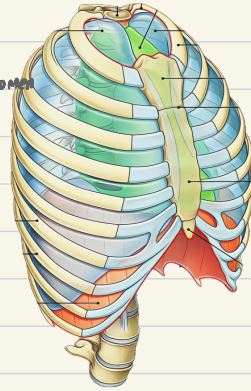
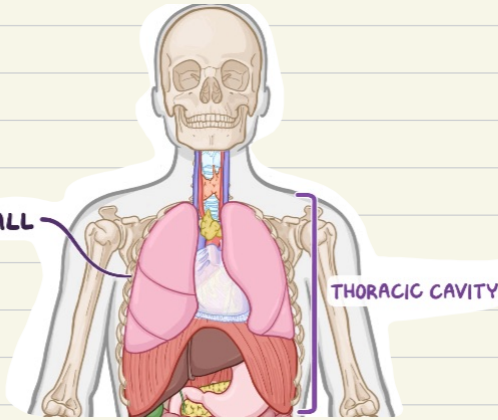




Thorax

part of the trunk extending between the root of neck & abdomen

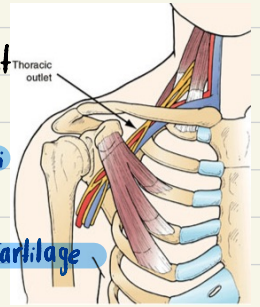


Thoracic outlet

→ opening between chest cavity and root of the neck

[Boundaries]

- anteriorly : superior border of manubrium sterni
- posteriorly : first thoracic vertebra
- laterally : medial border of first rib and their costal cartilage



Structure passing : Esophagus , trachea and many vessels and nerves

Inferior thoracic aperture

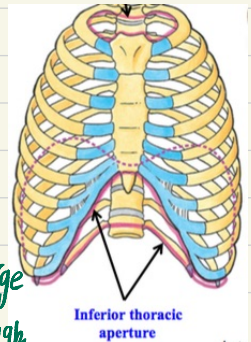
→ the thoracic cavity communicates with abdomen through a large opening

[Boundaries]

- anteriorly : xiphisternal joint
- posteriorly : 12th thoracic vertebra
- laterally : costal margin

Structures passing

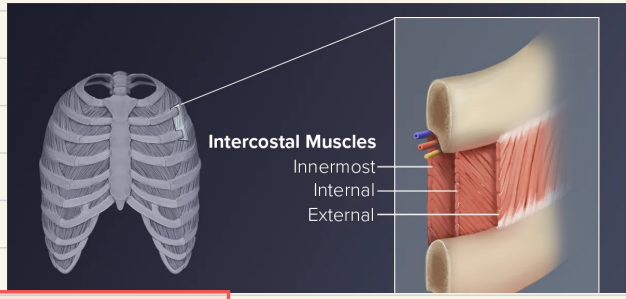
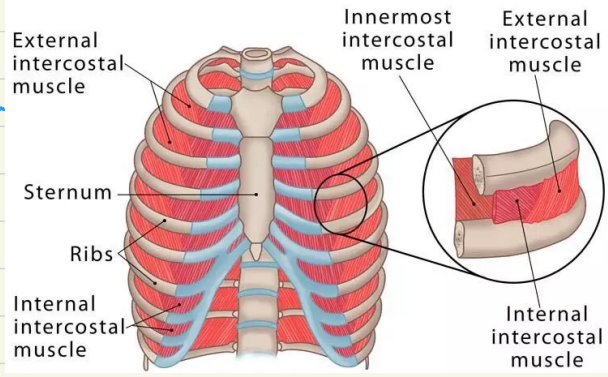
esophagus and many large vessels and nerves, through diaphragm foramina



Intercostal muscles

- 1- External intercostal muscle
 - ▷ fibers directed downward and forward
 - ▷ extends from inferior border of rib above to superior border of rib below
- 2- internal intercostal muscle
 - ▷ fibers directed downward and backward
 - ▷ extends from subcostal groove of rib above to upper border of rib below
 - ** responsible for Expiration **
- 3- innermost intercostal muscle
- 4- subcostal muscle
- 5- Transverseus thoracic muscles

Intercostal Muscles

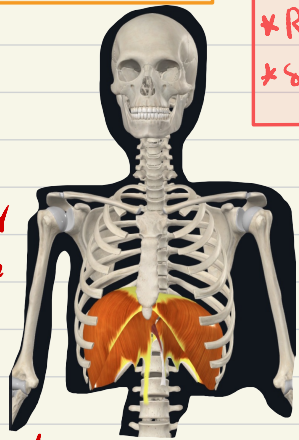


Nerve supply → inter costal nerves

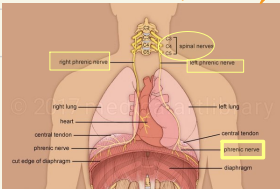
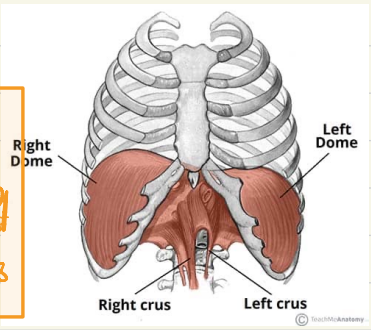
Action:
* Respiration
* strengthen intercostal spaces

