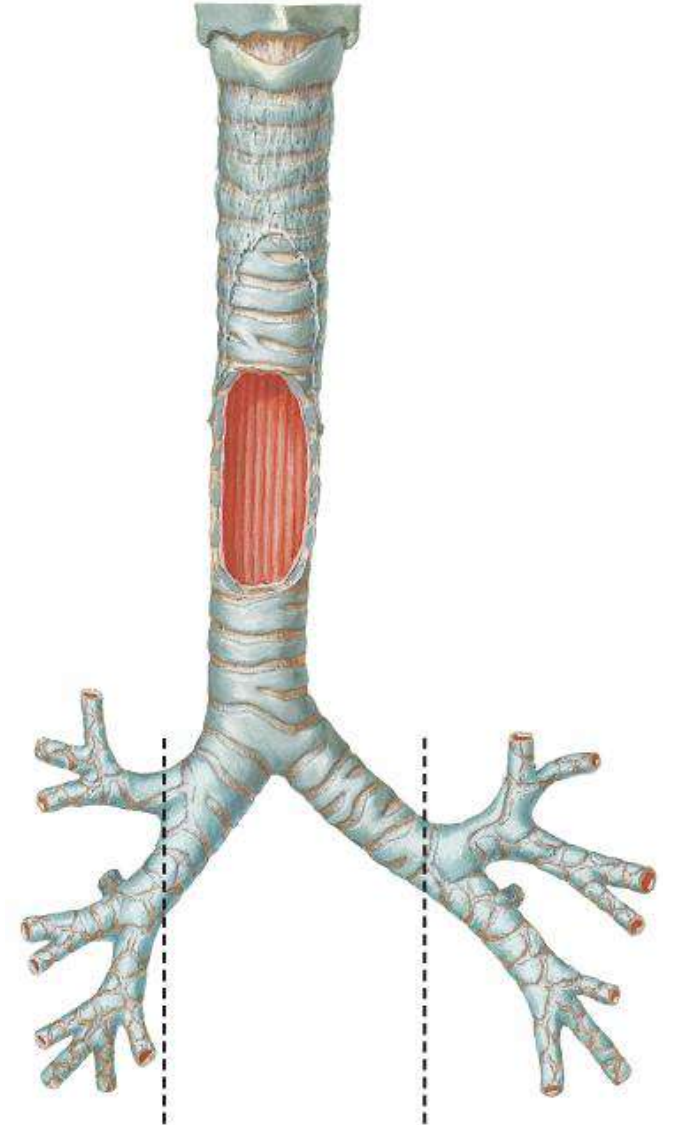
Left Lung

1. Longer & lighter.
2. Narrower.
3. Anterior border has a cardiac notch.
4. Has 2 lobes.
5. Has one fissure.
6. Root has one bronchus.
7. Two bronchial arteries.



Bronchopulmonary segments

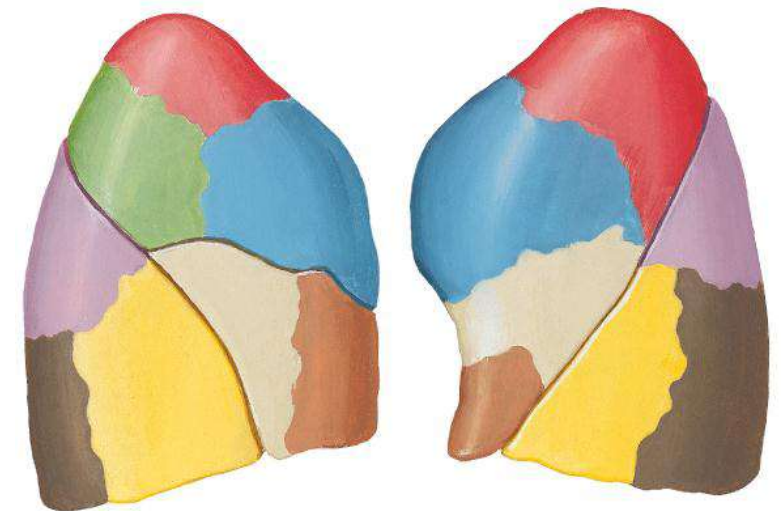
- ** Trachea divides into 2 main bronchi**
- ** Each bronchus divides into lobar bronchi; 3 on the right side & 2 on the left side.**
- ** Each lobar bronchus divides into segmental bronchi.**
- ** Each segmental bronchus ends in a segment in the lung.**



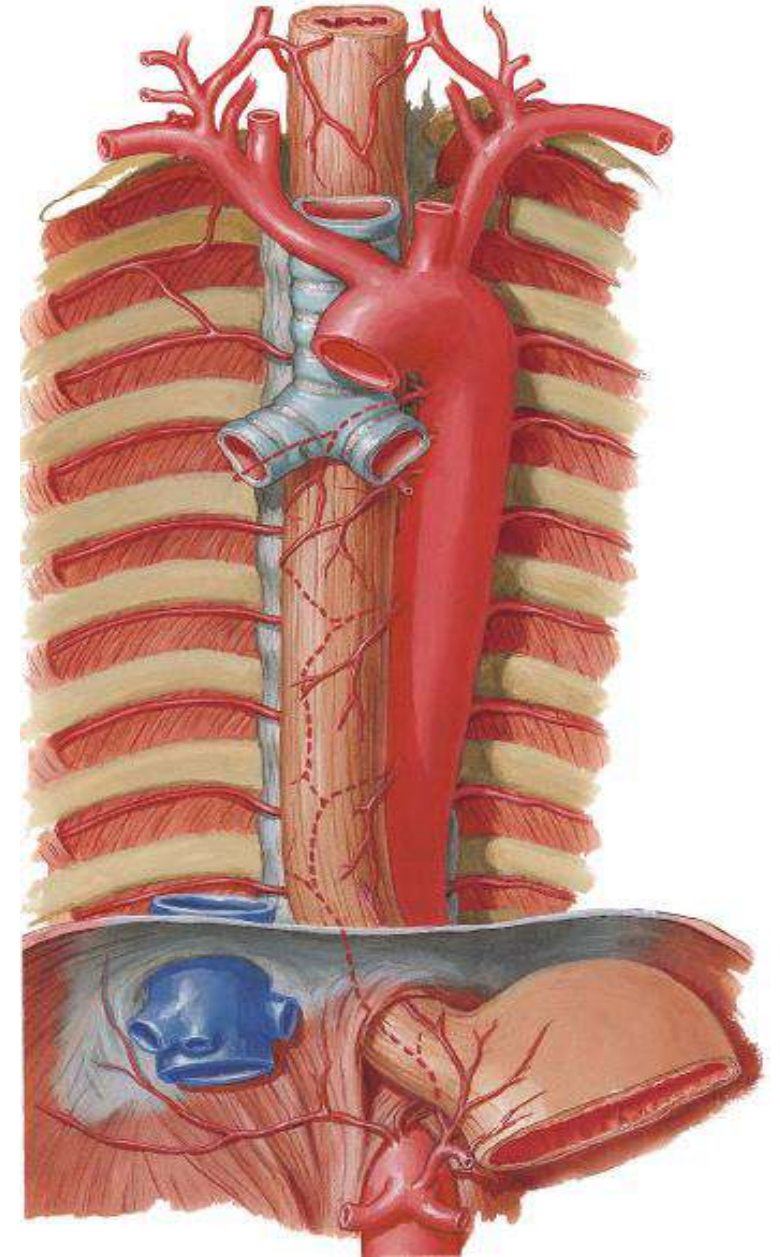
Bronchopulmonary segments (contd)

**** Areas of lung supplied by segmental bronchi are called bronchopulmonary segments. Each lung has 10 segments. Each is pyramidal in shape with its apex towards the hilum while its base looks towards the surface of the lung.**

**** Each segment has its own segmental bronchus & artery. They act as anatomical, functional & surgical units.**

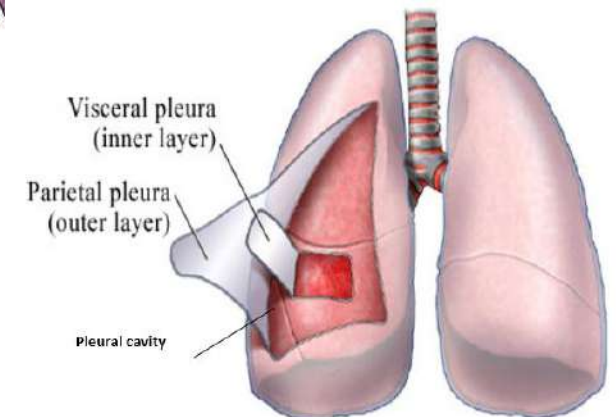
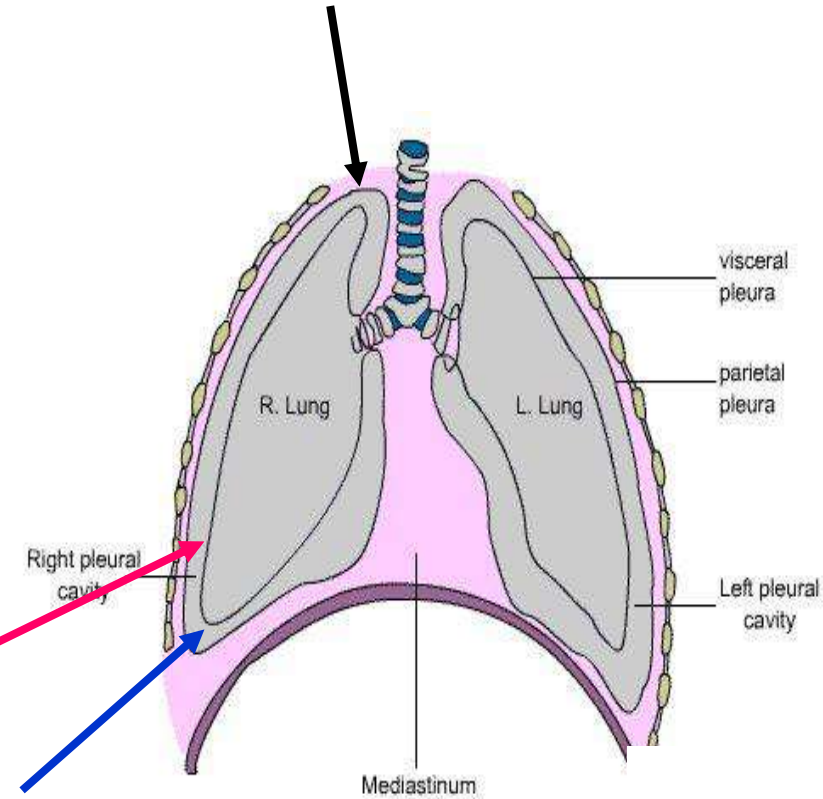


- * **Arterial blood supply of the lung:** Bronchial arteries; they are branches from the descending thoracic aorta; two to the left lung & one to the right lung.
- * **Venous drainage of the lung:** Bronchial veins.
- * **Lymphatic drainage:** Tracheobronchial lymph nodes.



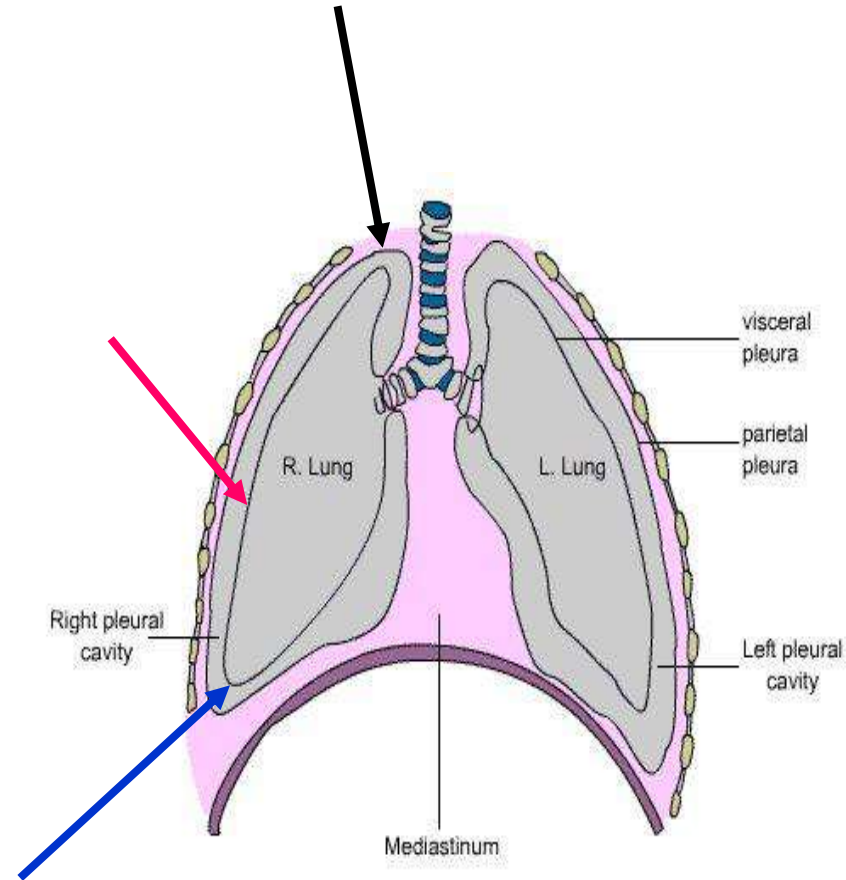
Pleura

- * It is a completely closed serous sac enclosing each lung.
- * Inner part of pleura covering the lung (adherent to the lung surfaces & lining the fissures) → **visceral pleura**.
- * Outer part of pleura lining thoracic wall → **parietal pleura**.



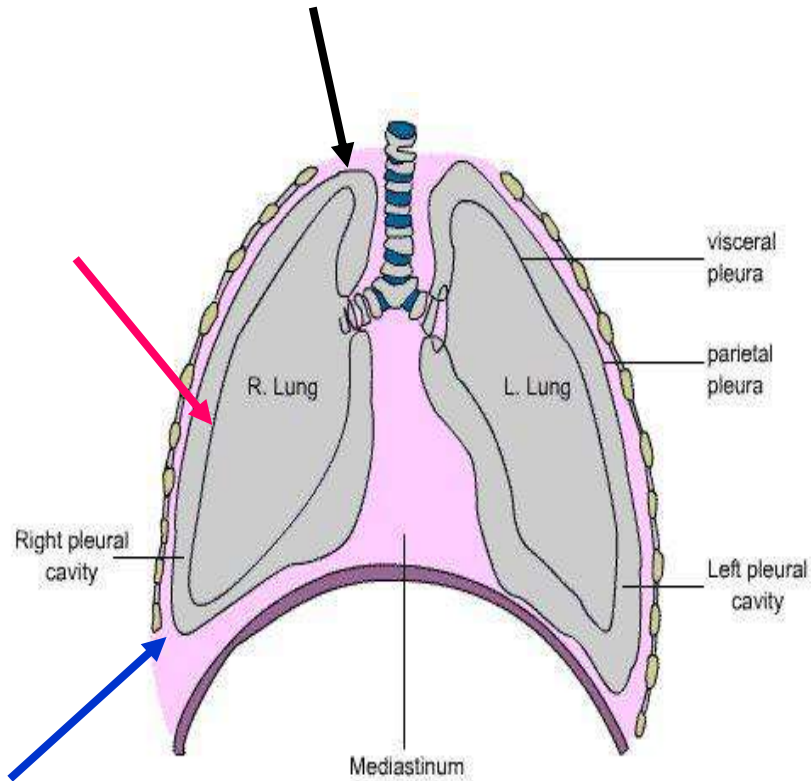
Pleura

- * Visceral & parietal pleura are separated by pleural cavity.
- * Pleural cavity is a potential space filled with a thin film of serous fluid, which facilitates the movement of the lungs & protects against friction.



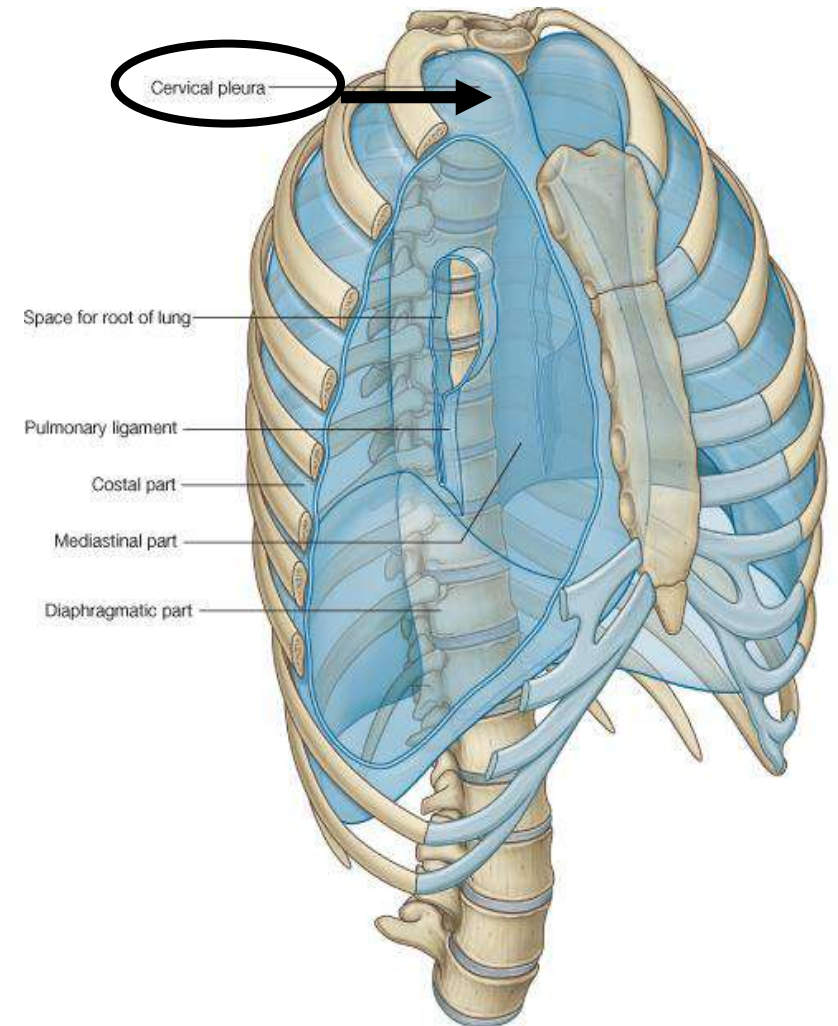
Clinical Notes

- * Inflammation of parietal pleura produces severe pain & is called **pleurisy**.
- * Visceral pleura is not sensitive to pain.
- * In some clinical cases, pleural cavity may be filled with air, blood or pus.



Subdivisions of Parietal Pleura

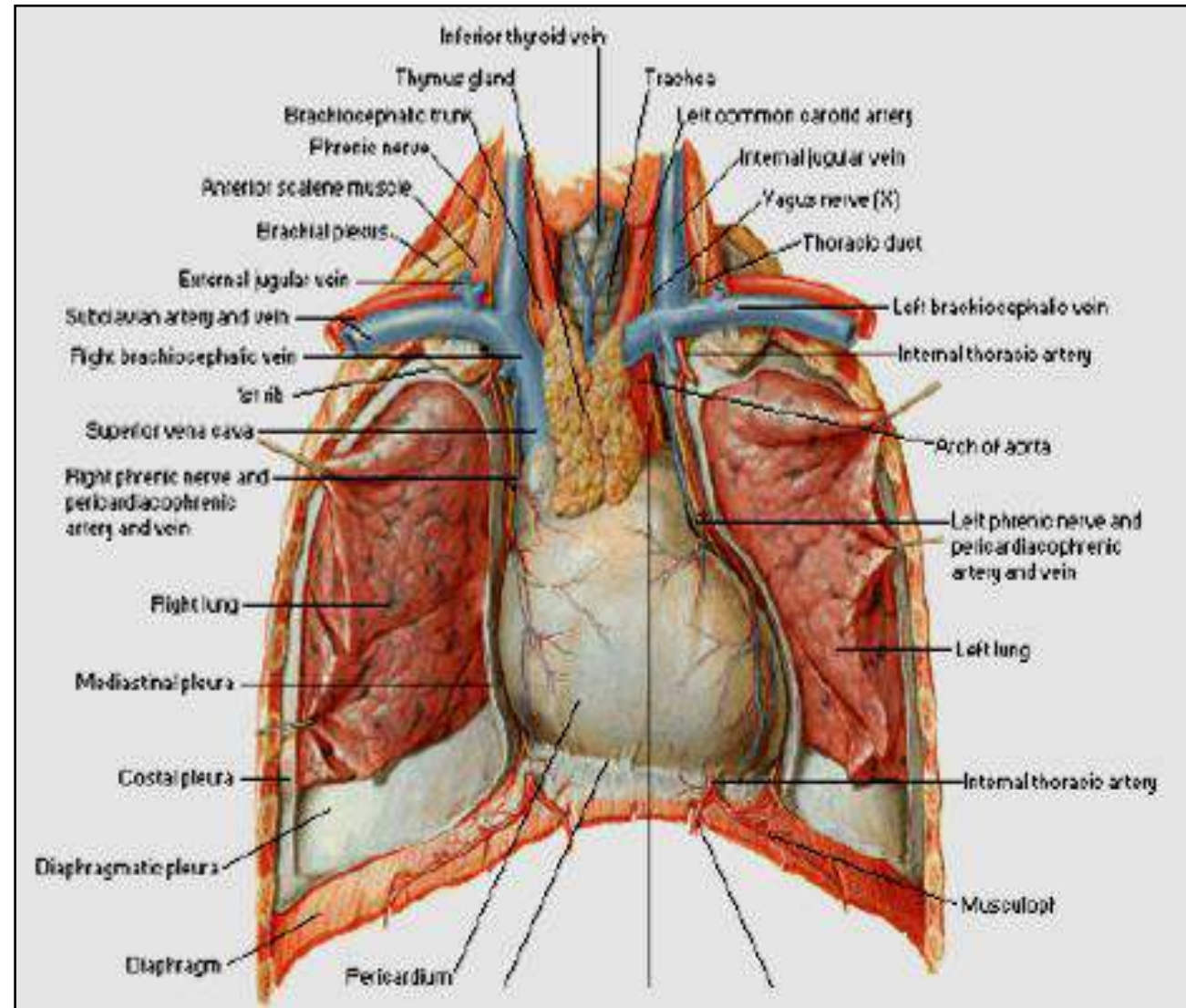
1. Cervical Pleura → part of parietal pleura bulging up through the thoracic inlet into root of neck.



2. Costal pleura → part of parietal pleura which lines ribs & intercostal spaces.

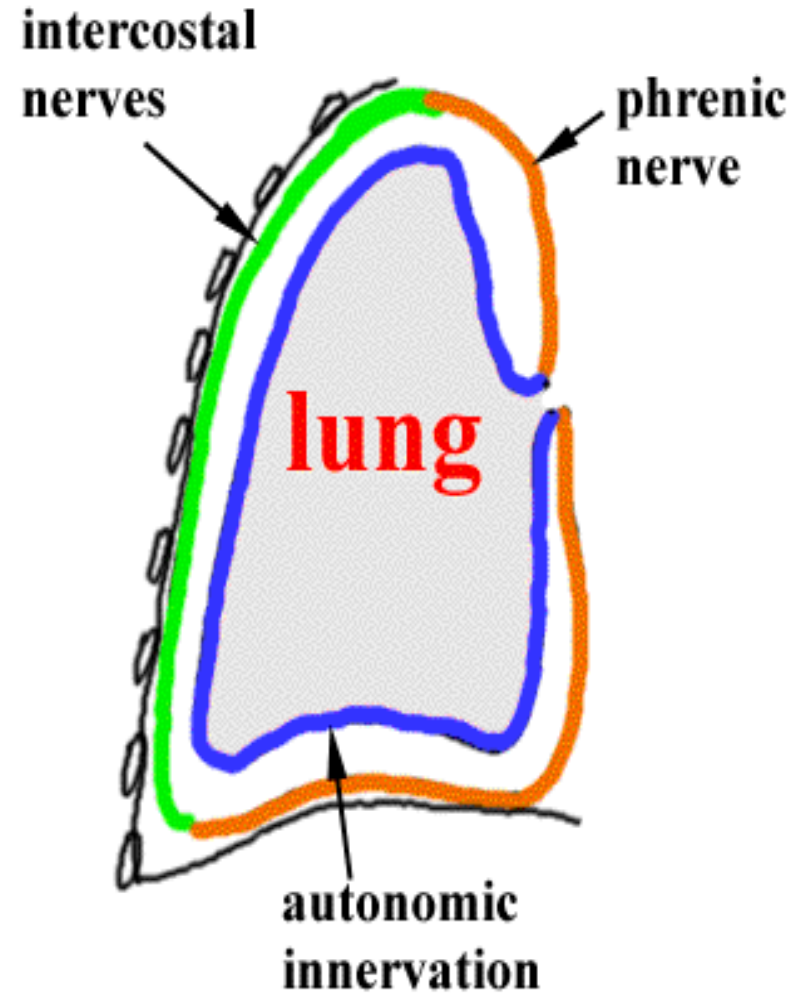
3. Mediastinal pleura → part of parietal pleura covering the side of the mediastinum.

4. Diaphragmatic pleura → part of the parietal pleura which covers upper surface of diaphragm.



Nerve supply of pleura

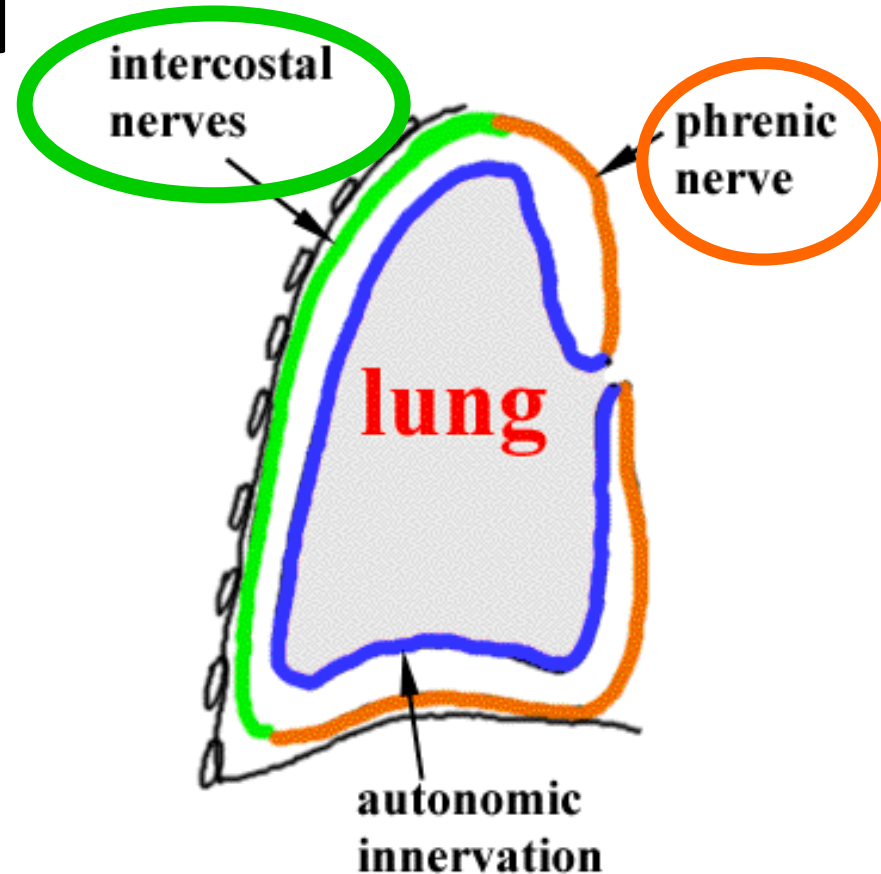
- * **Parietal pleura is highly sensitive to pain.**
- * **Visceral pleura is not sensitive to pain.**
- * **Visceral pleura is supplied by autonomic nerve plexuses.**



Nerve supply of pleura

* Costal pleura & peripheral part of diaphragmatic pleura → are supplied by **intercostal nerves**.

* Mediastinal pleura & central part of diaphragmatic pleura → are supplied by **phrenic nerve**.



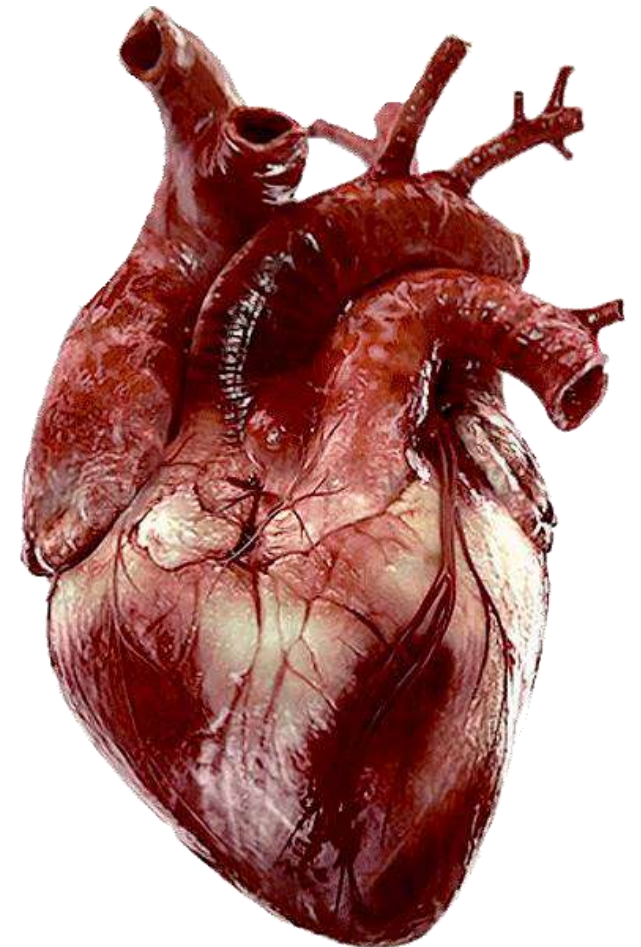


General Anatomy

Lecture 14: Cardiovascular System (1)

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THE CARDIOVASCULAR SYSTEM

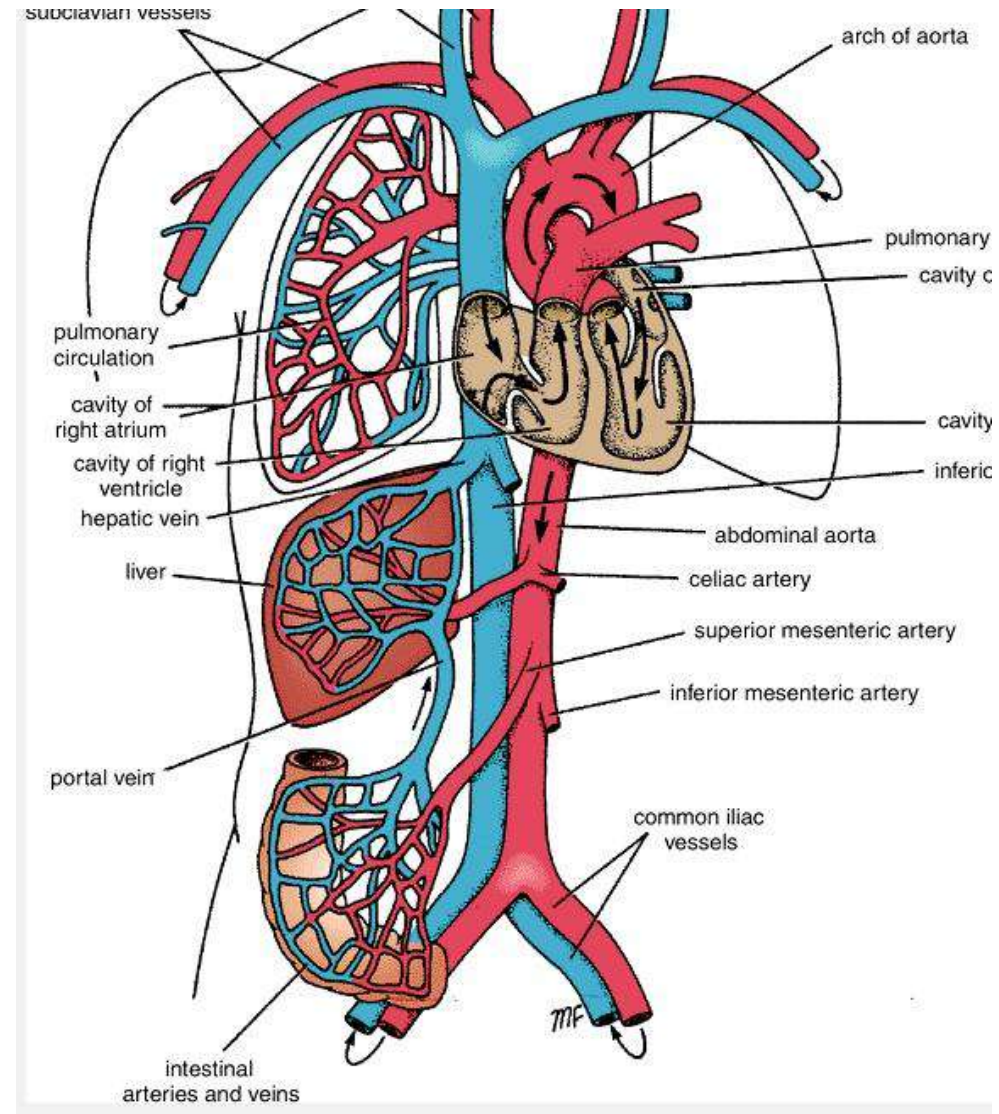
- * **Definition:**

- * **It is the major part of the circulatory system.**

- * **It consists of 2 main parts:**

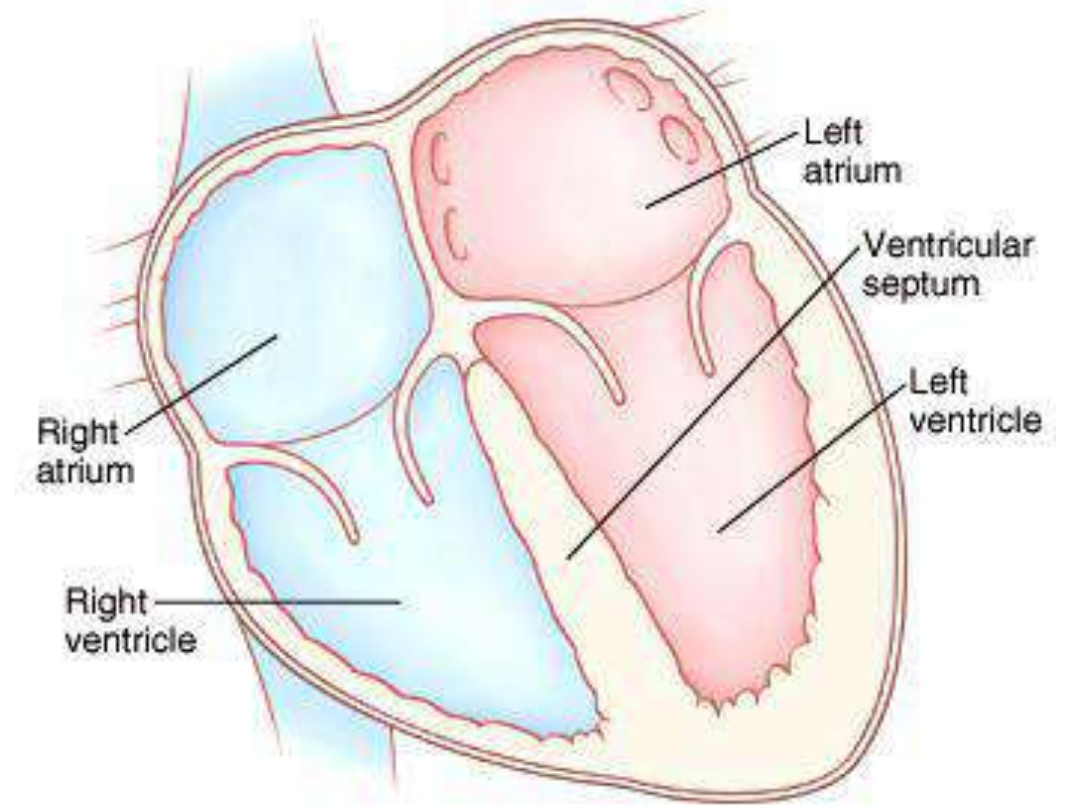
- 1. heart.**

- 2. Blood vessels.**



THE HEART

- * **Definition:** A conical hollow muscular organ that pumps the blood to various parts of the body.
- * **Site:** In the middle mediastinum (middle space of thoracic cavity).
- * **Weight:** 300 gm in males & 250 gm in females.
- * **Dimensions:** 12X9 cm.



**** Pericardium:** The heart is surrounded by the pericardium, which is divided into:

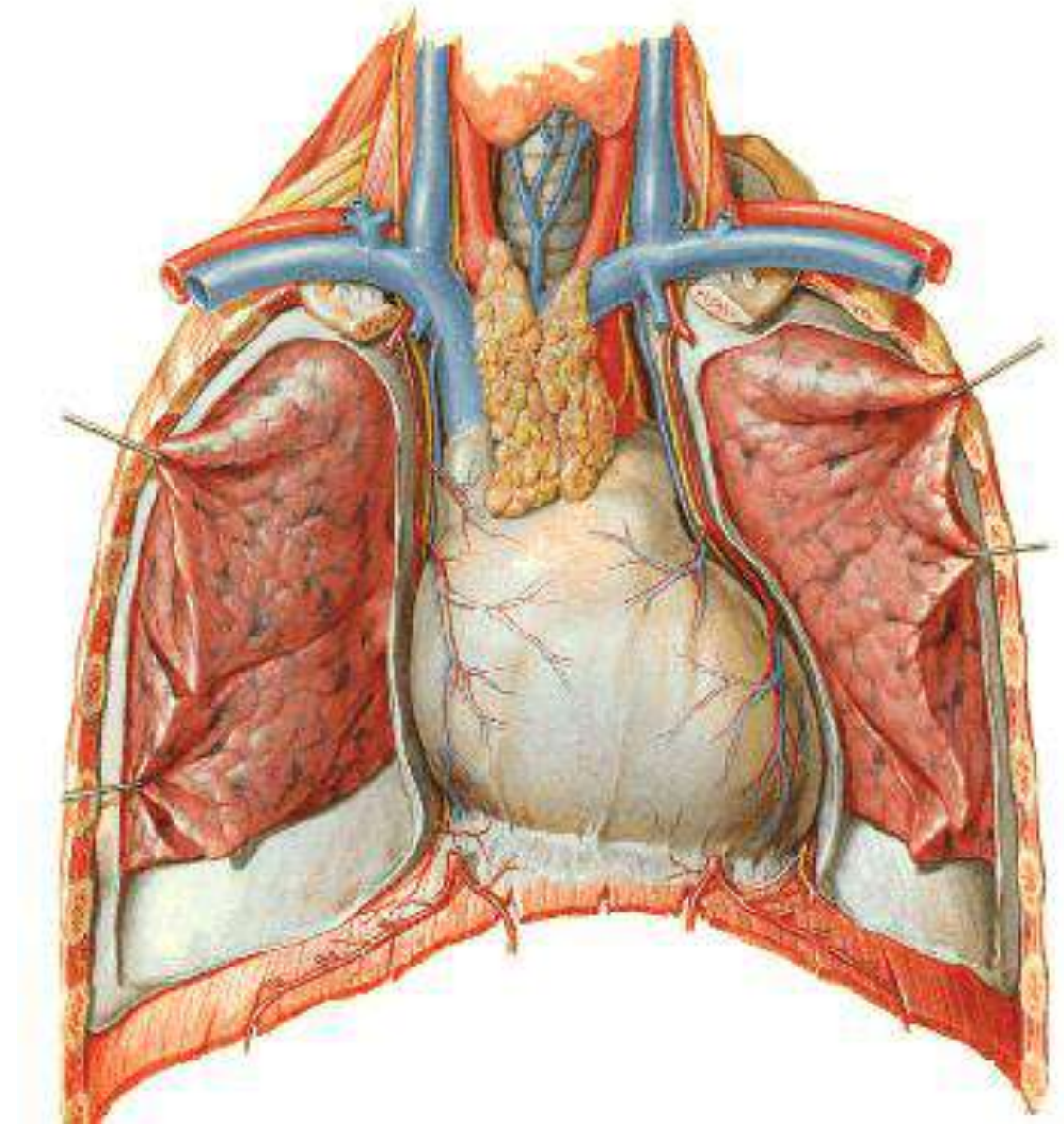
a. **outer fibrous pericardium:** thick, fibrous & attached to diaphragm.

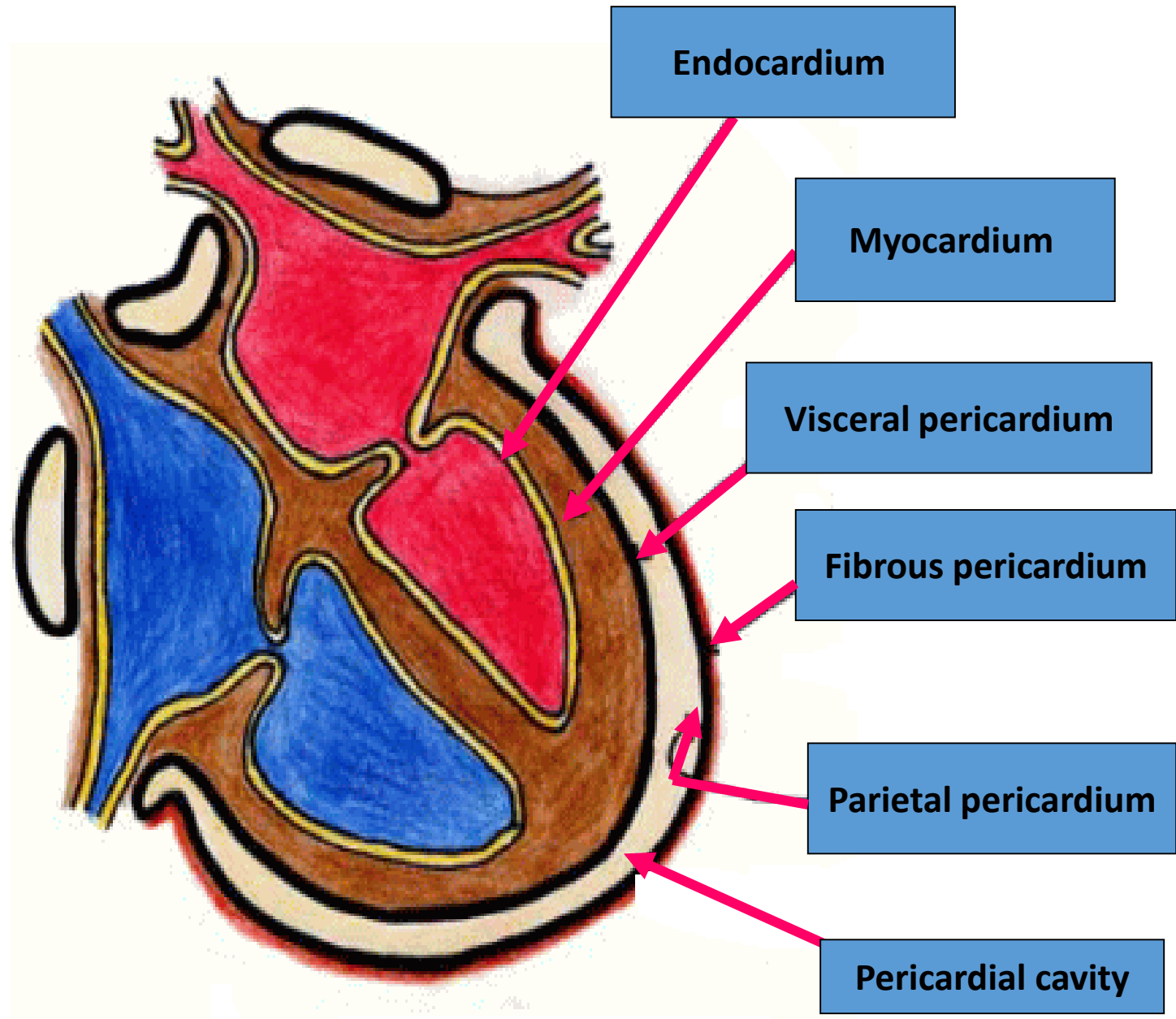
b. **inner serous pericardium:** which consists of 2 layers:

i. **outer parietal:** lines the fibrous pericardium.

ii. **inner visceral:** covers the heart.