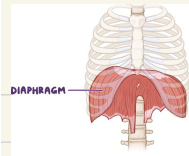
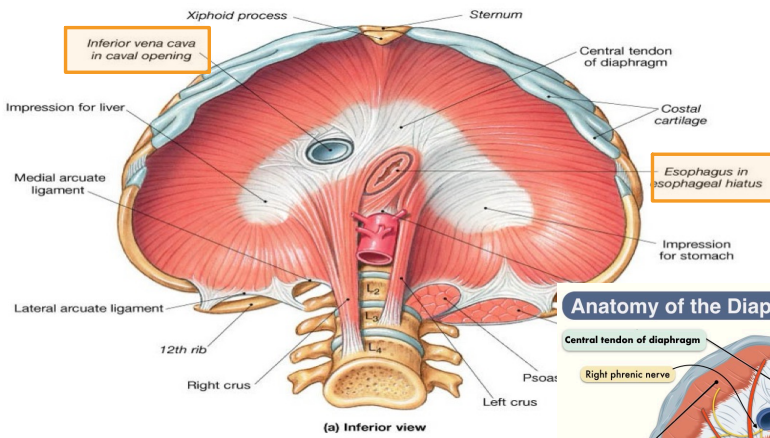
Diaphragm

Thin muscular and Tenuous Septum that separates chest cavity above from abdominal cavity



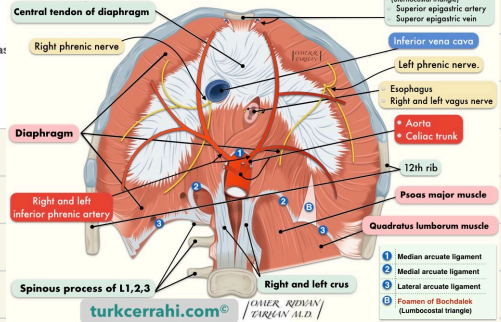
Nerve supply
motor → Right + Left phrenic nerves (C3, C4, C5)





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Anatomy of the Diaphragm (Bottom view)



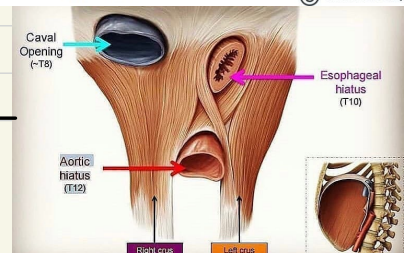
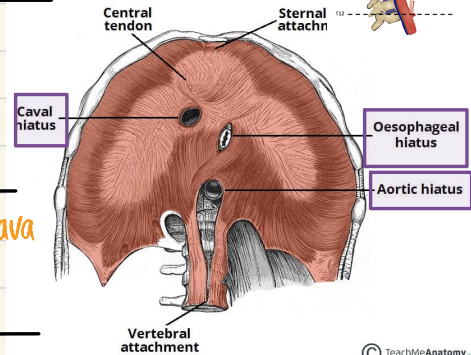
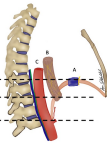
Sunction of diaphragm

- ① Respiration
- ② Muscles of abdominal training → Contraction of diaphragm is raising intra-abdominal pressure
- ③ weight lifting muscles
- ④ Thoraco abdominal pump → Pump for blood and lymph

Opening of diaphragm

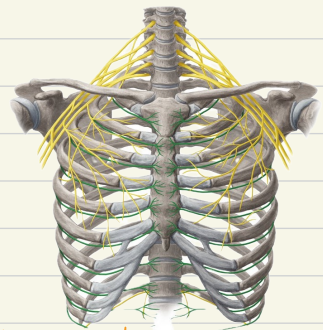
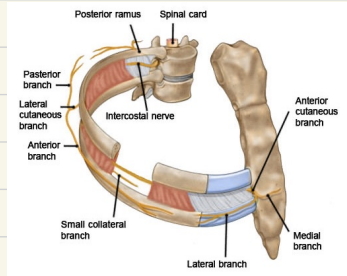
| opening | level | Structures Passing |
|--------------------------|------------------------|---|
| Vena Caval | 8th Thoracic vertebra | transmits inferior vena cava and terminal branches of the right phrenic nerve |
| Oesophageal (Oesophagus) | 10th Thoracic vertebra | oesophagus, right and left vagus nerves |
| Aortic | 12th thoracic vertebra | aorta, thoracic duct zygous vein |