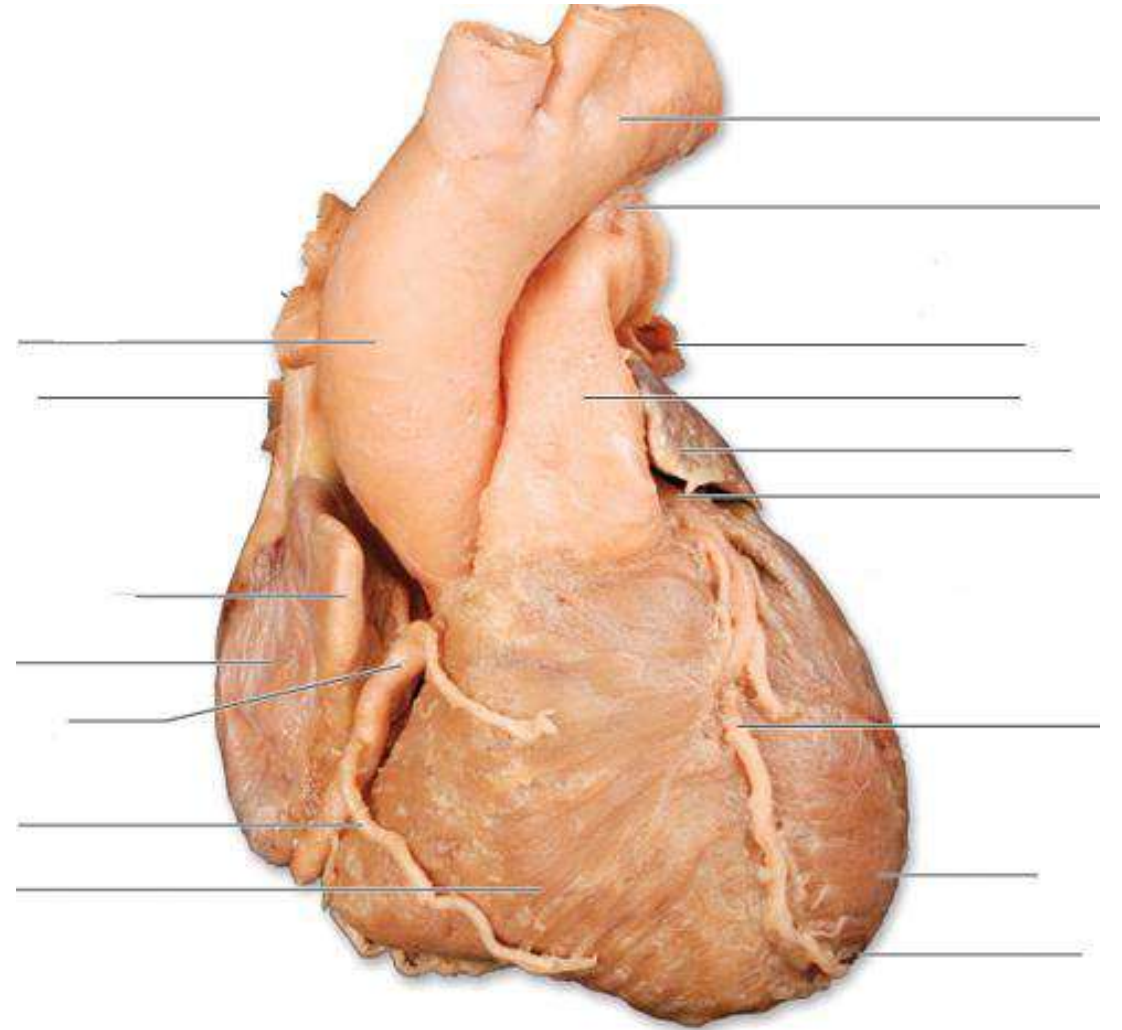
**** The space between the 2 layers is called the pericardial cavity.**





**** External
features of the
heart: it has:**

- 1. Apex.**
- 2. Base.**
- 3. Four borders.**
- 4. Two surfaces**
- 5. Four chambers.**



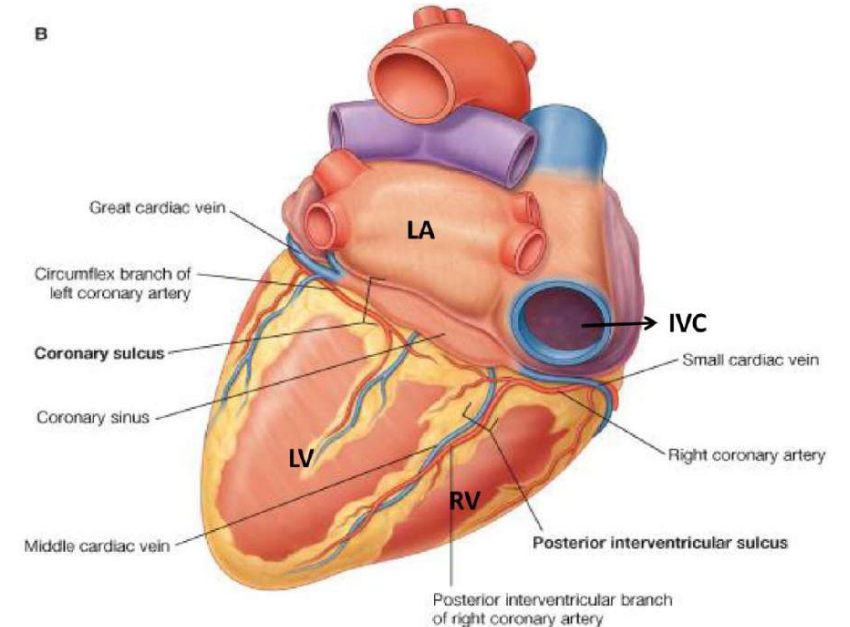
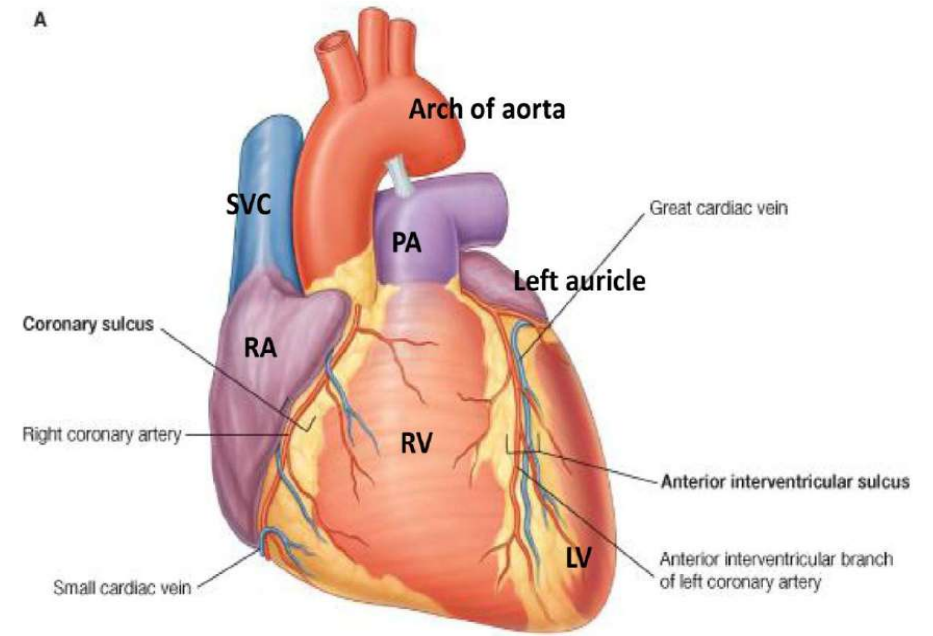
(a) Anterior view

1. The apex of the heart:

- * Formed of the Lt ventricle & directed downward forward to the left.**
- * It lies in the 5th left intercostal space, 9.5 cm from the mid-sternal line.**

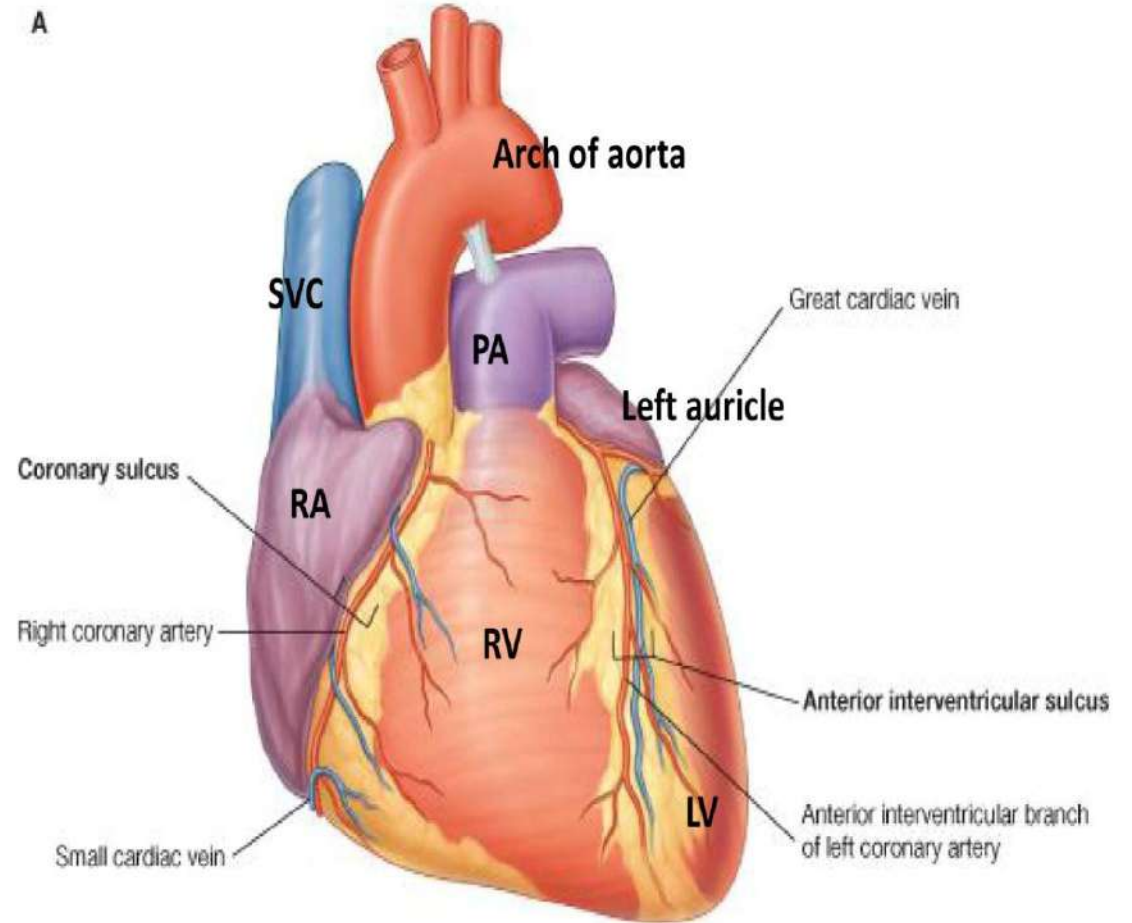
2. The base of the heart:

- * Formed of both atria, mainly the left atrium & directed backward, upward & to the right, forming the posterior aspect of the heart.**



3. The borders of the heart are:

- a. Upper border formed by the 2 atria.**
- b. Lower border formed by the 2 ventricles.**
- c. Right border formed by the right atrium.**
- d. Left border formed by the left ventricle & left auricle.**



4. The surfaces of the heart:

*** It has 2 surfaces:**

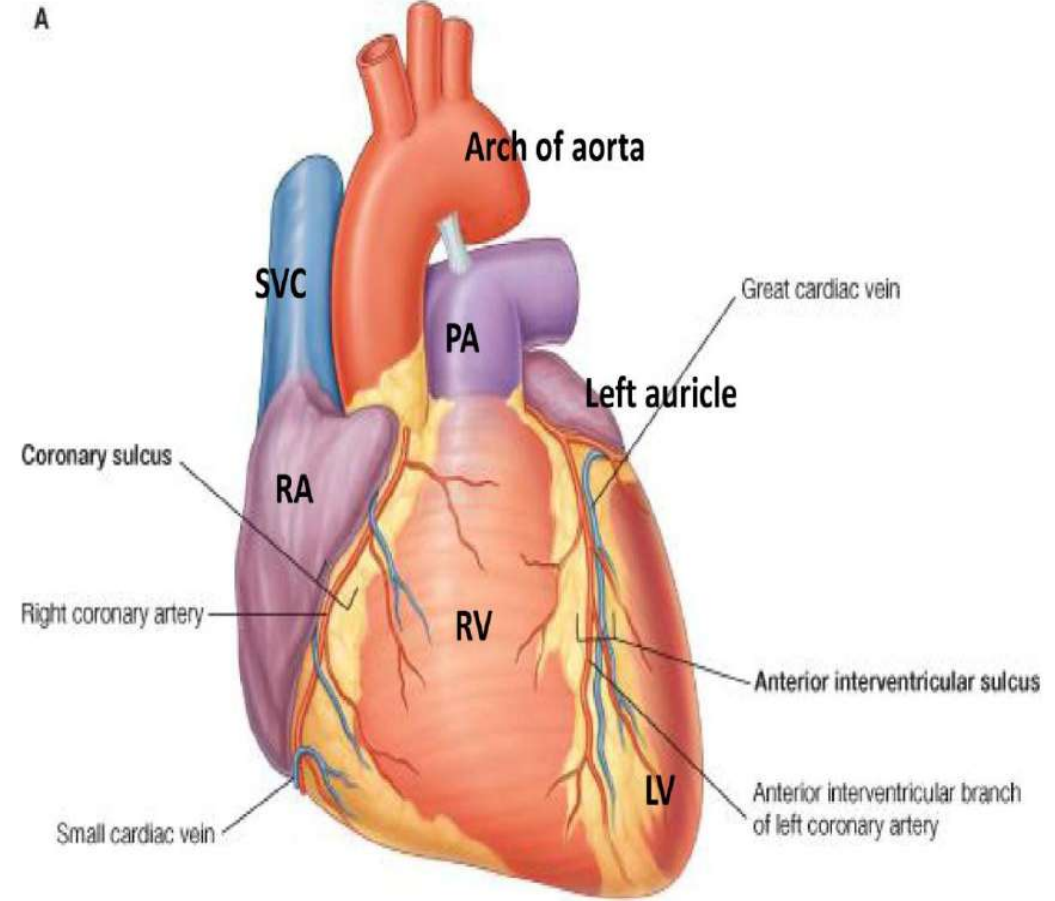
a. Anterior or sternocostal surface: is divided by coronary sulcus into:

1. Atrial part formed mainly by RT atrium.

2. Ventricular part: subdivided by anterior interventricular sulcus into:

*** RT 2/3 formed by RT ventricle.**

*** LT 1/3 formed by LT ventricle.**

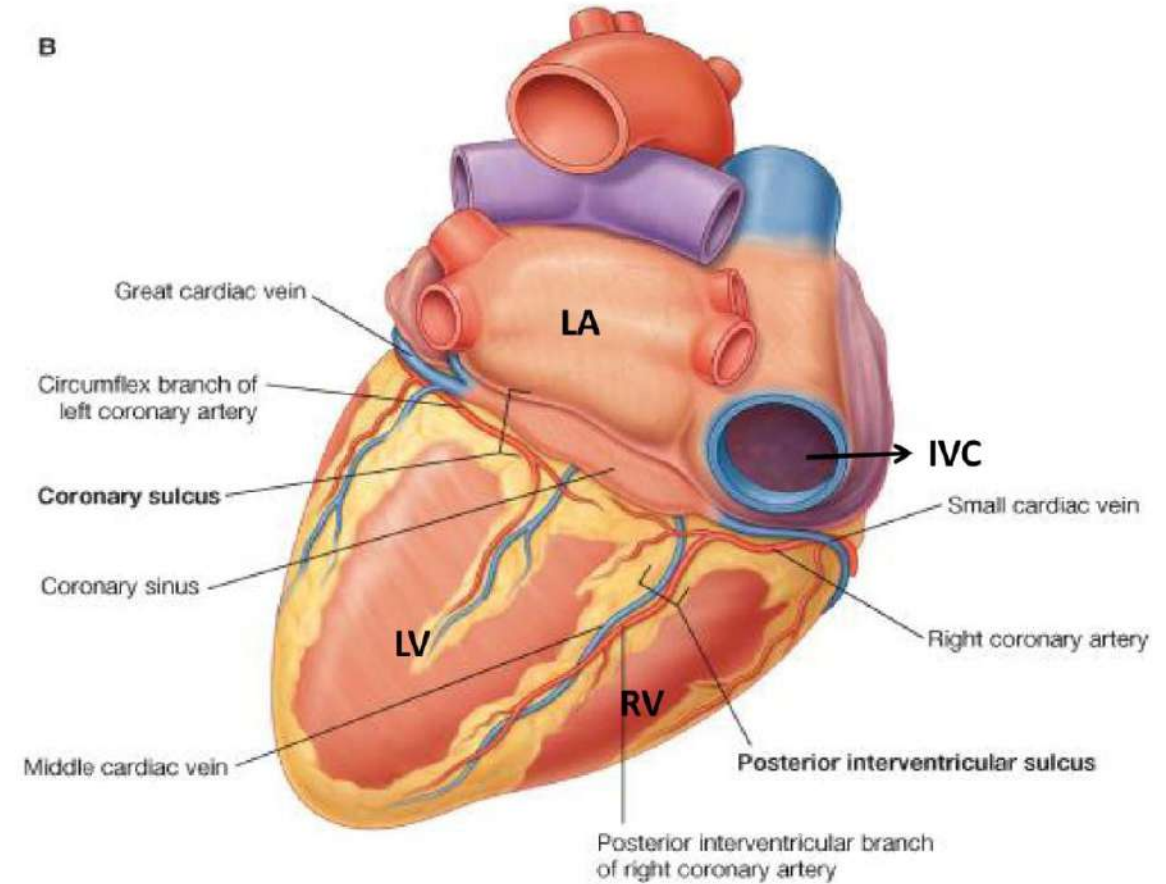


b. Inferior or diaphragmatic surface:

*** Formed by the 2 ventricles & divided by posterior interventricular sulcus into:**

*** LT 2/3 formed by LT ventricle.**

*** RT 1/3 formed by the RT ventricle.**



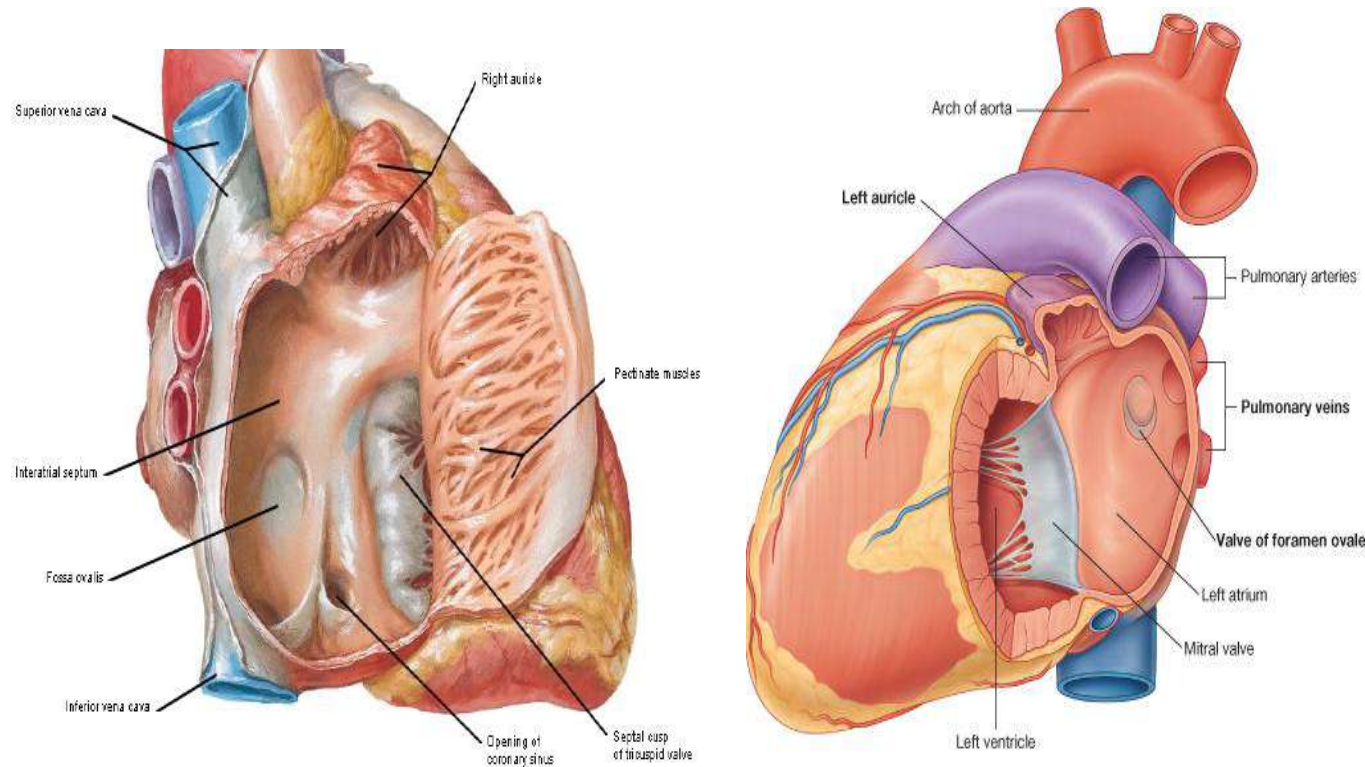
5. The chambers of the heart:

a. The RT atrium: has 2 walls:

* Anterior rough or muscular.