Major openings of the diaphragm: lateral view



intercostal nerves

- * it is a ventral ramus of thoracic nerves
- * 11 nerves on each side
- * last nerve → subcostal nerve



Function

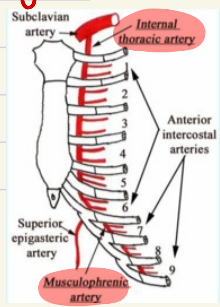
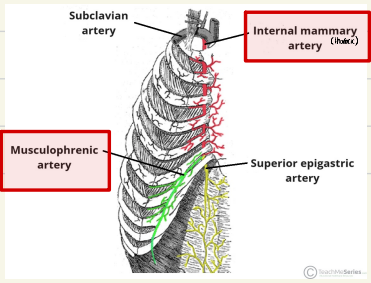
- Sensory: skin, parietal layer of pleura and peritoneum
- Motor: muscles of anterior thoracic & abdominal walls
- Postganglionic sympathetic: blood vessels, sweat glands

Blood supply of Thoracic wall

anterior

- 9 on each side
- 2 in each space

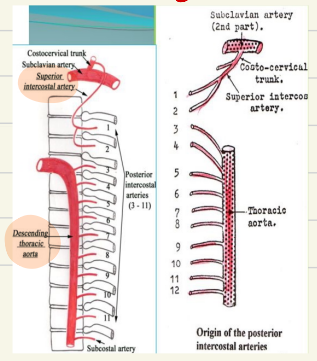
- upper 6 → internal thoracic artery
- 7, 8, 9 → musculophrenic artery



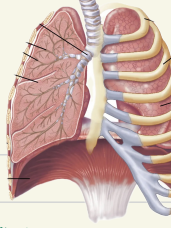
Posterior wall

- 11 each side
- one in each space

- 1st, 2nd → superior intercostal artery
- 3-11 → descending thoracic aorta

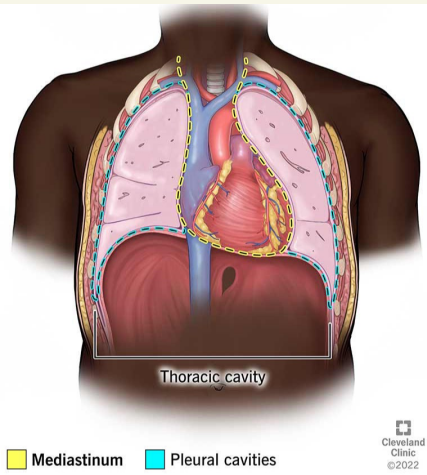


Thoracic cavity



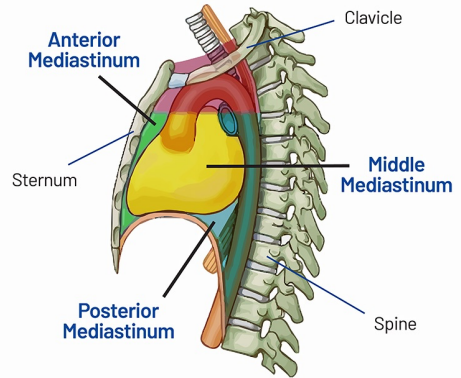
1 bounded by thoracic cage, diaphragm

2 Contains two pleural cavities containing lungs and mediastinum



Mediastinum → Septum between two pleural cavities

Boundaries → Superior: Thoracic outlet
 inferior: Diaphragm
 anterior: sternum
 posterior: vertebral column



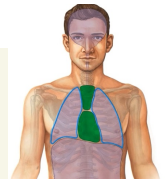
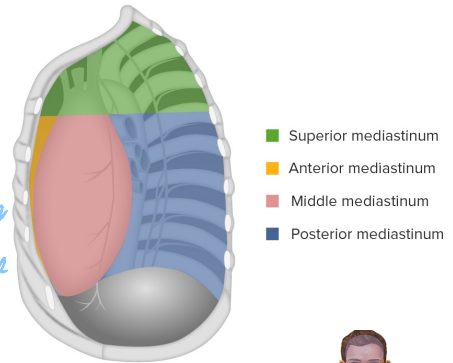
Subdivisions

division: an imaginary line from sternal angle to lower border of 4th thoracic vertebra divide mediastinum into:

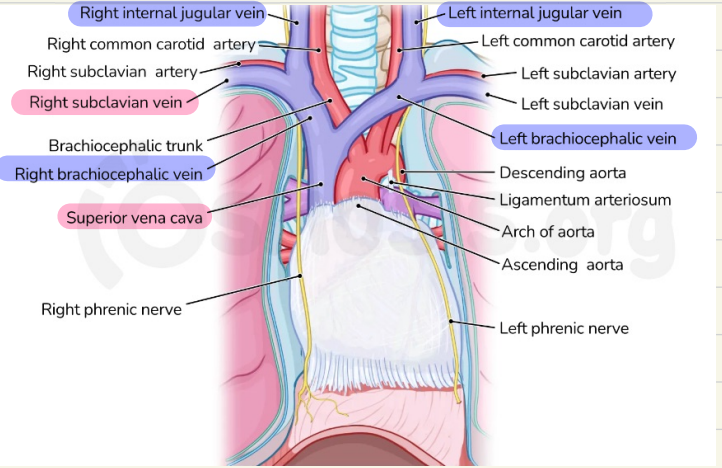
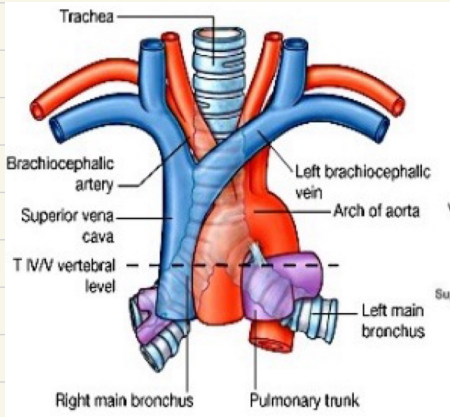
* Superior above the line and inferior below

* inferior divide into:

- middle → contains heart and pericardium
- anterior → in front of middle mediastinum
- posterior → behind middle mediastinum

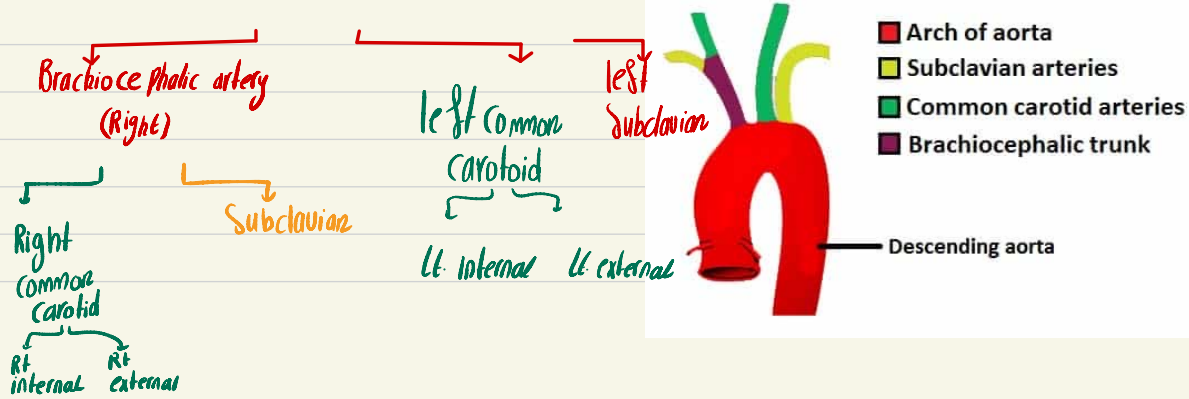


Superior mediasternum - content



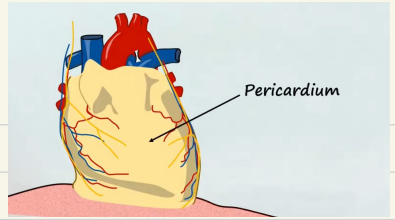
- * Vein of Head and neck → internal jugular vein
- * Vein of upper limb → subclavian vein
- * Right internal jugular vein join right subclavian → right brachiocephalic vein
- * Left internal jugular vein join left subclavian → left brachiocephalic vein
- * Right brachiocephalic vein joins left brachiocephalic → Superior vena cava

Arch of aorta



Heart <3

- muscular pump that propel blood to various parts of the body
 * lies within the pericardium in the middle mediastinum



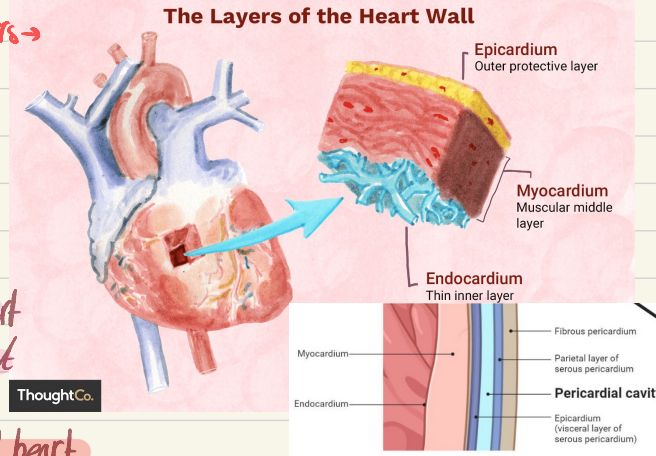
* 1/3 of the heart lies to right & 2/3 to the left of median plane



wallos of the heart are composed of 3 layers ->

- 1] epicardium
- 2] myocardium -> cardiac muscle
- 3] Endocardium

pericardium -> fibroserous sac surrounding the heart and roots of great vessels



Function:

- 1] Restrict excessive movement of heart
- 2] serve as a lubricated container in which different parts of heart contact

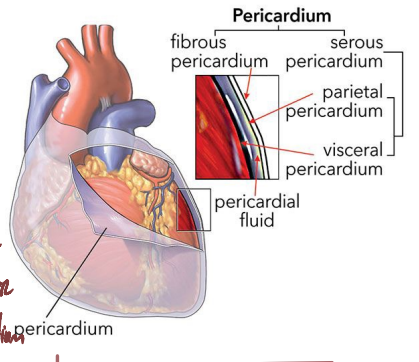
Pericardium

Fibrous Pericardium

- outer sac of pericardium
- firmly attached to diaphragm

Serous Pericardium

thin transparent double layered sac that lies between fibrous pericardium



Pericardial cavity

* space between 2 layers of serous pericardium

* contains a thin film of fluid that acts as a lubricant for movement of heart

Parietal

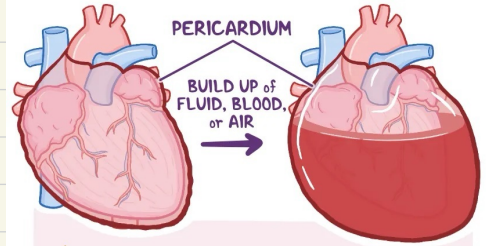
lines inner surface of fibrous pericardium

Visceral

adheres to the heart and forms its outer covering

Cardiac tamponade

Fluid in pericardium (sac around heart) builds up, resulting in compression of heart



⚠️ **CONSIDERED a MEDICAL EMERGENCY**
CAN PROGRESS to CIRCULATORY SHOCK and CARDIAC ARREST

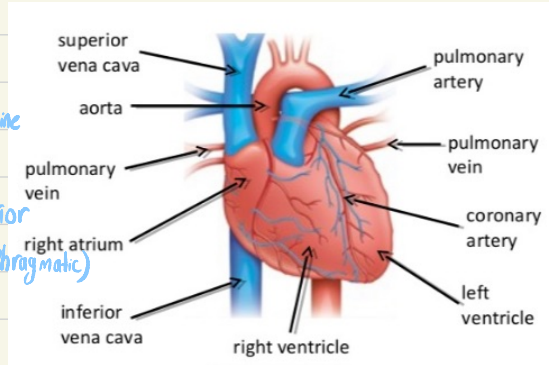
External morphology of the heart

* **Base:** located posteriorly, formed mainly by left atrium

* **Apex:** formed by left ventricle, it lies at the 5th intercostal space, 3-5 inches (9 cm) from midline

* **Two surfaces:** anterior or sternocostal and inferior or diaphragmatic

* **Four borders**



Heart chambers

↳ 4 chambers

Receiving chambers (Atria)

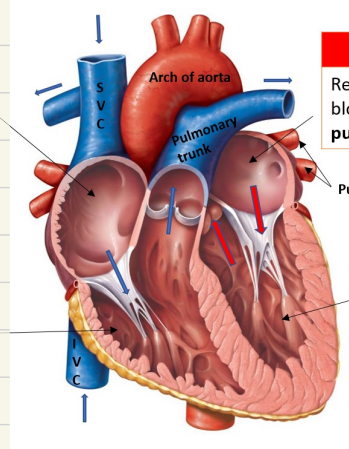
↳ Right atrium
↳ Left atrium

RIGHT ATRIUM
Receives deoxygenated blood from the body via SVC, IVC and coronary sinus

RIGHT VENTRICLE
Receives deoxygenated blood from right atrium via **Right atrioventricular orifice** and sends it to lungs via **Pulmonary trunk**.

Discharging (Ventricles)

* Right ventricle
* Left ventricle

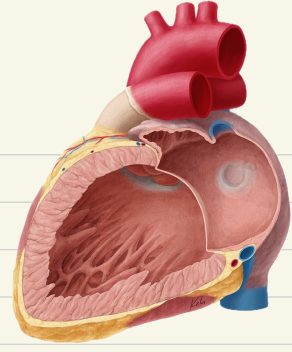
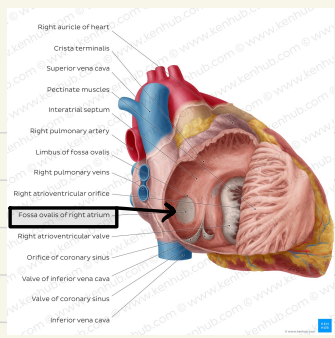
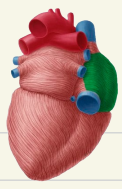


LEFT ATRIUM
Receives oxygenated blood from the lungs via **pulmonary veins**.