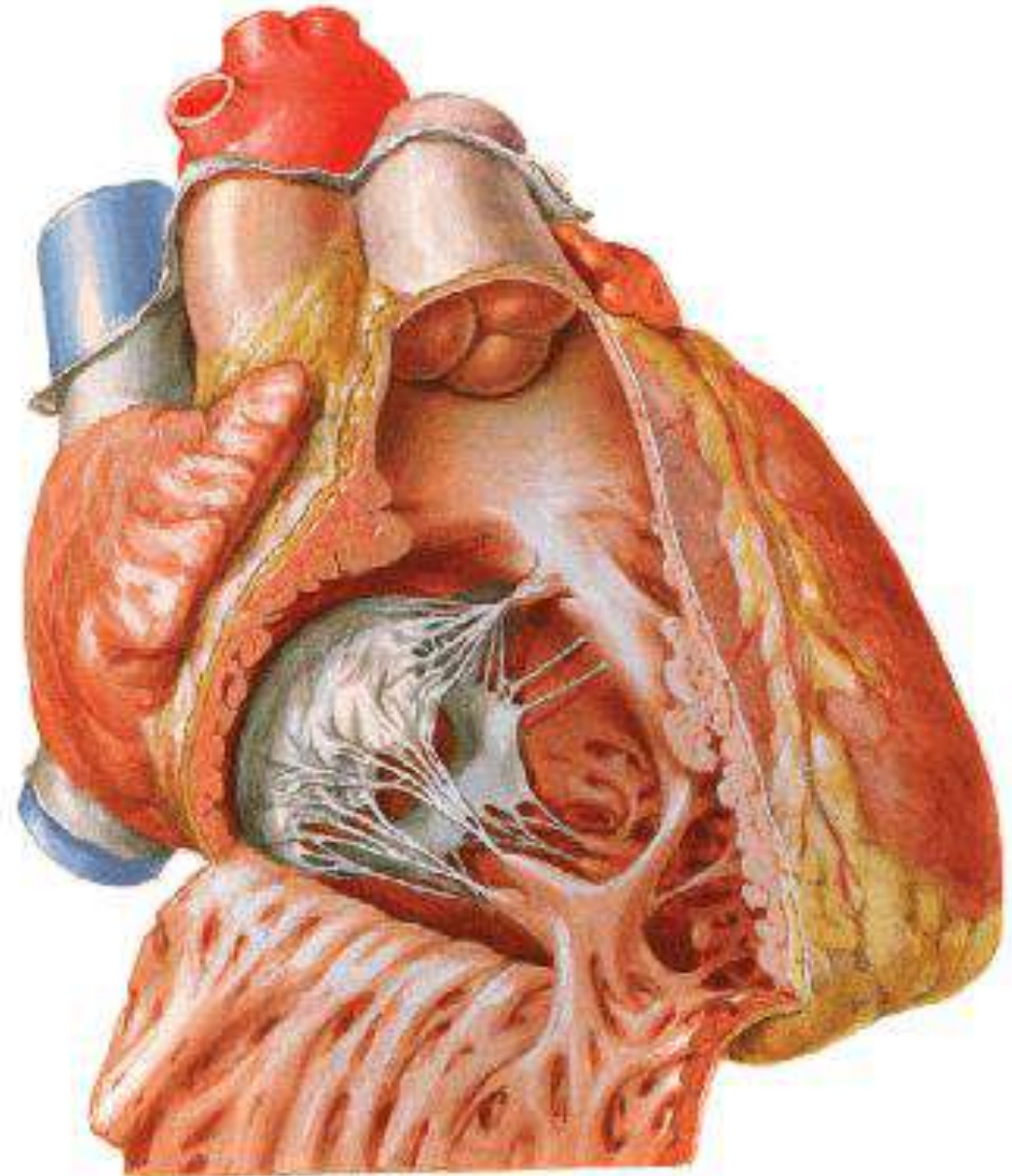
* Posterior smooth receiving the openings of big veins SVC, IVC & Coronary sinus.

b. The LT atrium: its wall is mostly smooth, receiving the openings of the 4 pulmonary veins.



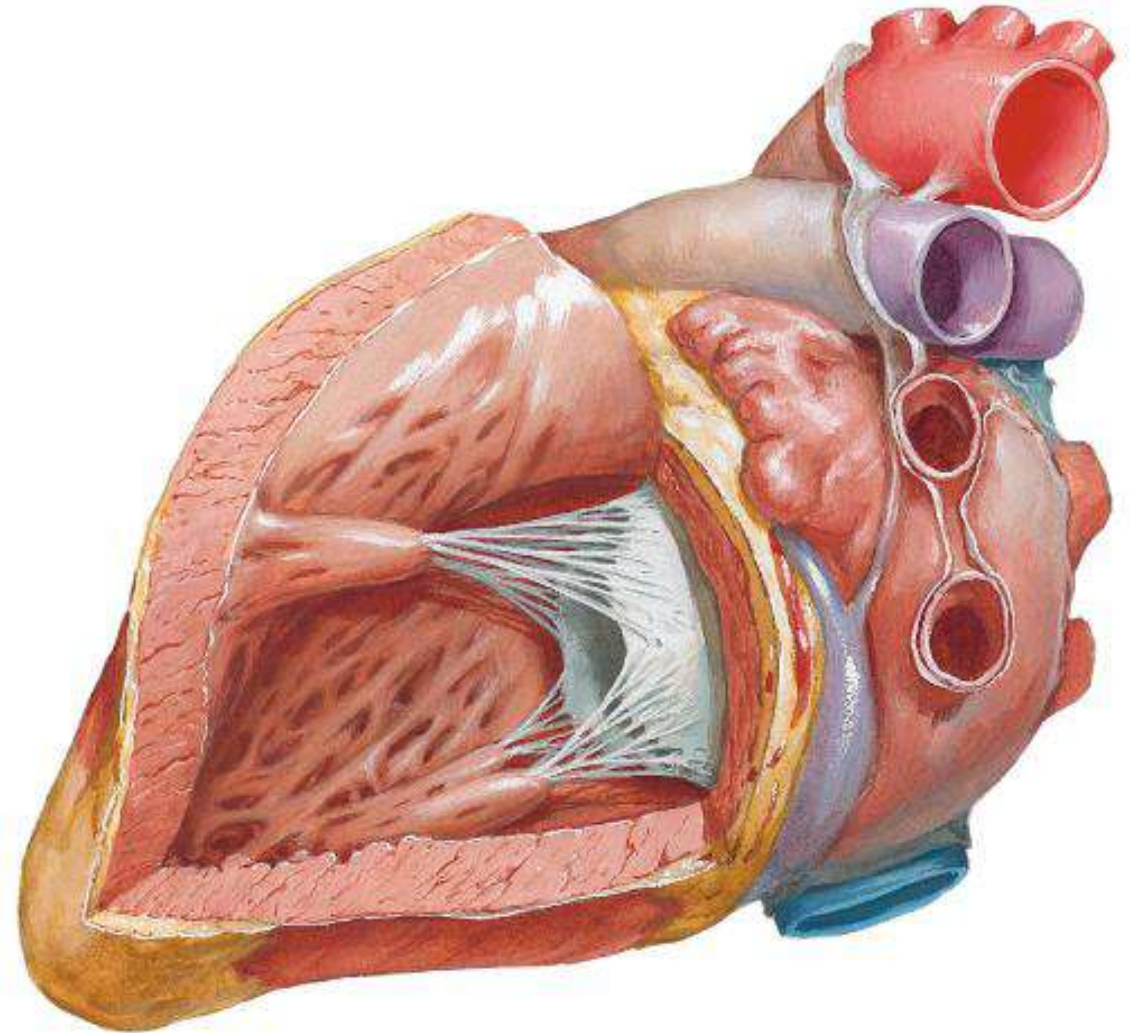
c. The RT ventricle: is divided into 2 parts:

- 1. Rough muscular inflowing part:** receives the blood from the right atrium & contains 3 papillary muscles.
- 2. Smooth outflowing part:** It is called Infundibulum: it pushes the blood into the pulmonary trunk.



d. LT ventricle: is divided into 2 parts:

- 1. Rough muscular inflowing part: receives the blood from the left atrium & contains 2 papillary muscles.**
- 2. Smooth outflowing part: It is called vestibule: it pushes the blood into the aorta.**

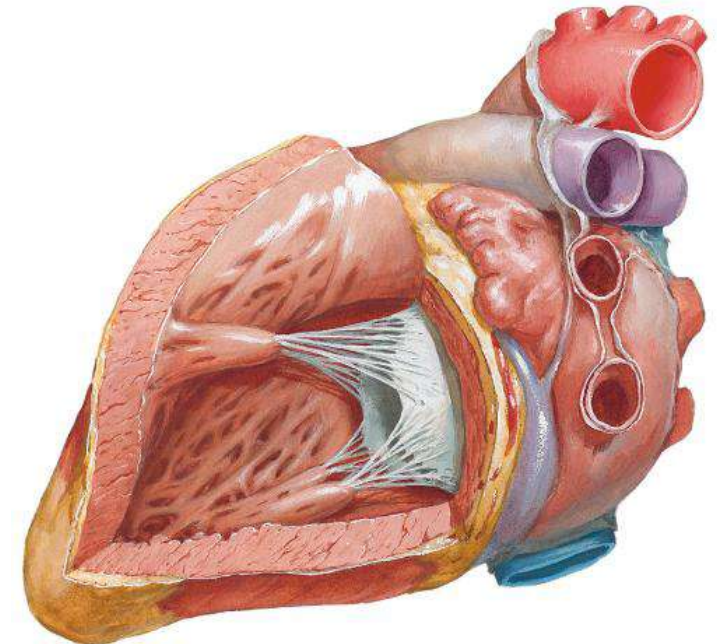
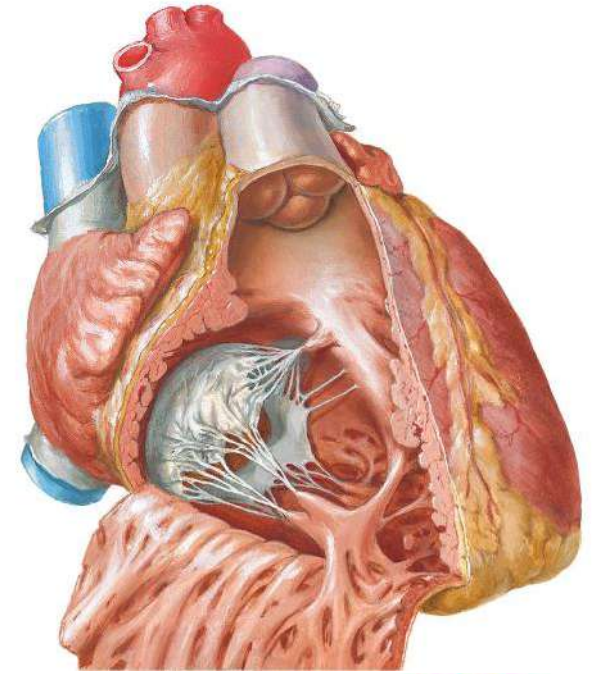


**** The valves of the heart:**

There are 2 types of heart valves:

a. Atrio-ventricular (AV) valves:

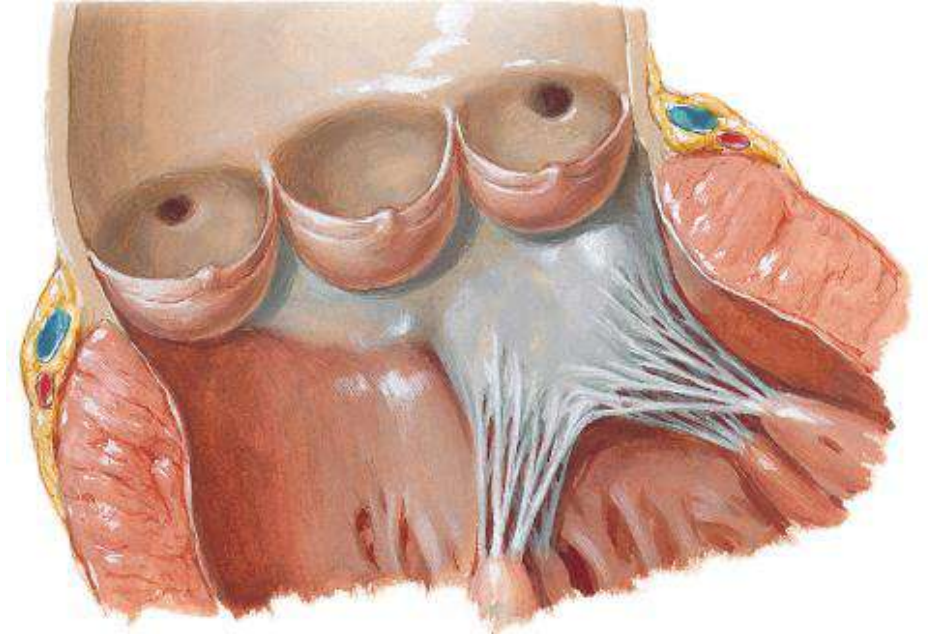
- 1. The right valve called Tricuspid. It has 3 cusps separating the right atrium from right ventricle.**
- 2. The left valve called Bicusped or Mitral. It has 2 cusps separating the left atrium from left ventricle.**



b. Semilunar valves:

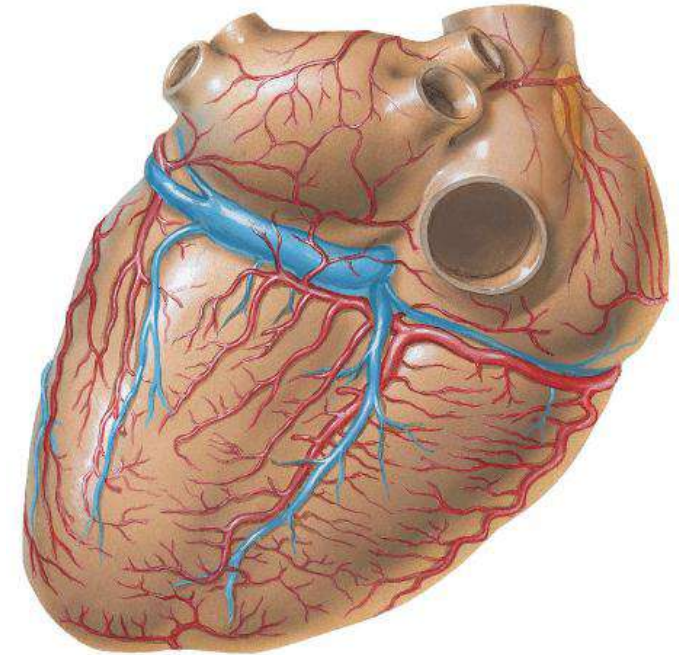
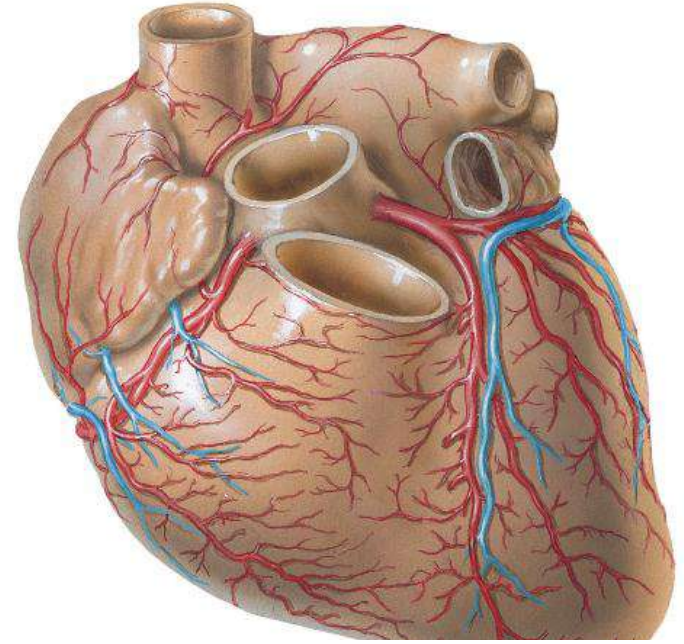
They are formed of 3 cusps, each cusp has a hollow space above called sinus.

- 1. Aortic valve: has one sinus anterior & 2 sinuses posterior.**
- 2. Pulmonary valve: has one sinus posterior & 2 sinuses anterior.**



****Blood supply of heart:**

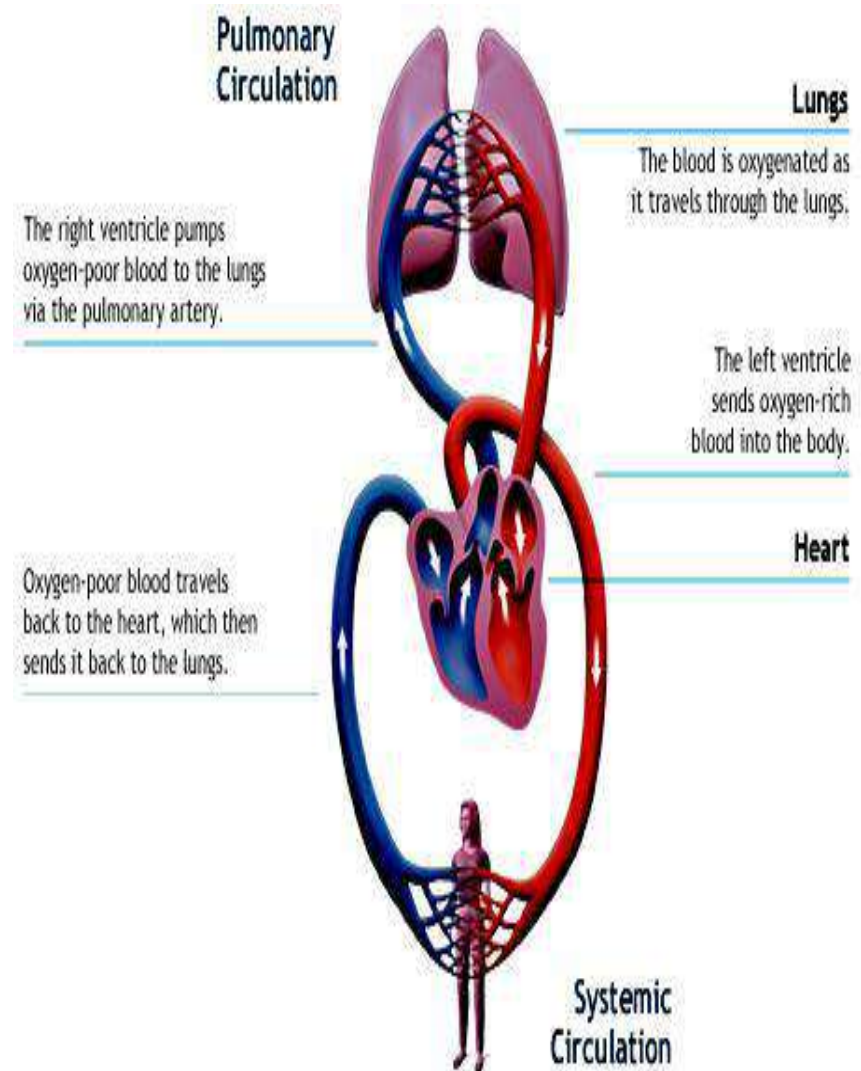
- 1. Arterial supply:** by the coronary arteries (RT<) that arise from the beginning of ascending aorta.
- 2. Venous drainage:** through small veins that end in short venous channel called coronary sinus that opens in the RT atrium.



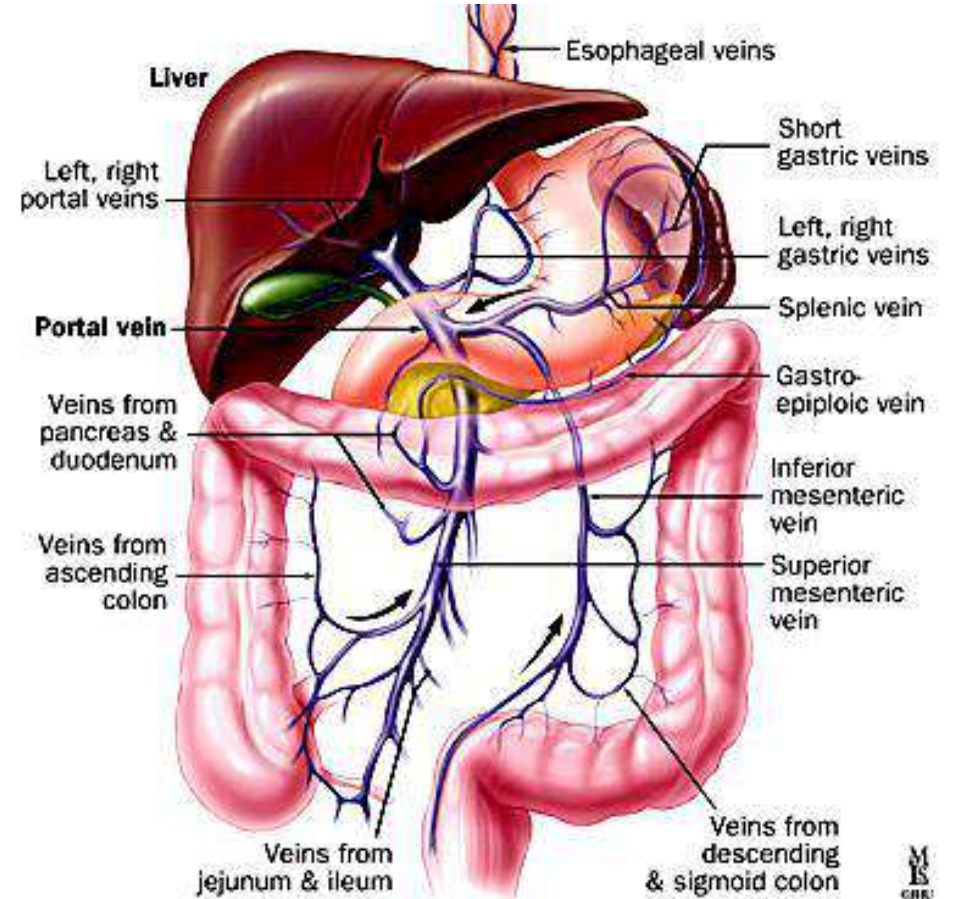
Types of Blood Circulations

1. **Systemic circulation**: It is the passage of blood from the Lt ventricle to the whole body via the aorta & its branches then returning the blood back to the Rt atrium through the SVC & IVC.

2. **Pulmonary circulation**: It is the passage of the non-oxygenated blood from the Rt ventricle to the lungs via the pulmonary arteries then returning the blood back to the Lt atrium through the pulmonary veins after oxygenation.



3. Portal circulation: It is the passage of the venous blood from the gastrointestinal system carrying the products of digestion & absorption to the liver via the portal vein where the liver cells metabolize these products, then returning back the blood to the systemic circulation through the hepatic veins to the IVC to the right atrium.



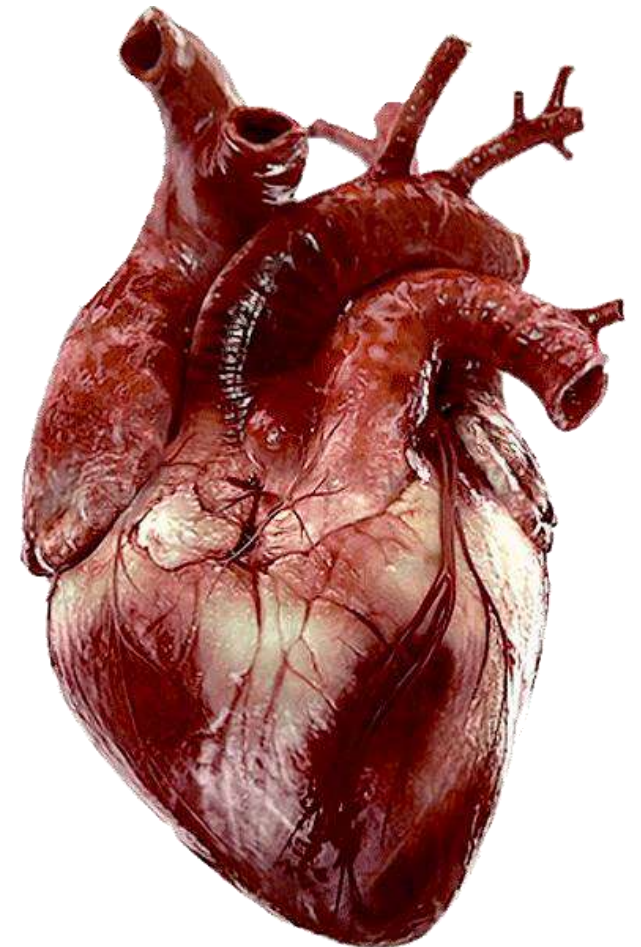


General Anatomy

Lecture 15: Cardiovascular System (2)

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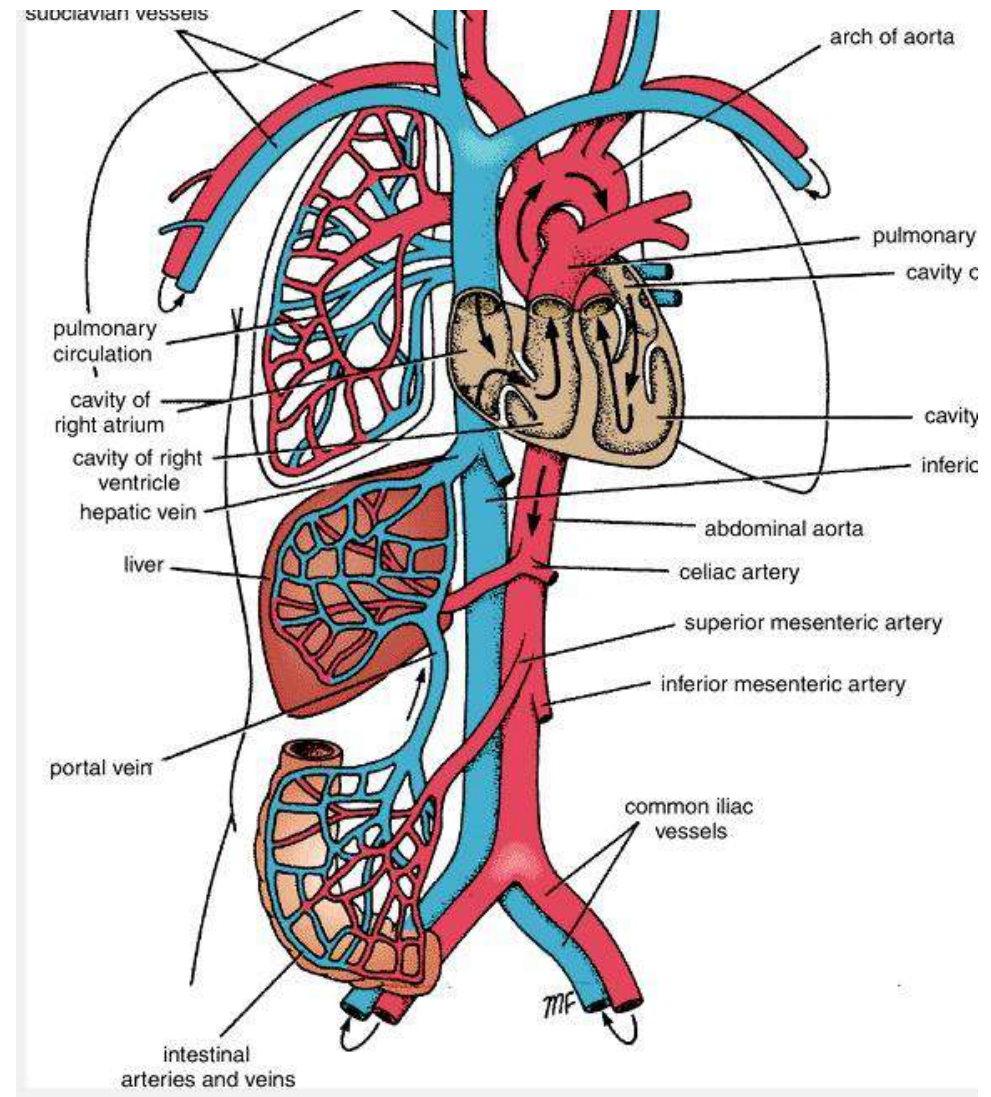
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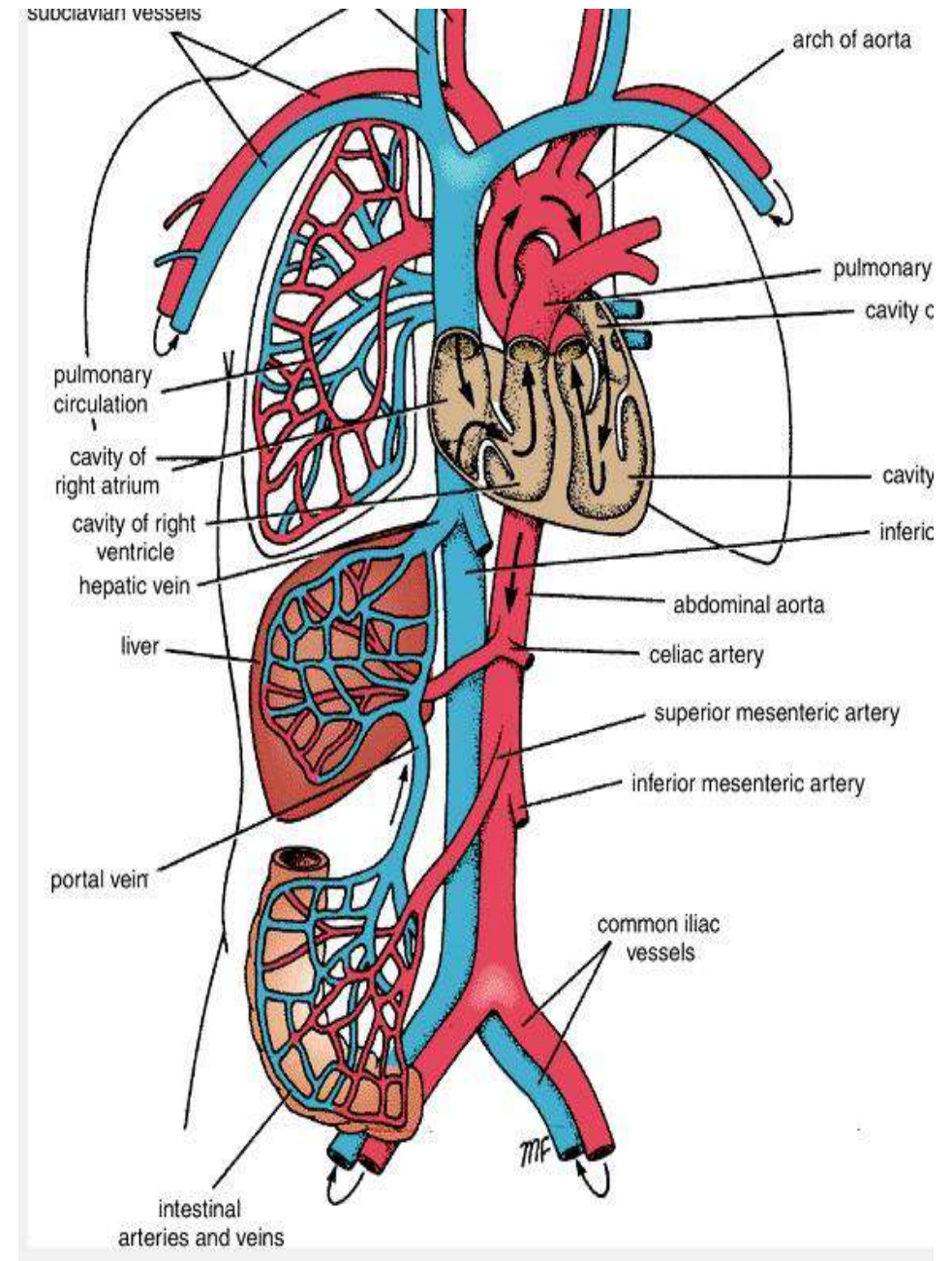
BLOOD VESSELS

**** Types of blood vessels:**

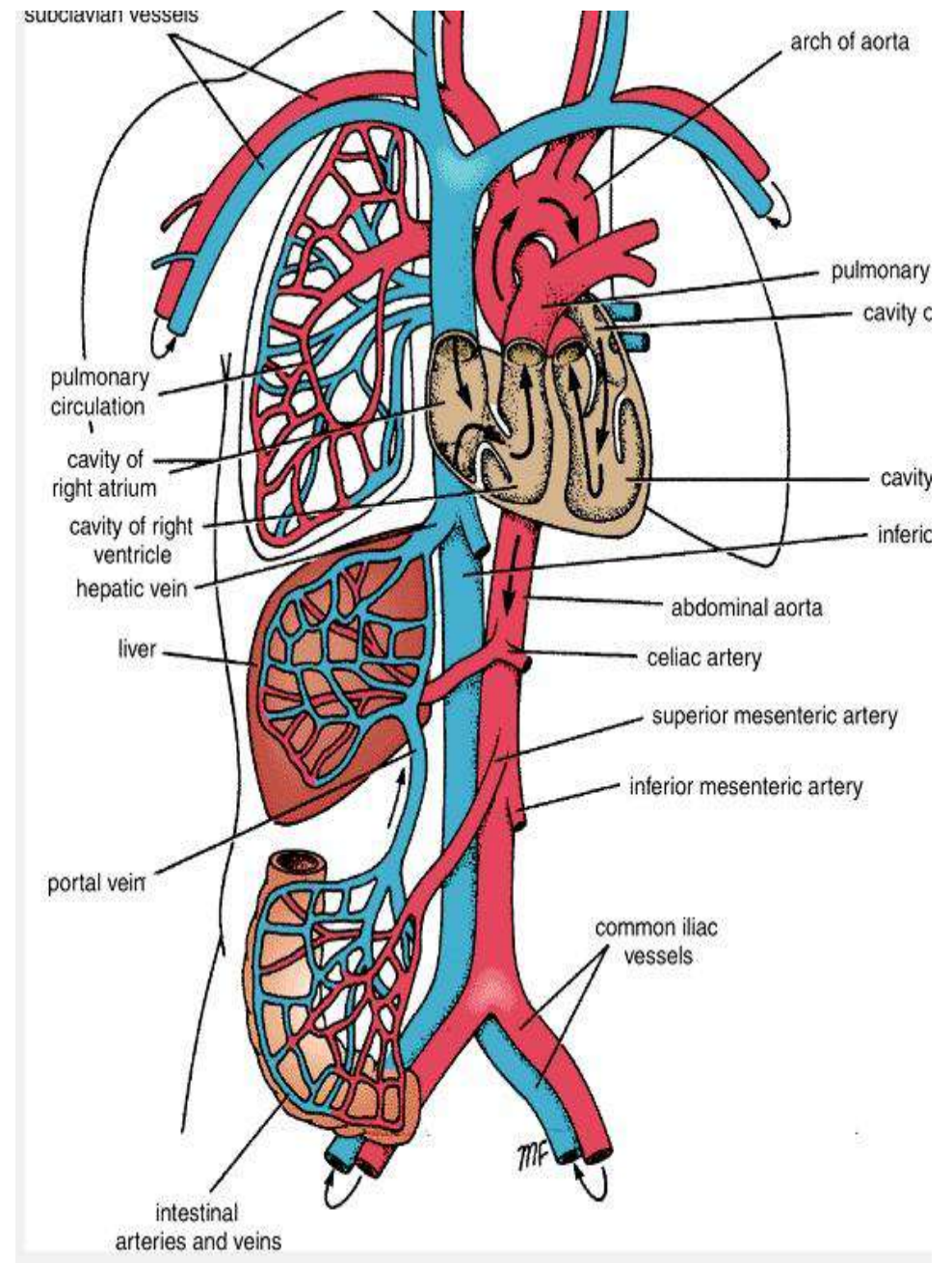
- 1. Arteries.**
- 2. veins.**
- 3. Capillaries.**



- The blood leaves the left ventricle of the heart through the **aorta**, which divides into smaller branches to supply the different systems & tissues of the body.
- These branches divide into smaller & smaller arteries till they end inside tissues by giving small **arterioles**. These arterioles divide into smaller arterioles & finally, the smaller ones join the **capillaries**.



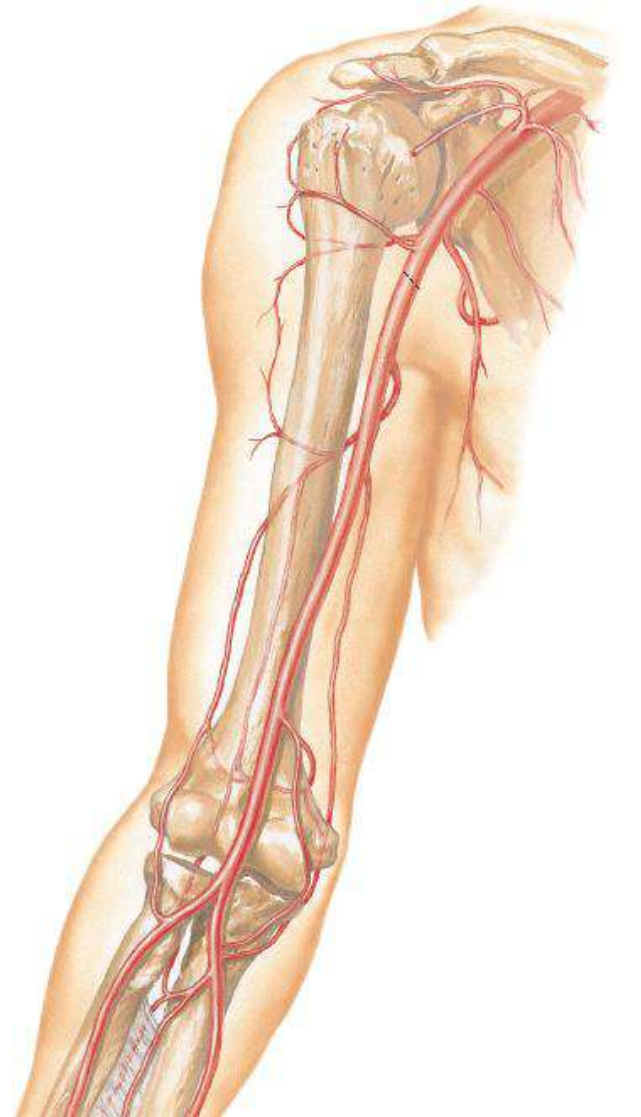
*** Capillaries collect into very minute venules, which collect into small veins. These veins unite to form large veins, which collect into larger veins, & finally, veins collect in 2 big veins; Superior vena cava (SVC) & inferior vena cava (IVC), which open into the right atrium of the heart.**



Arteries	Veins
1. Carry blood away from the heart.	1. Carry blood towards the heart.
2. Carry oxygenated bl. (except Pulmonary A.)	2. Carry deoxygenated bl. (except Pulmonary V.)
3. Divide into branches.	3 Collect from tributaries.
4. Its wall is rich in smooth ms. & elastic fibers (Non-compressible).	4. Its wall is poor in its smooth muscle & elastic fibers (compressible).
5. Thick-walled & narrow lumen.	5. Thin-walled & wide lumen.
6. Do not contain valves.	6. Contain valves.

Arterial Anastomosis

- * This is a connection between branches of one artery & branches of adjacent artery.
- * It allows a **collateral circulation** in case of obstruction of one of the 2 arteries.
- * It is present mainly around joints.
- * Arteries which do not anastomose are called **end arteries**.

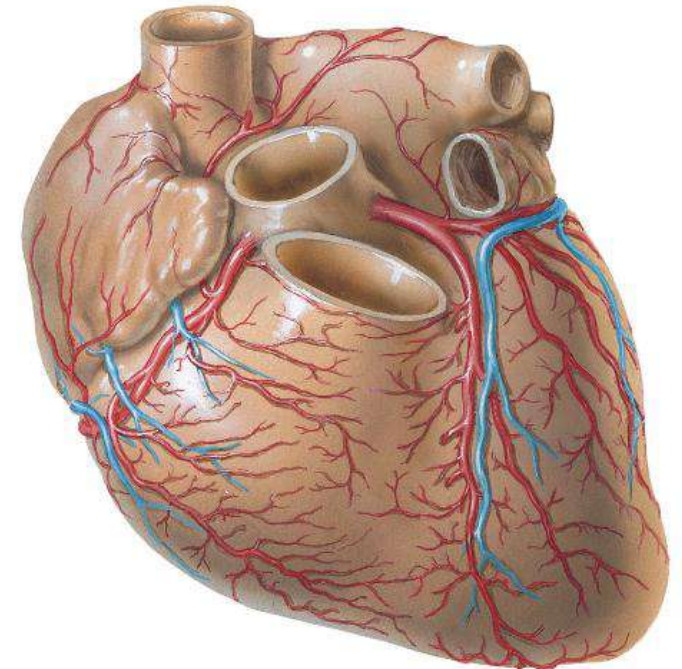
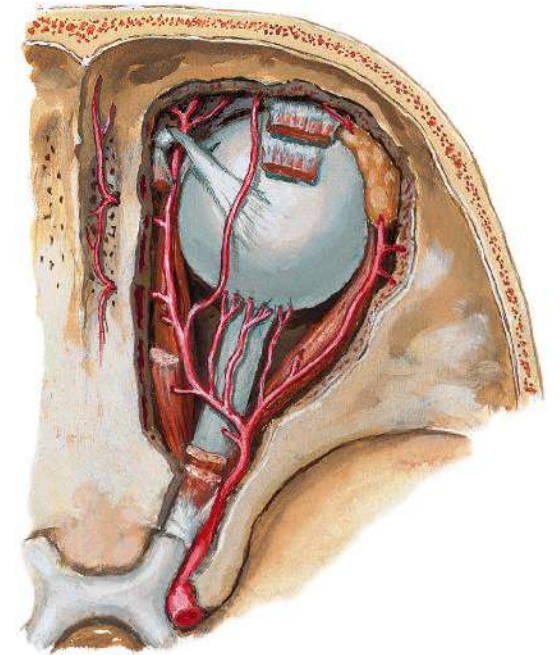


End Arteries

* Are of 2 types:

1. Anatomical end arteries: which do not acquire any sort of anastomosis
e.g. central retinal artery.

2. Functional end arteries: which have some anastomosis between its arteries, however, it is insufficient to compensate the obstructed artery, **e.g. coronary arteries of the heart.**



Types of anastomosis between arteries & veins

A. Capillaries: Small vascular connections present in all body organs connecting the small arterioles to the small venules.

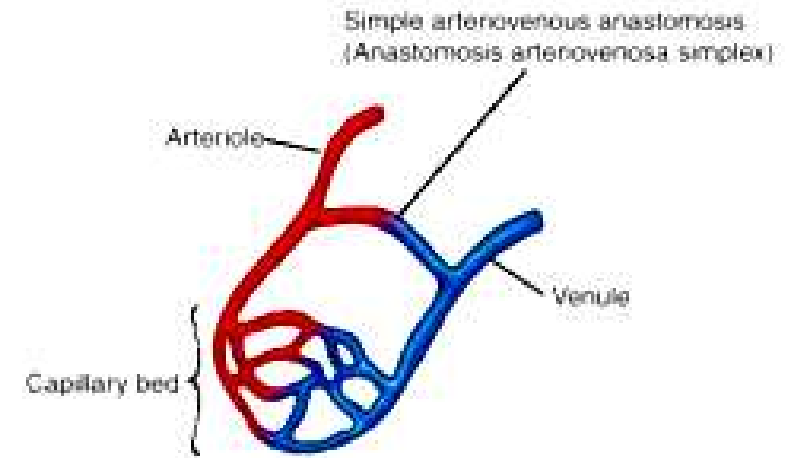
B. Direct arterio-venous Shunt:

* This is a **direct shunt** between arteries & veins in the tissues.

* **It is present in certain areas**, such as in palm of hand, sole of foot, auricle, nose, lips & gastro-intestinal tract.