LEFT VENTRICLE
Receives oxygenated blood from left atrium via **Left atrioventricular orifice** and sends it to body via **aorta**.

Heart chambers

Right atrium

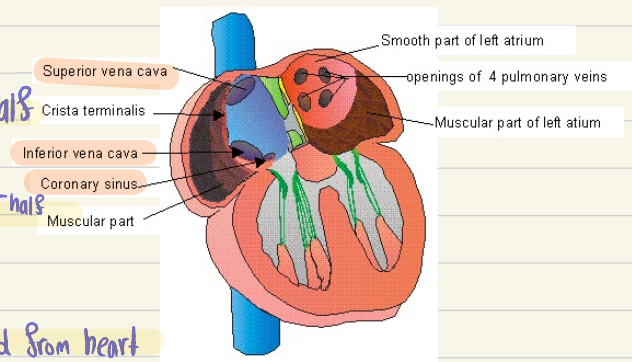


Smooth posterior Rough anterior

Septal wall: Separates Right atrium from left atrium, contains fossa ovalis which was the site of foramen ovale in fetus

openings into the right atrium

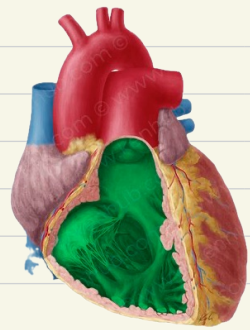
- * S.V.C: returns blood to heart from upper half of body
- * I.V.C: returns blood to heart from lower half of body
- * Coronary sinus: drains most of the blood from heart



* Right atrioventricular orifice guarded by Tricuspid valve

Right ventricle → Smooth outflow part called infundibulum leads to pulmonary artery

Communication → Right atrium & Pulmonary artery

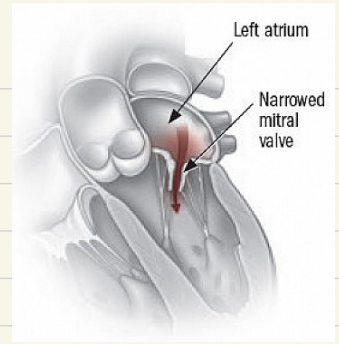
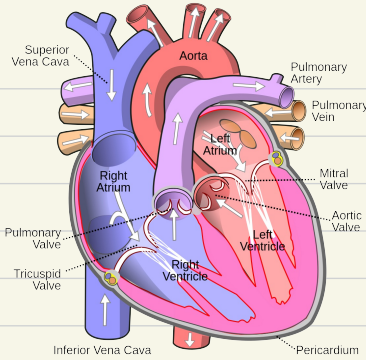


left atrium

openings →

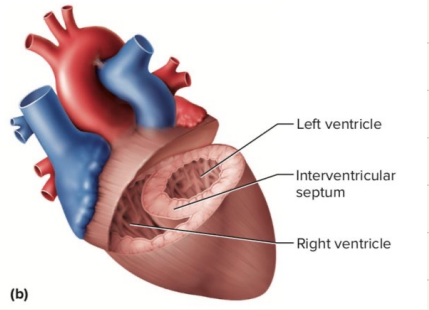
1 - four pulmonary vein

2 - left artioventricular orifice guarded by mitral valve



left ventricle

The thickness of wall is 3:1 that of right ventricle

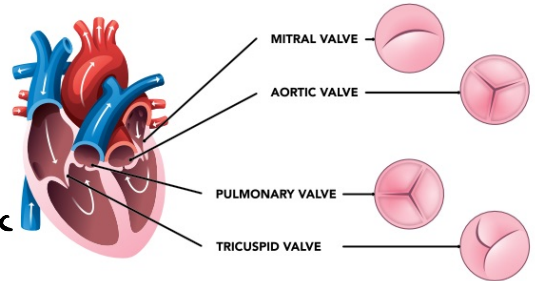
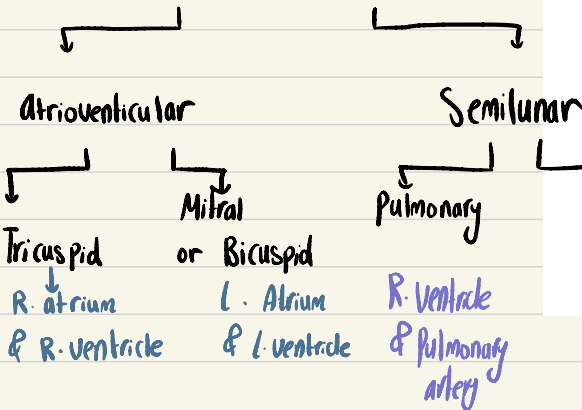