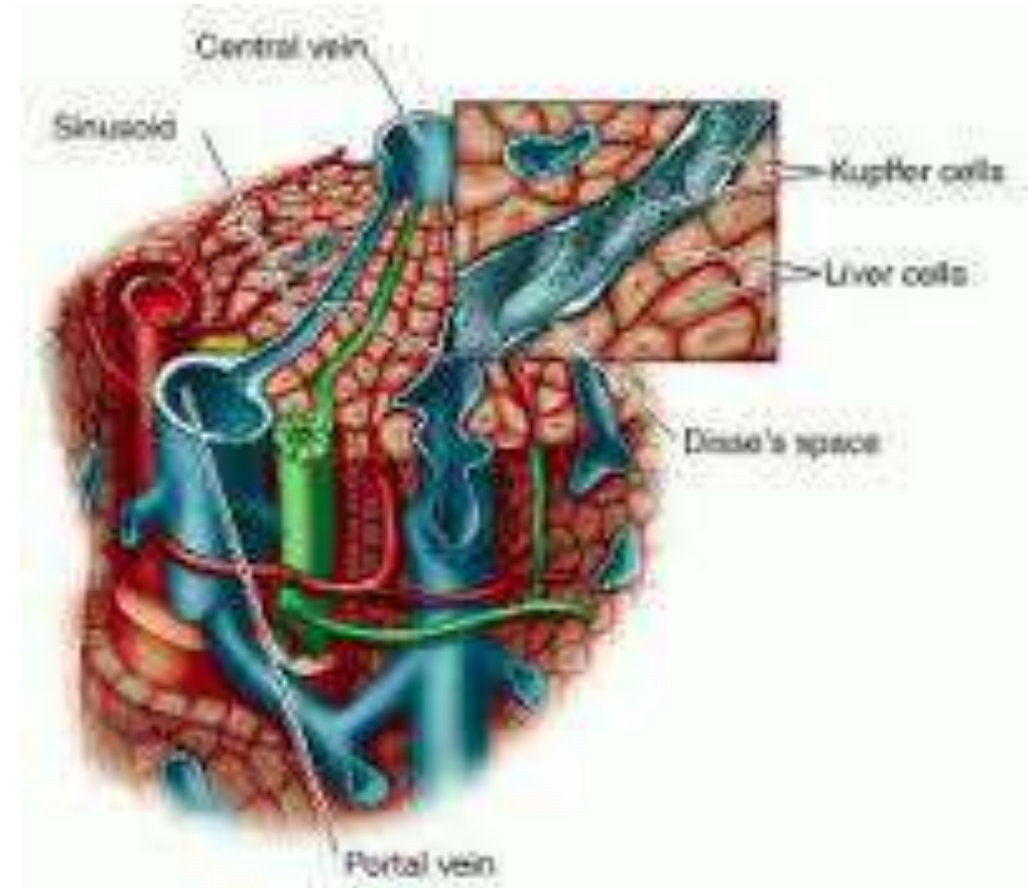
* **It plays an important role in:**

1. **Regulation of the blood flow** to each organ.
2. **Regulation of body temperature** (since it can help losing temperature in some cases or storing temperature in other cases).



C. Sinusoids: are wide tortuous vascular spaces lined with phagocytes, present in liver, spleen & bone marrow. They slow down blood flow allowing maximum exchange of O_2 , CO_2 & nutrients between blood & tissues.

D. Cavernous (erectile) tissue: Small vascular spaces filled with blood, present in the erectile tissues of penis & clitoris.



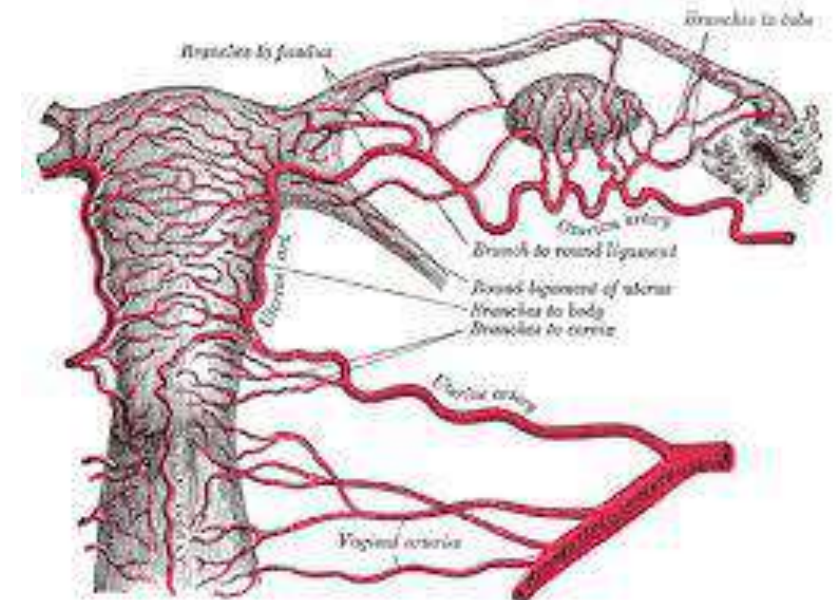
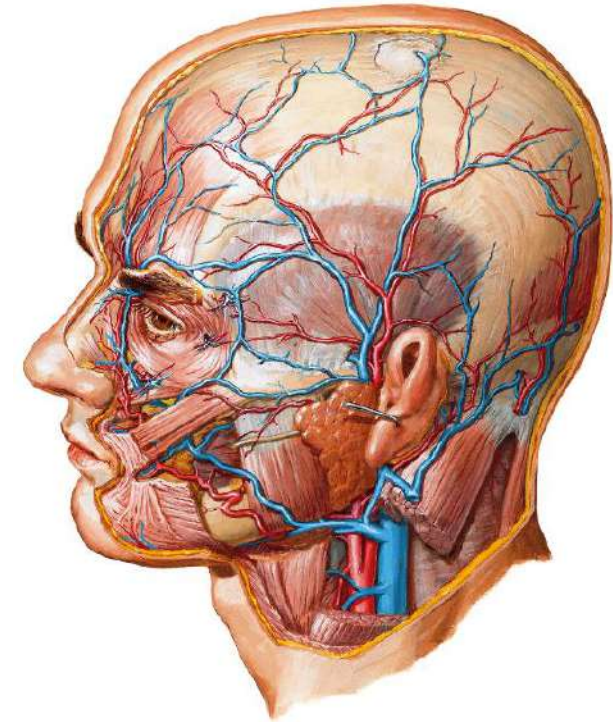
Tortuous arteries

* Are irregular arteries & are present in:

a. **Movable organ;** as facial A.

b. **Expansile organ;** as
arteries of uterus
& urinary bladder.

c. **Protrudable organ;** as
lingual A.

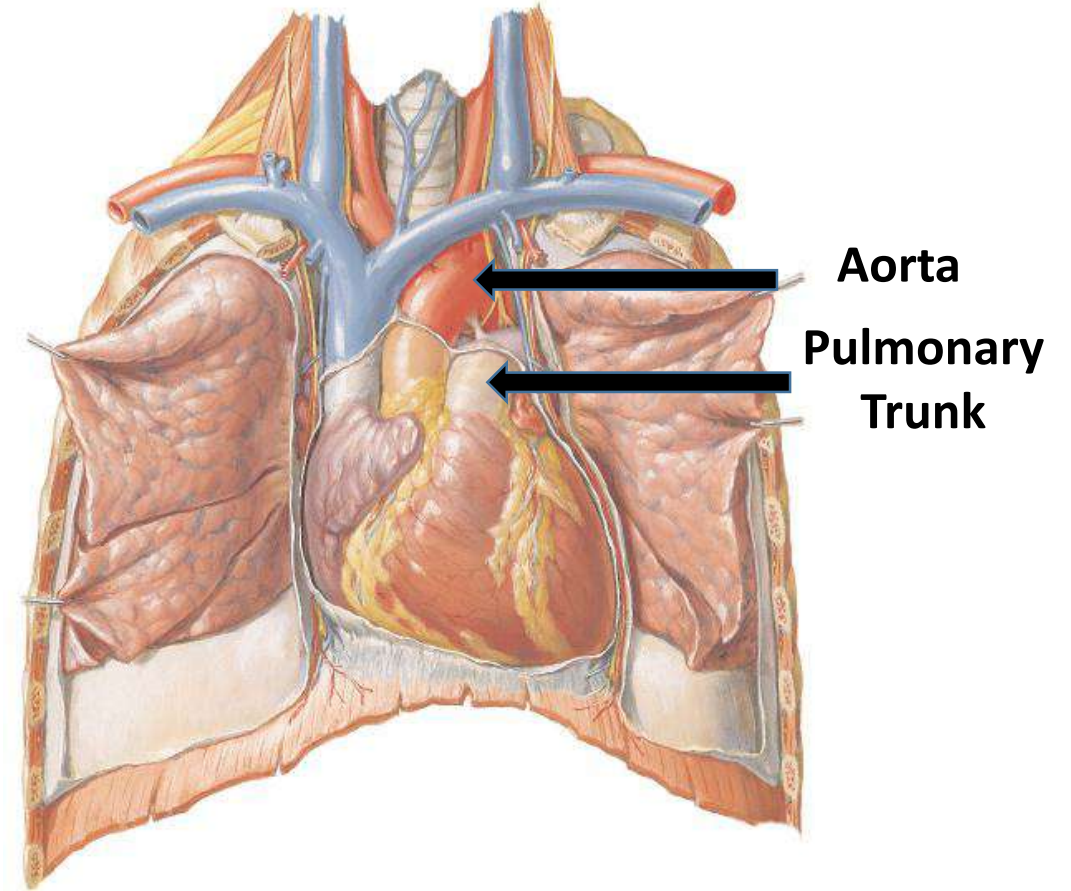


Main Arteries of the Body

* Important arteries originating from heart:

I. Pulmonary Trunk: arises from right ventricle carrying deoxygenated blood to lungs.

II. Aorta: arises from left ventricle carrying oxygenated blood to be distributed to all systems of body.

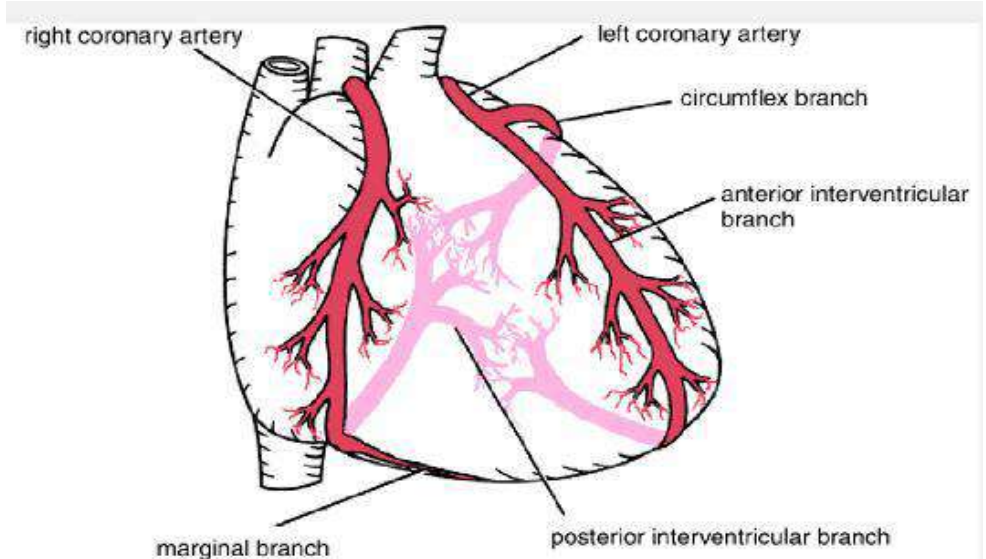
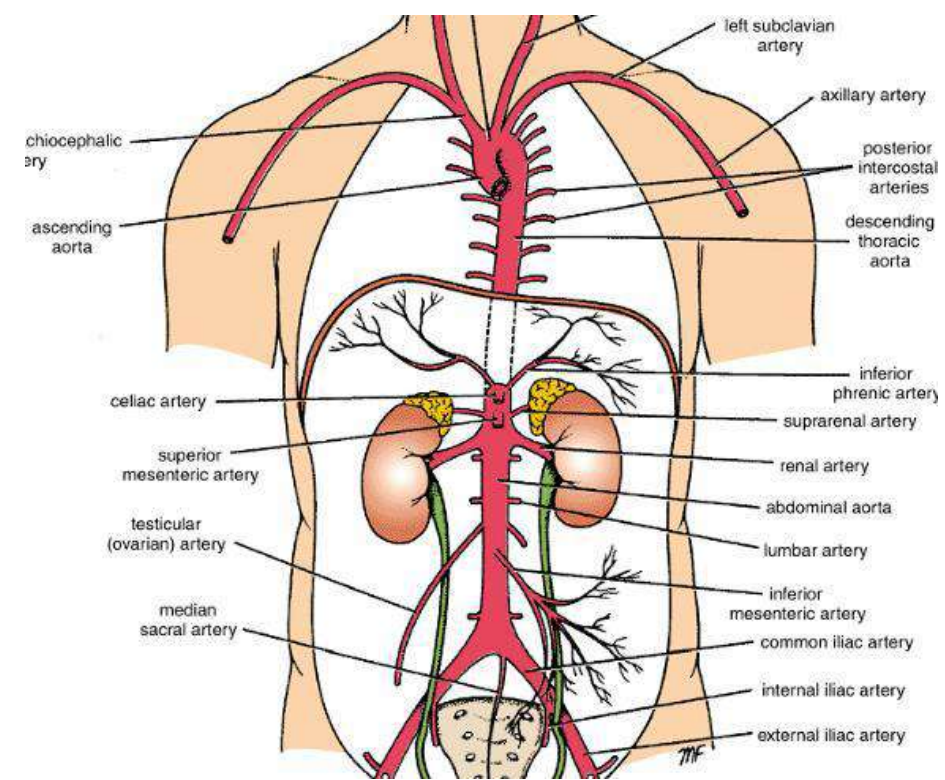


The AORTA

* It is divided into 4 parts:
ascending aorta, aortic arch,
descending thoracic aorta &
abdominal aorta.

1. Ascending Aorta:

- * It passes upward to the right within the pericardium.
- * It gives the RT & LT coronaries (which supply the heart).



2. Aortic Arch:

* It lies within the superior mediastinum of the thoracic cavity in front of trachea & esophagus.

* It gives 3 branches:

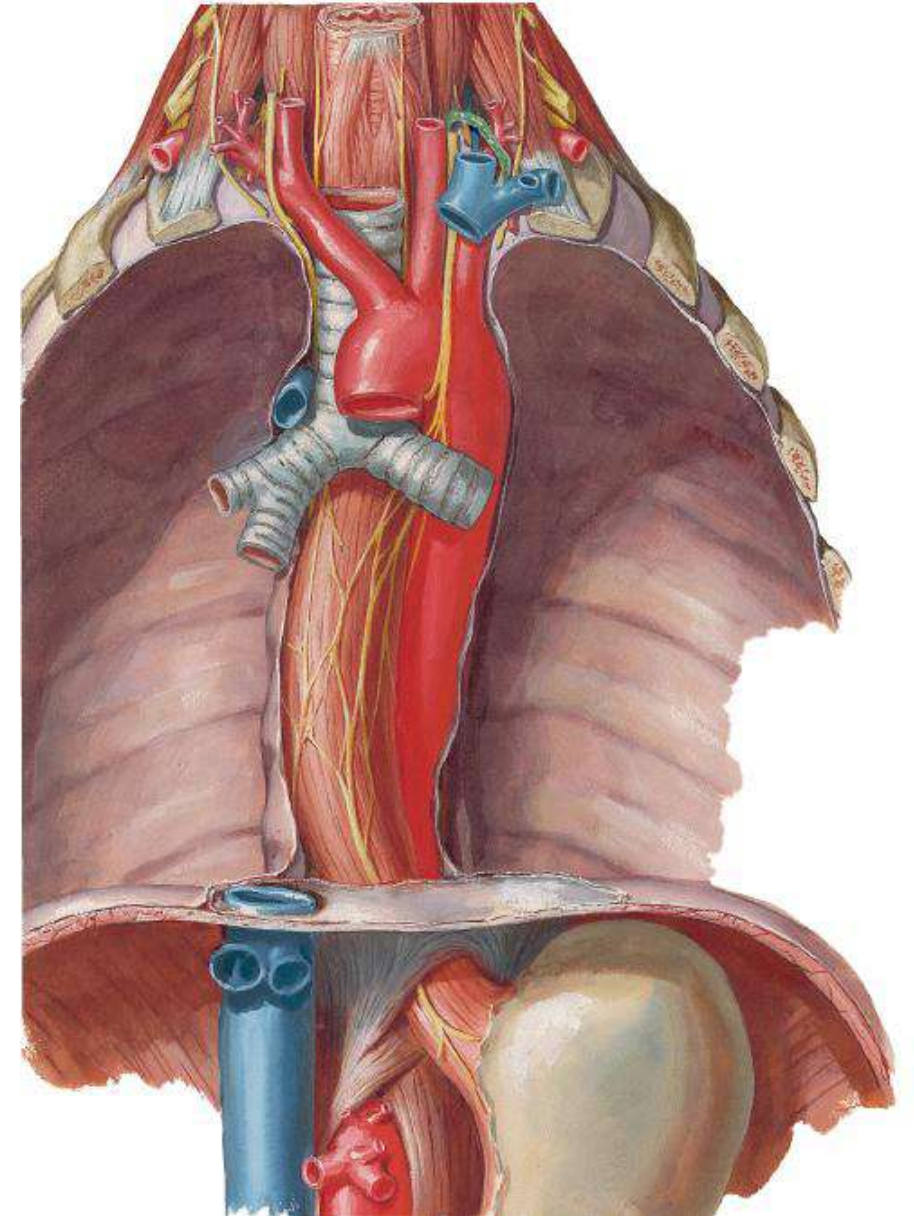
1. Left subclavian A.: which lies in neck & continues in left upper limb as **left axillary artery.**

2. Left common carotid A.: which supplies left half of head & neck.

3. Brachiocephalic (Innominate) A.: which divides into:

a. Right Subclavian A.; which lies in neck & continues in right upper limb as **right axillary A.**

b. Right Common carotid A.; which supplies right half of head & neck.



*** Each common carotid A.**

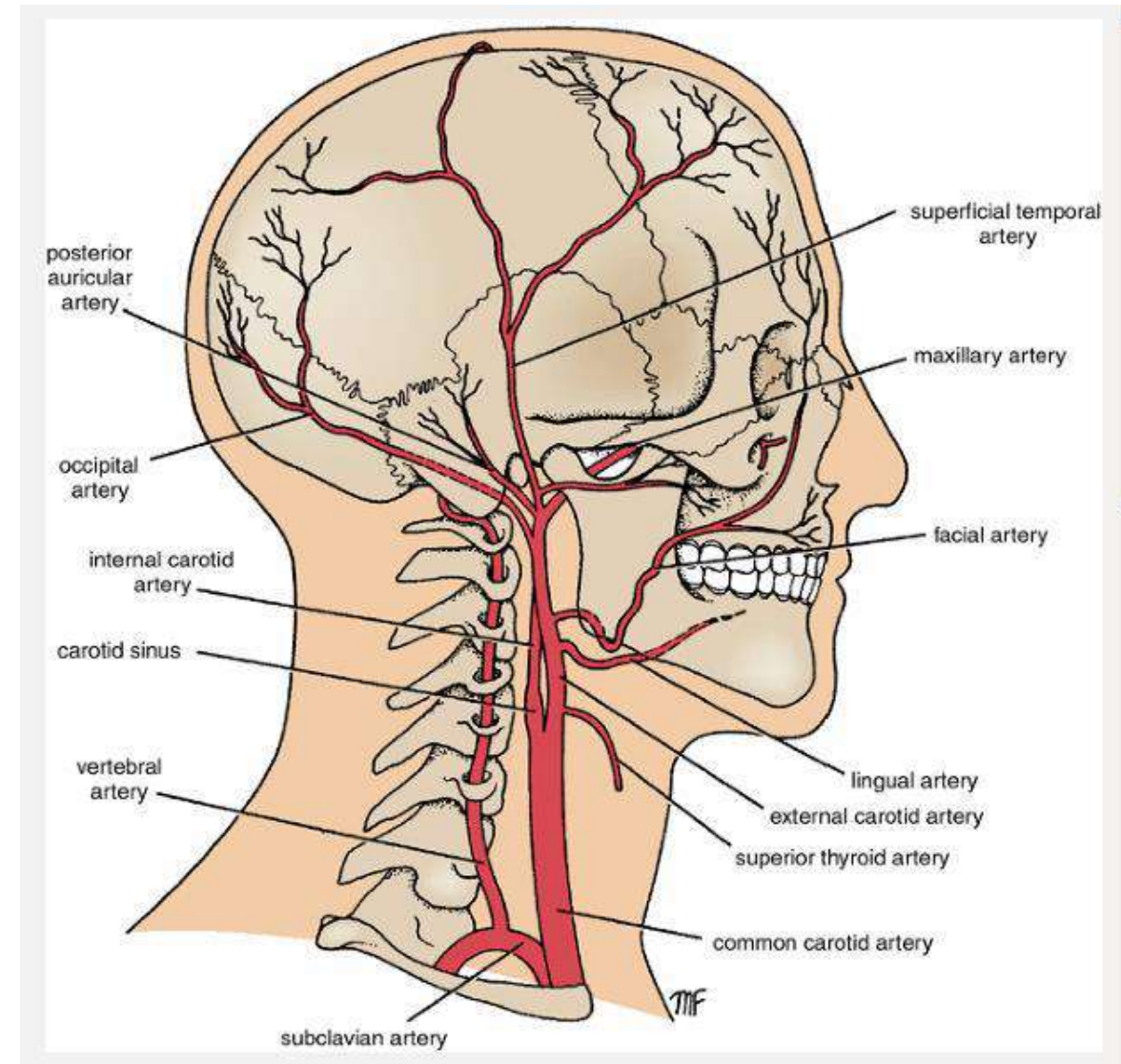
divides into:

a. External carotid A.;

which supplies mainly the structures of head & neck outside the skull.

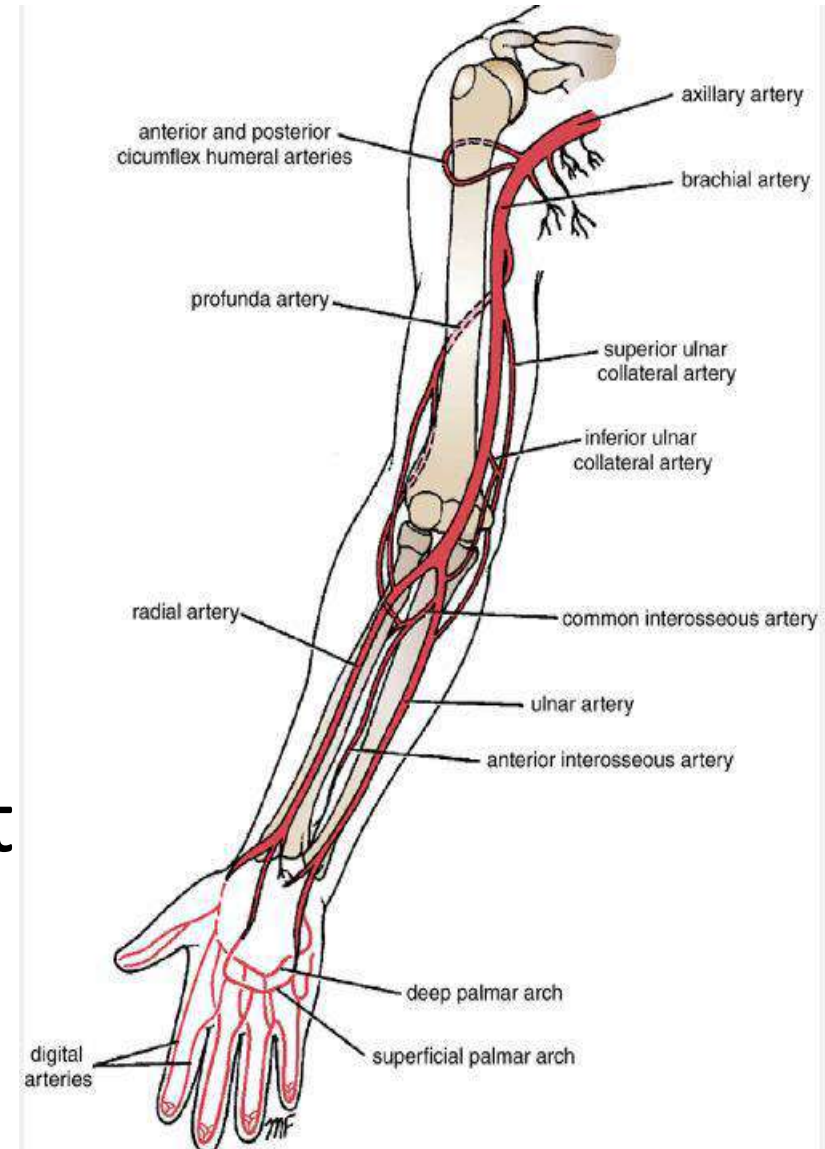
b. Internal carotid A.;

which enters the skull & supplies mainly brain and intracranial structures.



Main arteries of upper limb

- * **Subclavian artery**: Continues in the upper limb as axillary artery.
- * **Axillary artery**: continues as Brachial artery in the arm.
- * **Brachial artery**: descends to the cubital fossa (in front of elbow), where it lies medial to the tendon of biceps muscle. This is an important site, because we put the stethoscope on it when we measure the blood pressure.

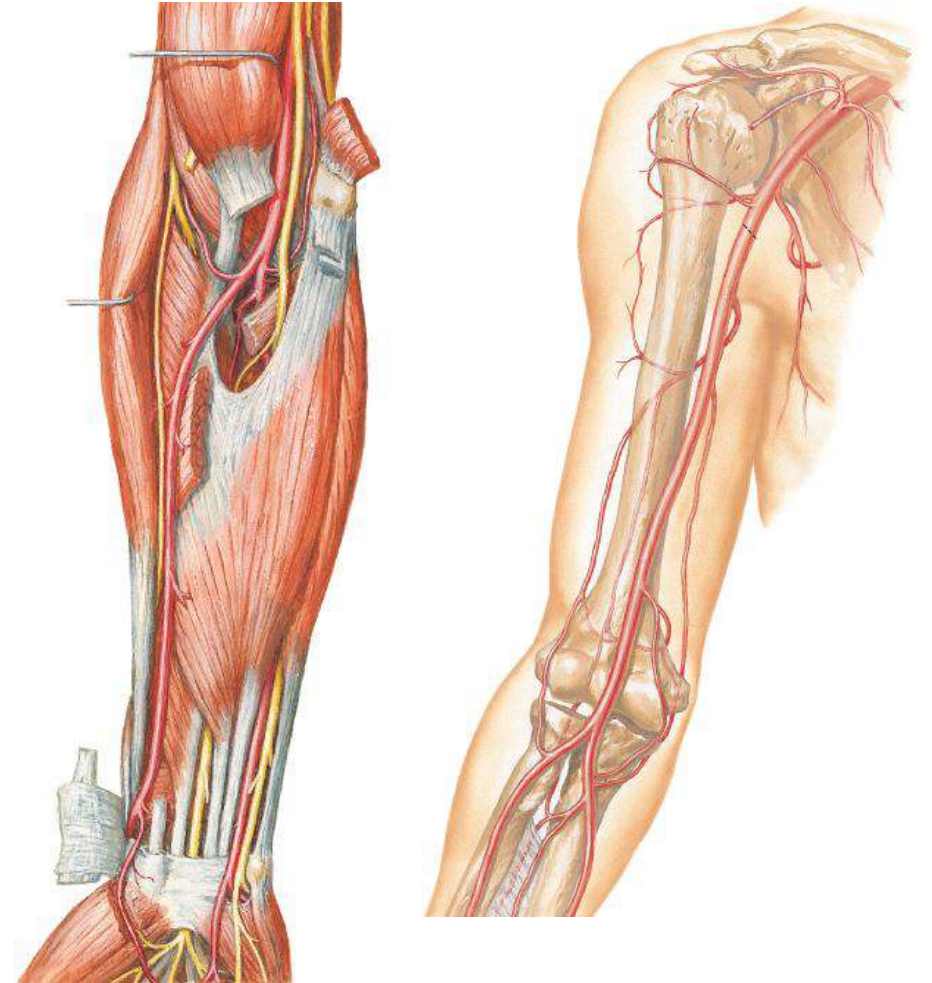


Main arteries of upper limb (contd)

* One cm below bent of elbow, the brachial artery divides into:

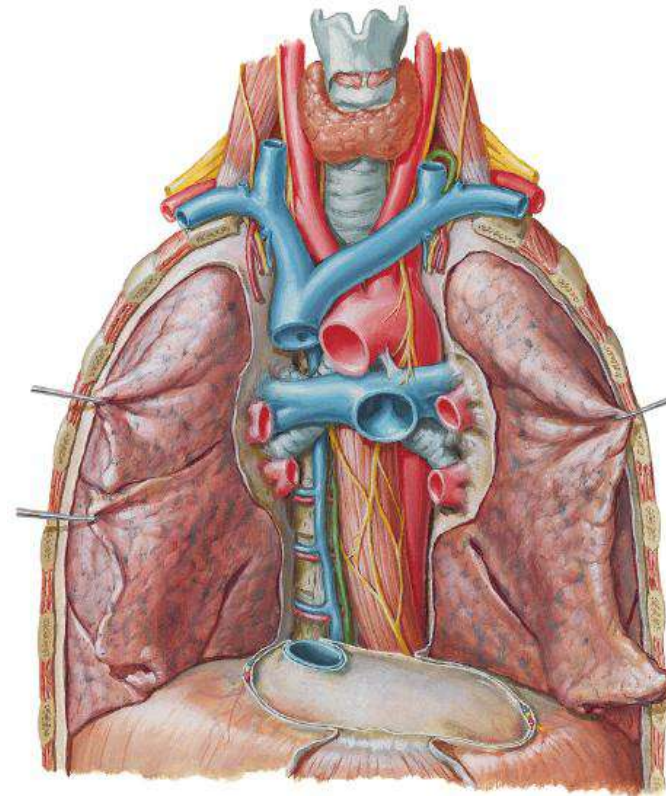
a. Ulnar artery, which runs along the medial side of forearm.

b. Radial artery, which runs along the lateral side of forearm. Above wrist, we can feel the pulse of the radial artery lateral to the tendon of flexor carpi radialis.



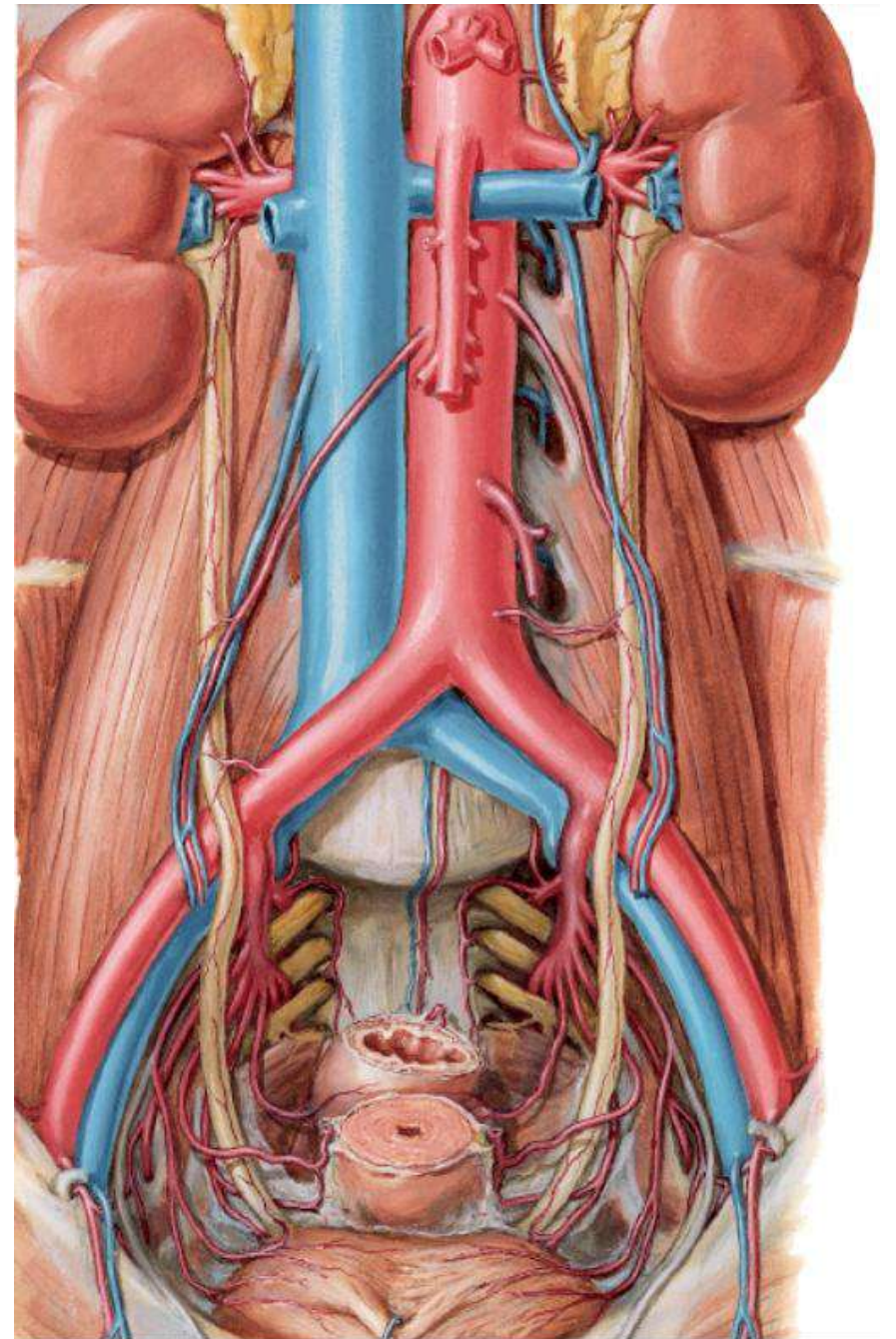
3. Descending Thoracic Aorta:

- * It lies in the posterior mediastinum.**
- * It starts at the level of T4 & ends at the level of T12.**
- * It gives 2 groups of branches:**
 - a. Parietal group → supplying the thoracic cage: e.g.: Intercostal arteries.**
 - b. Visceral group → supplying the lungs, trachea & esophagus.**



4. Abdominal Aorta:

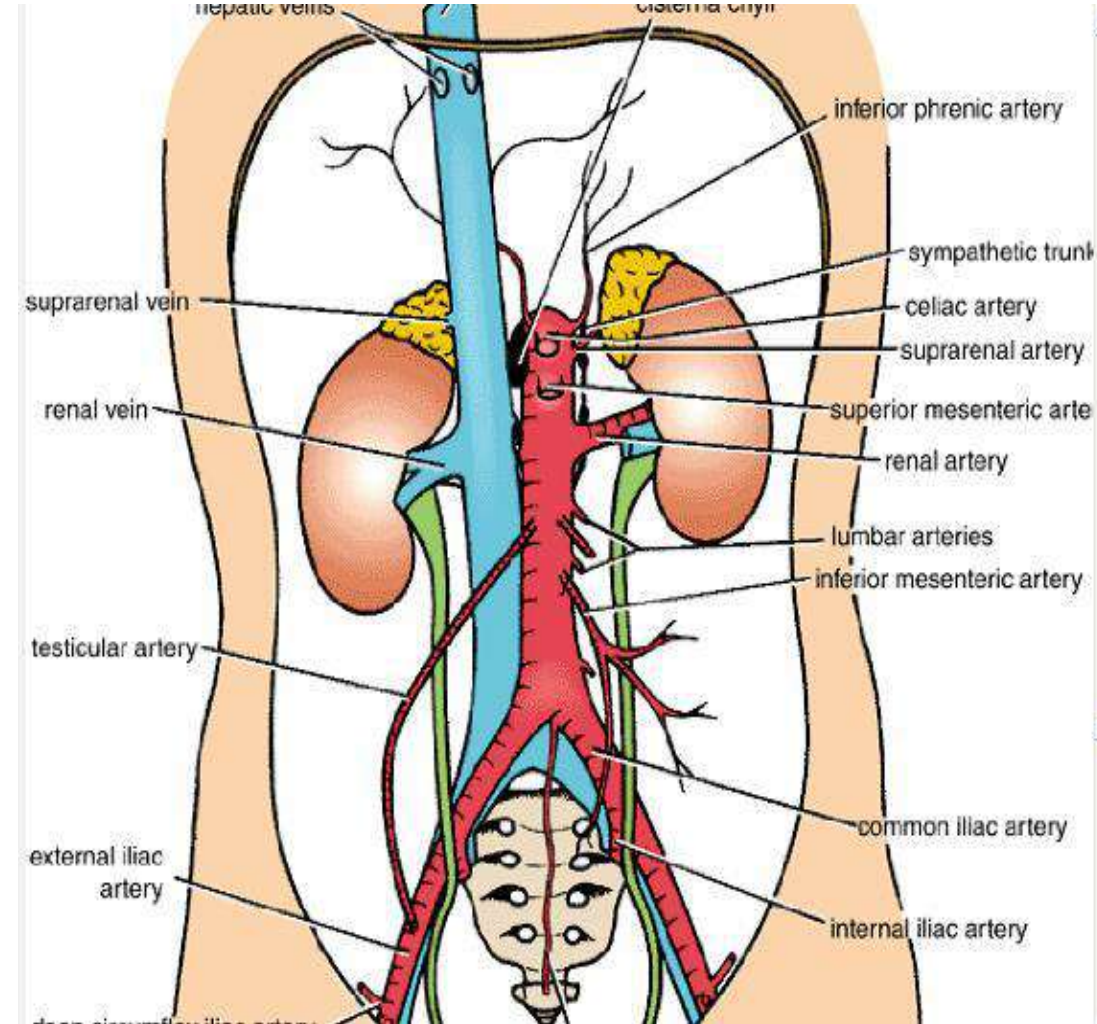
- * Lies in front of lumbar vertebrae.
- * It starts at T12 & ends at L4.
- * It gives 3 groups of branches:
 - a. Single branches: from its anterior aspect for gastrointestinal tube & its related glands (liver, pancreas & spleen) ; They are:
 - i. celiac trunk.
 - ii. Superior mesenteric A.
 - iii. Inferior mesenteric A.



b. Paired branches: from its lateral aspect.

1. Phrenic artery: to diaphragm.
2. Middle suprarenal artery: to suprarenal gland.
3. Renal artery: to kidney.
4. Gonadal artery: testicular artery (to testis) or ovarian artery (to ovary).
5. Four Lumbar arteries: to abdominal wall.

c. Terminal branches: Two common iliac arteries

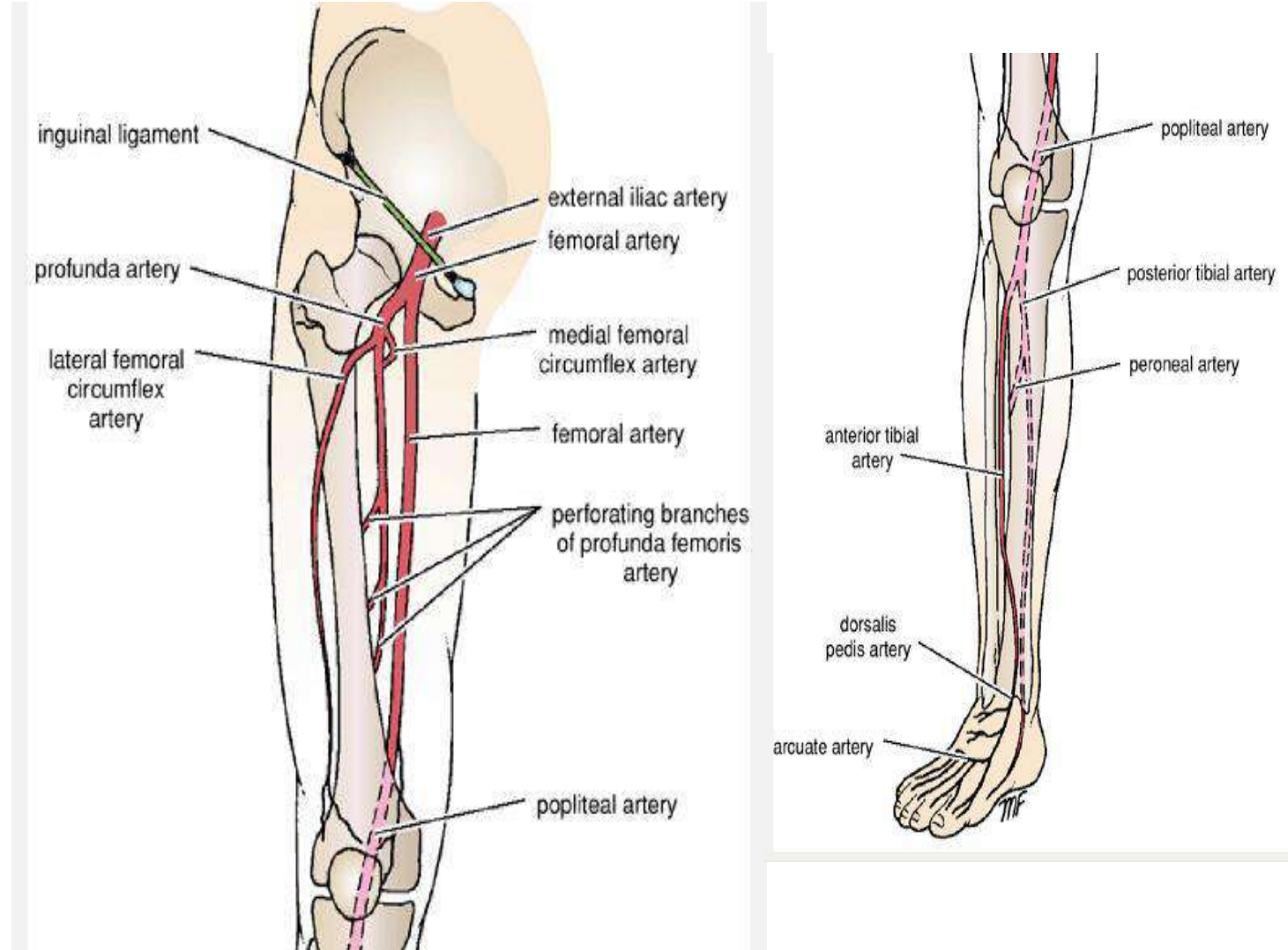


Common Iliac Arteries

* Each common iliac artery divides into:

1. Internal iliac artery: which is responsible for blood supply of pelvic organs.

2. External iliac artery: which continues in thigh & forms **femoral artery**, which ends in lower one third of thigh by forming **popliteal A.** which runs in the back of the knee and ends by dividing into: **a. anterior tibial A.;** in front of leg. **b. posterior tibial A.;** in back of leg.