* Rough inflow & outflow - smooth vestibule leads into ascending aorta

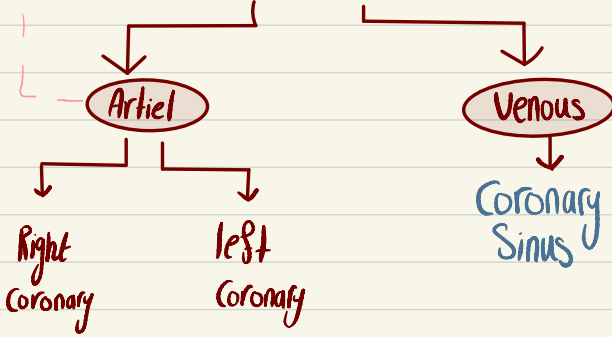
Communication → left atrium and Aorta

Valves of Heart

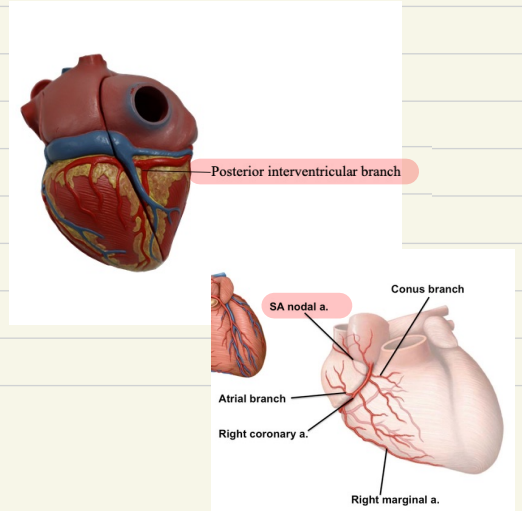
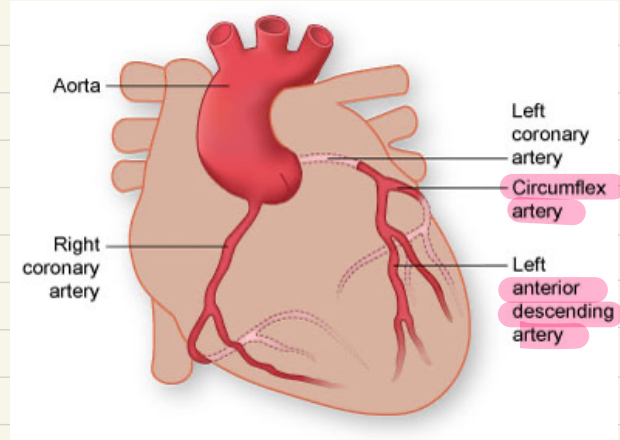
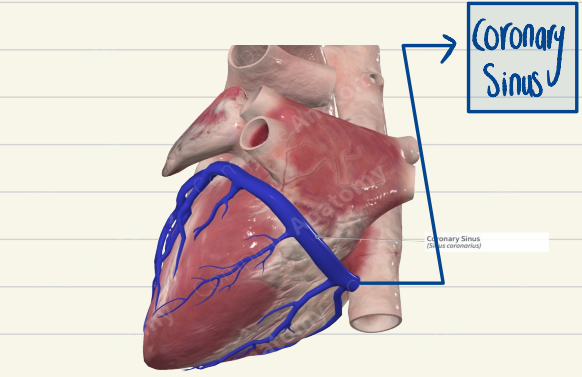
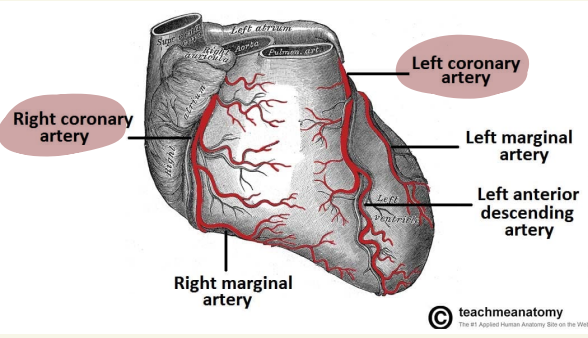
THE HEART'S VALVES