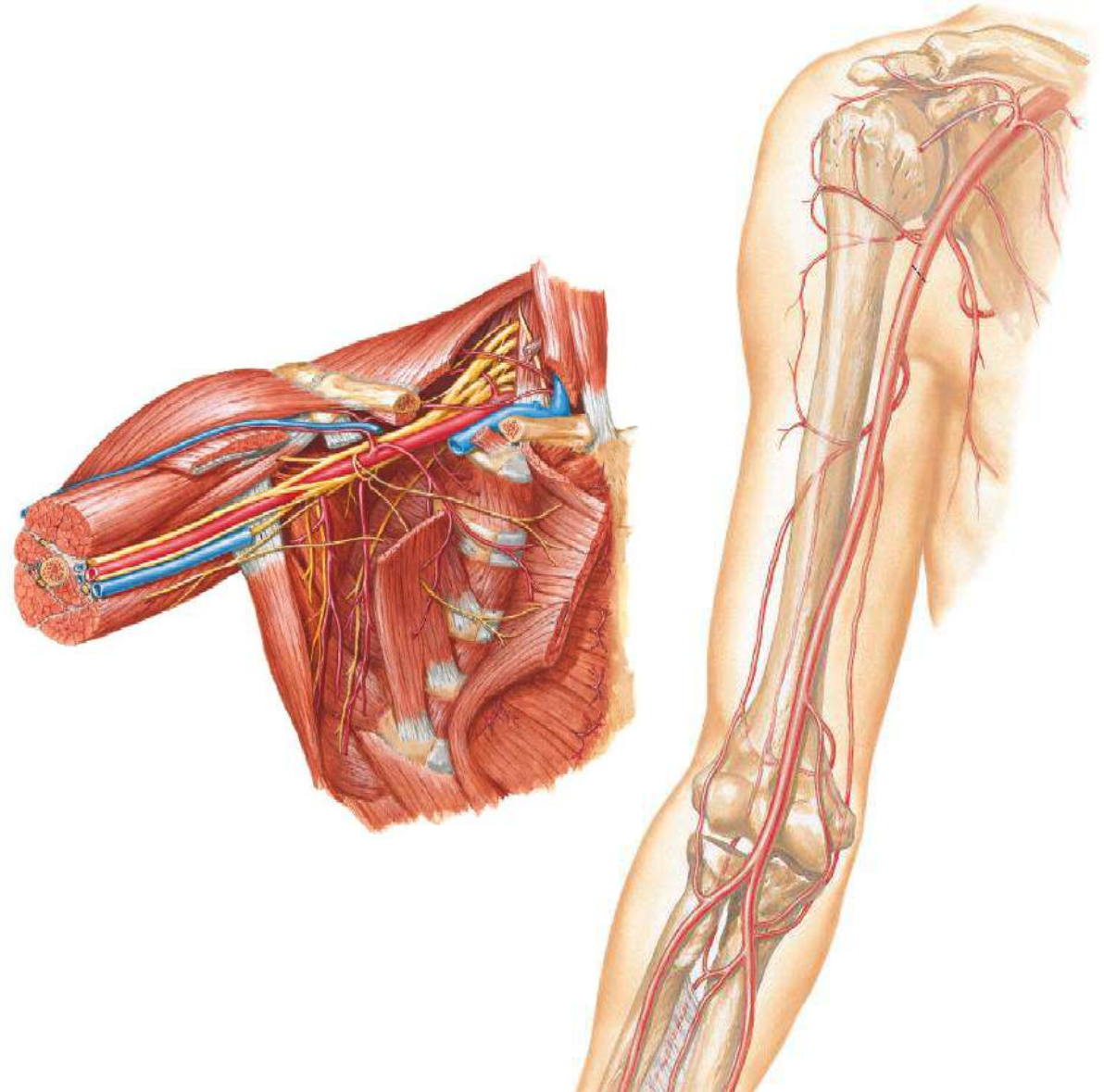


Main Veins of the Body

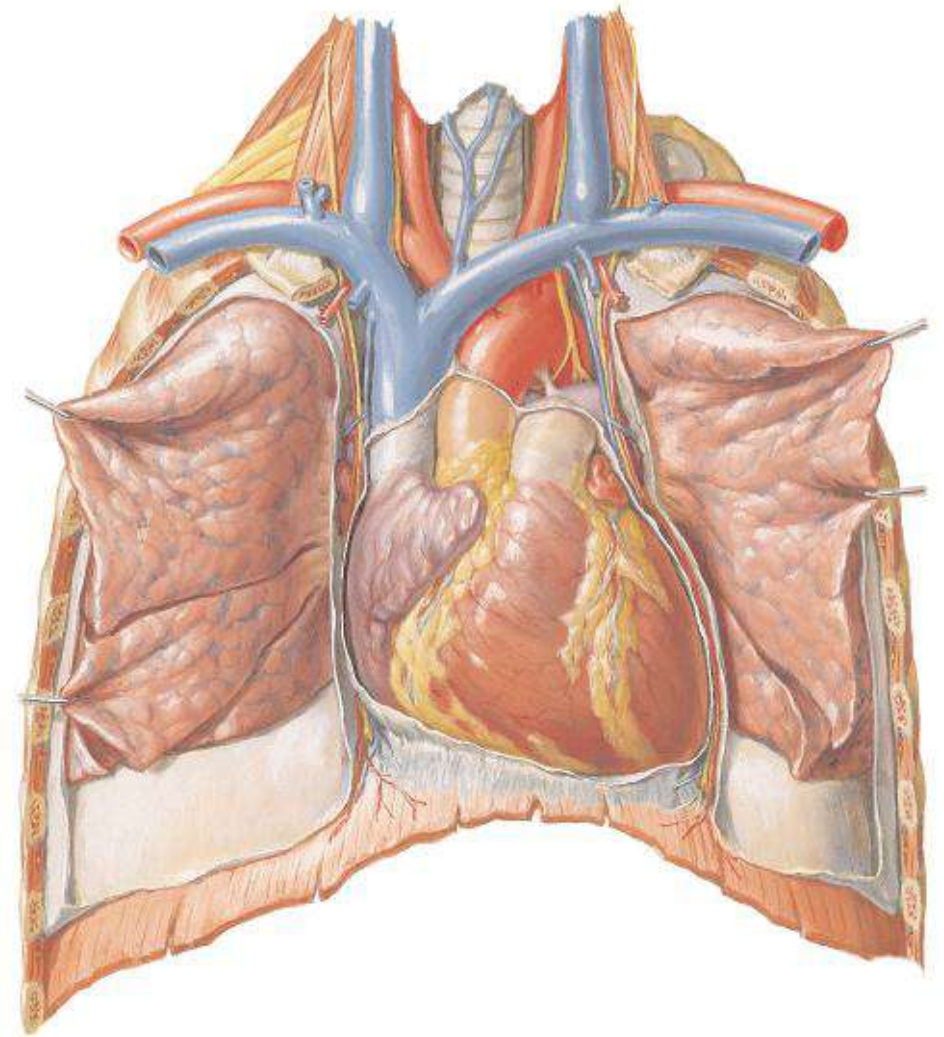
**** There are 2 types of veins in the body:**

1. The superficial veins: lie beneath the skin.

2. The deep veins: accompany the arteries. Some small arteries are accompanied by two veins called venae comitants.



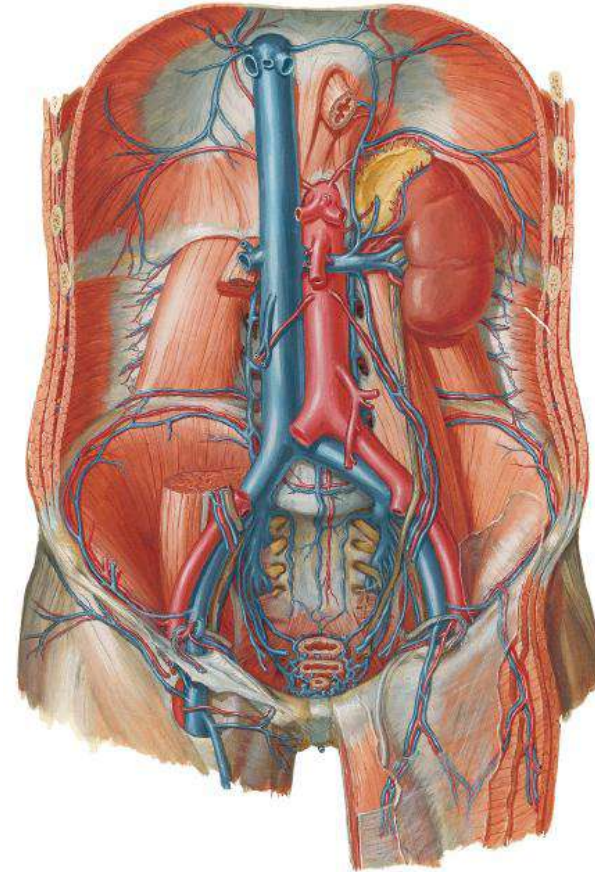
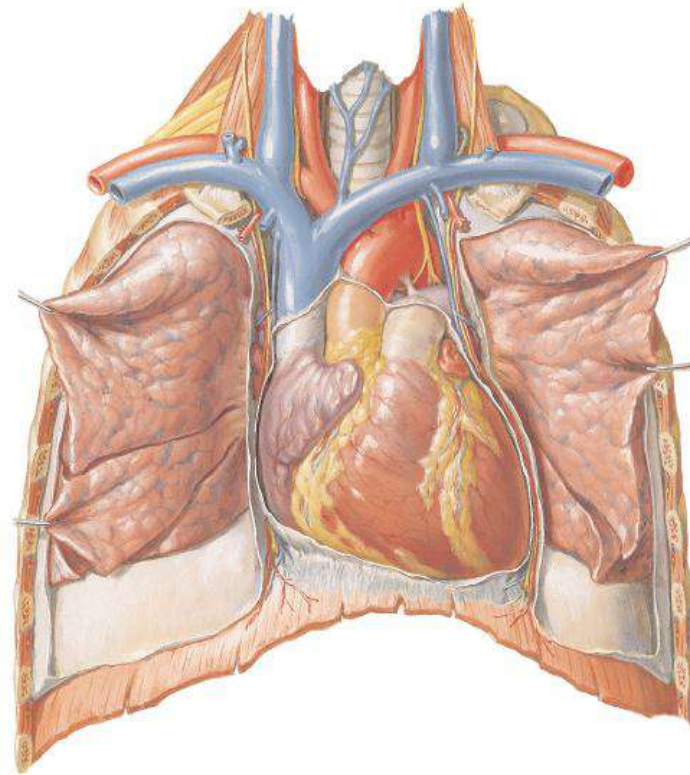
- 1. Veins of the heart end in the coronary sinus.**
- 2. Veins from the head & neck are collected into internal jugular vein.**
- 3. Veins of the upper limb are collected in the subclavian vein.**



**** Internal jugular unites with the subclavian vein to form brachiocephalic vein.**

**** The 2 brachiocephalic veins unite to form the SVC.**

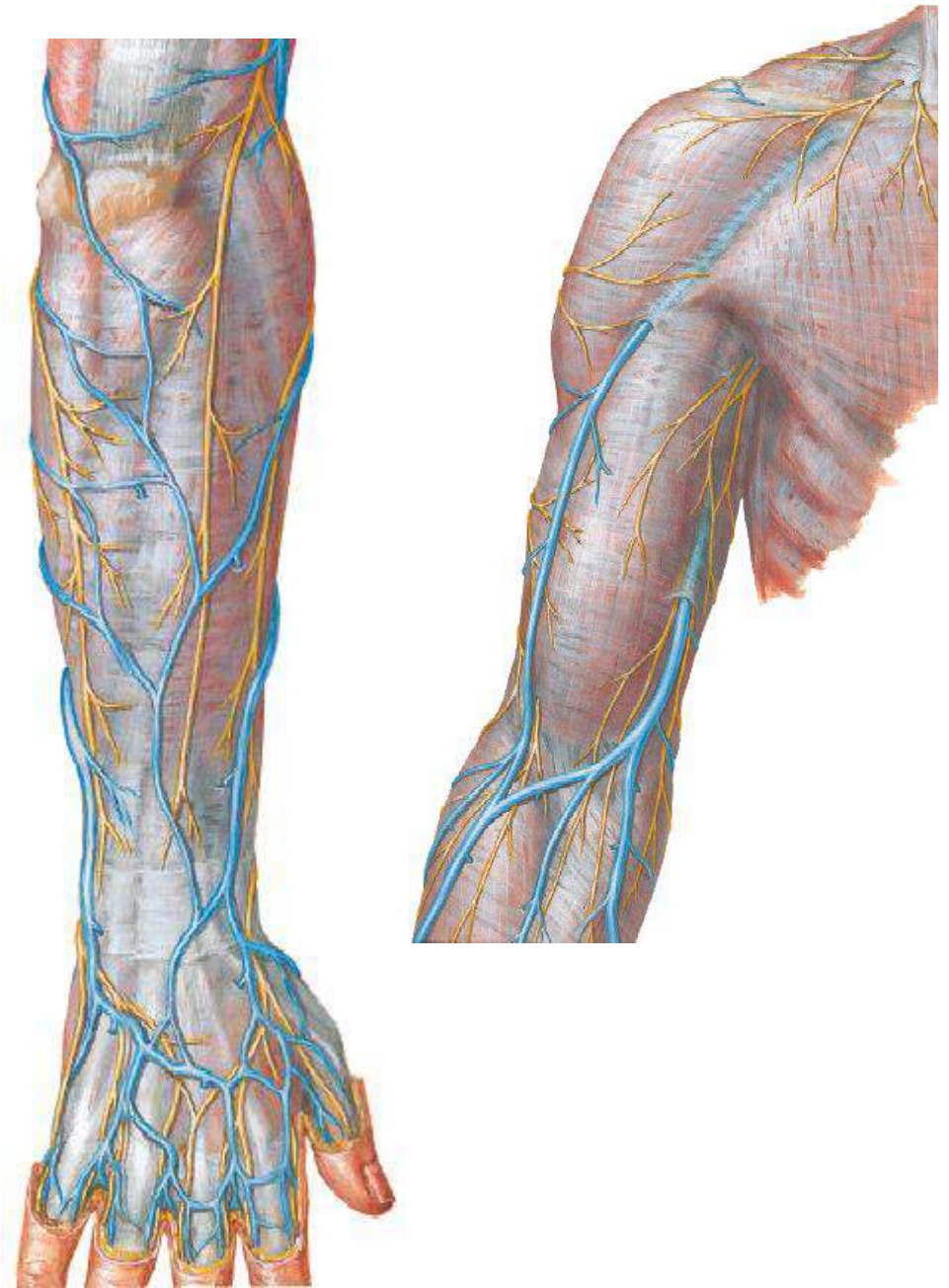
4. Veins of the abdomen, pelvis & lower limbs end in the IVC.



**** Superficial veins used in intravenous injection or taking blood sample:**

- 1. Cephalic vein:** Starts at the lateral end of dorsal venous arch.
- 2. Basilic vein:** Starts at the medial end of the dorsal venous arch.

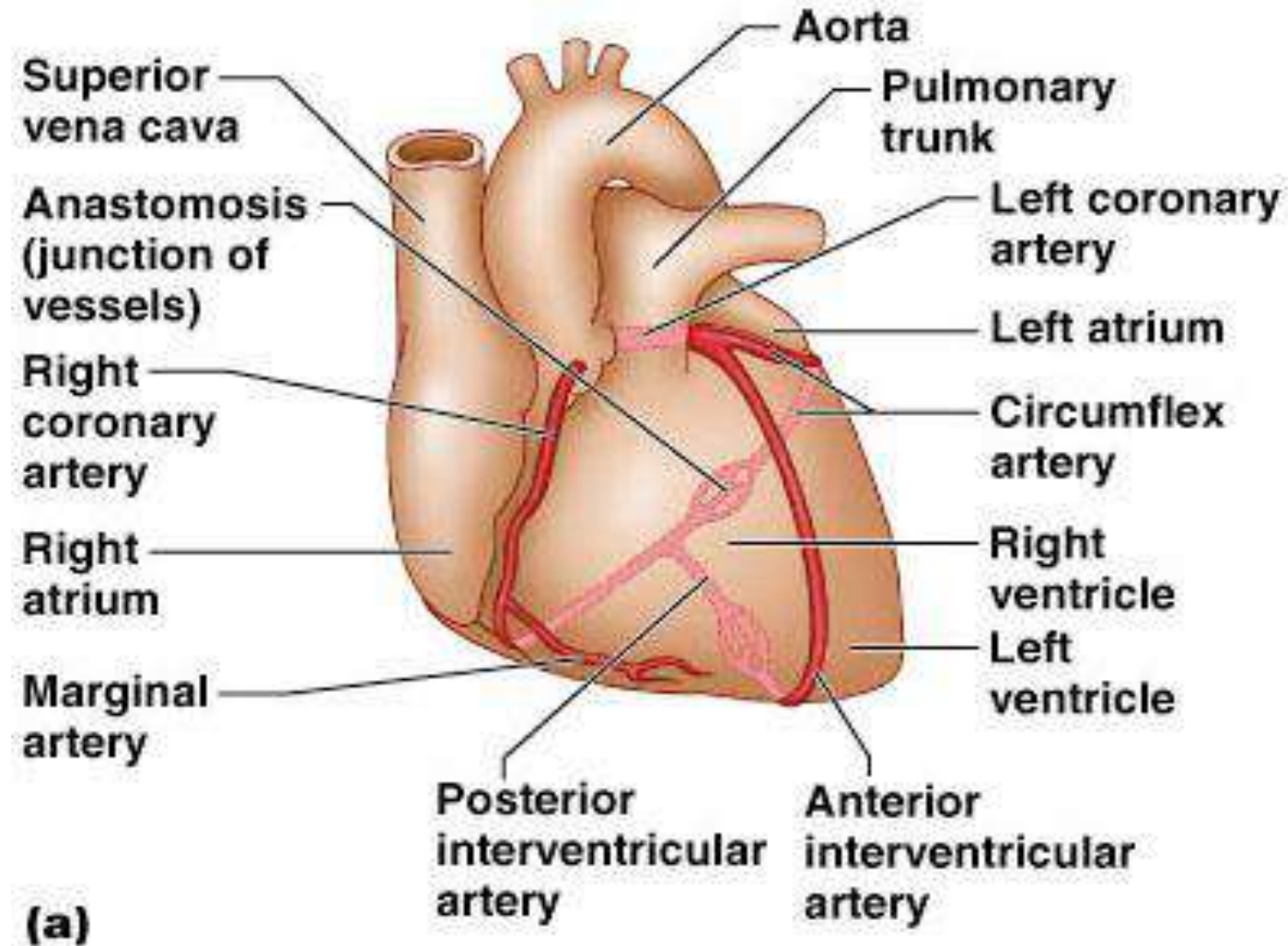
*** The cephalic & basilic veins are joined at the elbow by a vein called **median cubital vein**. This vein is the commonest vein used for intravenous injection.**



Types of CIRCULATION

- **Coronary circulation – the circulation of blood within the heart.**
- **Pulmonary circulation – the flow of blood between the heart and lungs.**
- **Systemic circulation – the flow of blood between the heart and the cells of the body.**
- **Portal circulation**
- **Fetal Circulation**

CORONARY CIRCULATION: ARTERIAL SUPPLY

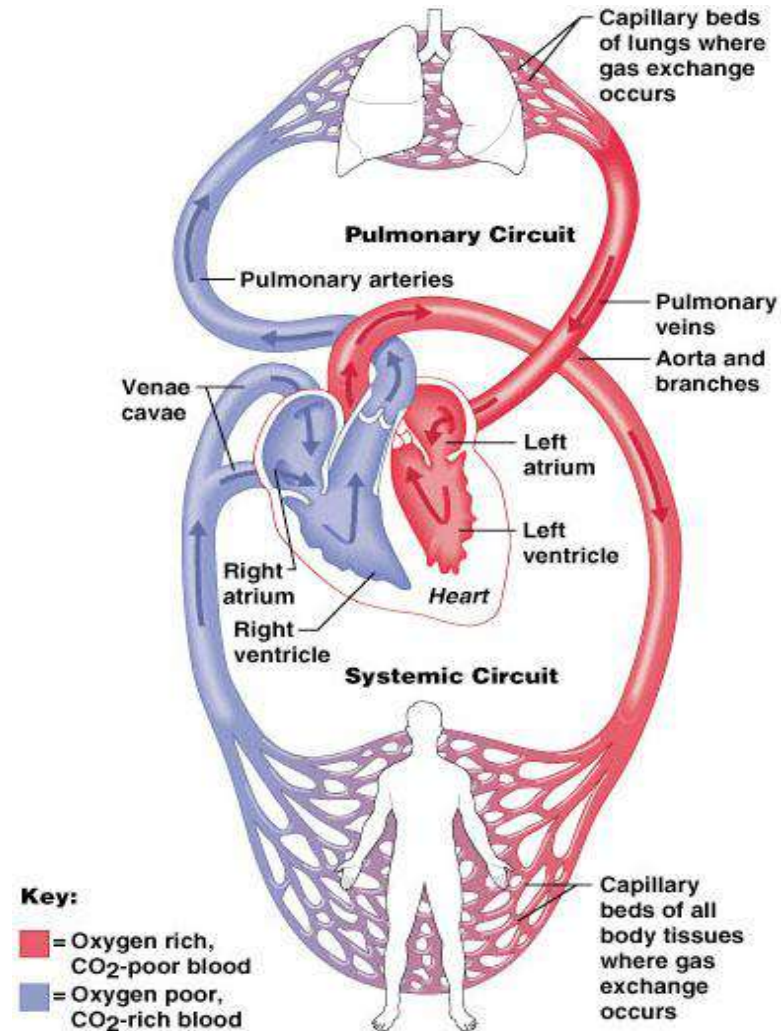


SYSTEMIC AND PULMONARY CIRCULATION

Pulmonary circulation

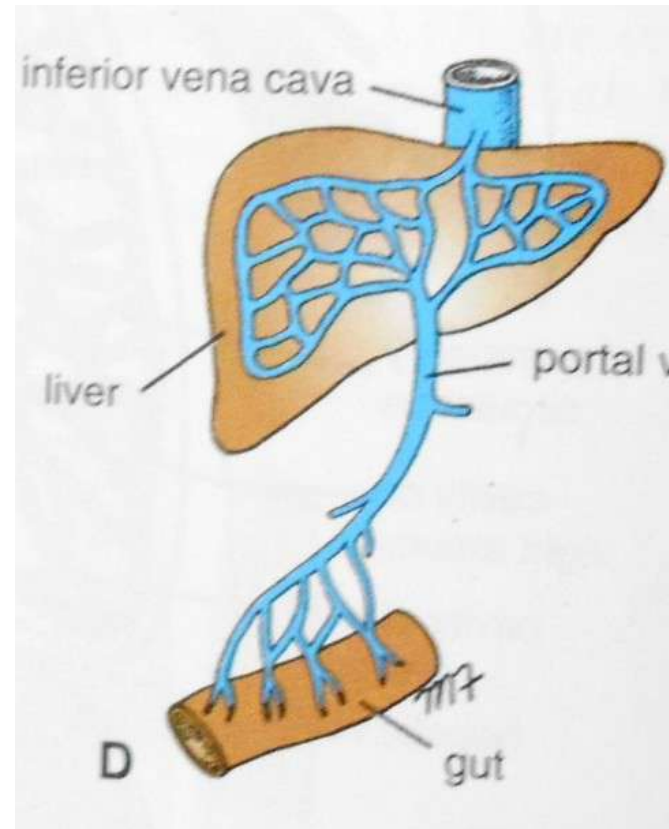
The flow of blood between the heart and lungs.

Systemic circulation The flow of blood between the heart and the cells of the body.



PORTAL CIRCULATION

► **Portal circulation - the flow of blood between two set of capillaries before draining in systemic veins.**



The Digestive System

* It includes the following:

A. The gastrointestinal tract or alimentary canal:

* This is a continuous tube that extends from mouth to anus.

* It includes mouth, pharynx, esophagus, stomach, small intestine & large intestine.

B. Accessory Glands: such as liver, pancreas & salivary glands.