Blood supply of the heart



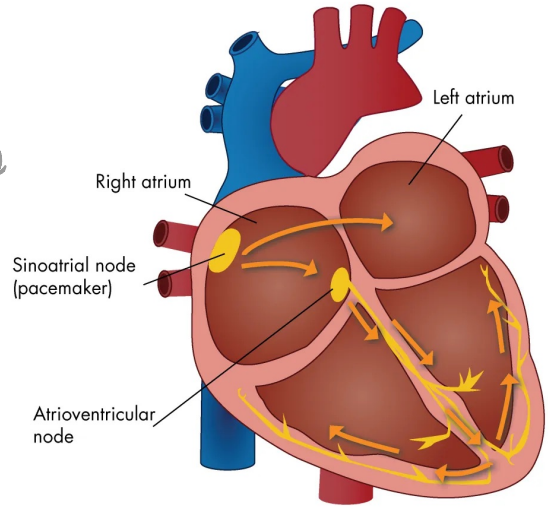
| Right Coronary | Left Coronary |
|---|--|
| arises from anterior aortic sinus of ascending aorta | arises from posterior aortic sinus of the ascending aorta |
| Important branches: 1- posterior interventricular 2- SA node branch | Important branches: 1- anterior interventricular 2- Circumflex |



Conducting system of the heart

Responsible for initiation & conduction of cardiac impulses

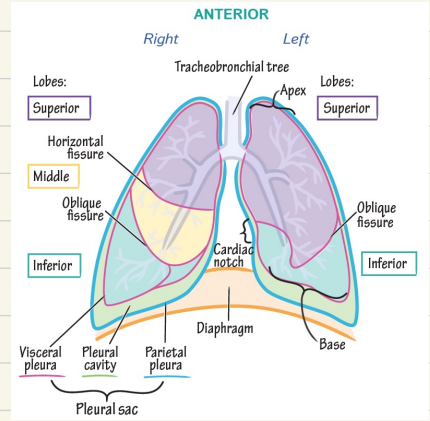
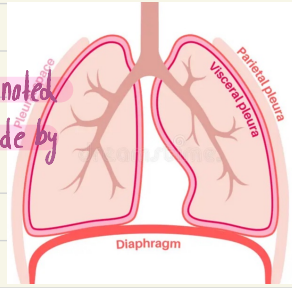
- 1- Sinoatrial node (SA node)
- 2- Atrioventricular (AV node)
- 3- Atrioventricular bundle (bundle of His)
- 4- Right branch of AV bundle
- 5- Left branch of AV bundle
- 6- Purkinje fibers



Pleura

Serous sac invaginated from its medial side by the lungs

Two pleural sacs are separated from each other by mediastinum



The pleura

Visceral layer

Covers the outer surfaces of the lungs and extends into interlobar fissure

Parietal layer

Lines thoracic wall, covers diaphragm and lateral aspect of mediastinum

Pleural cavity

Contains pleural fluid, permits the two layers to move on each other with friction

Nerve Supply

Parietal Pleura

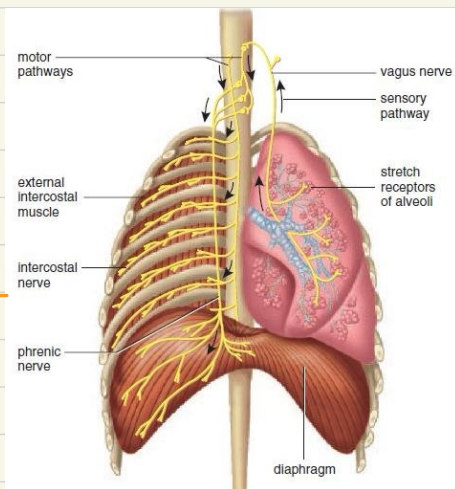
Supplied by somatic nerve
(intercostal nerves)

Visceral Pleura

Supplied by visceral
nerves (autonomic)

Sensitive to Temperature,
Pain, touch and pressure

Sensitive to
Stretch



The pleural cavity may be distended

Fluid → pleural effusion {hydrothorax}

Air → Pneumothorax

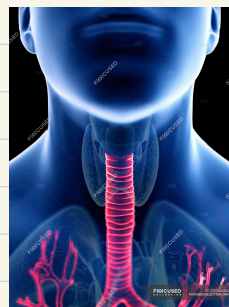
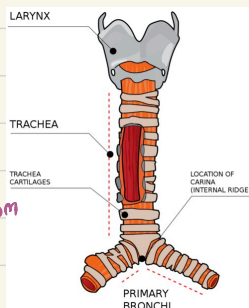
Blood → Haemothorax

Pus → Pyothorax

Lymph → chylothorax

Trachea

Cartilaginous and membranous tube conducting air from larynx to lungs



Beginning: at the level of 6th cervical vertebra

End: at the level of the sternal angle (opposite to the disc between T4 and T5)

The Trachea is divided into Right and Left Principle (main) bronchi

Trachea is kept patent by presence of U-shaped rings of hyaline cartilage

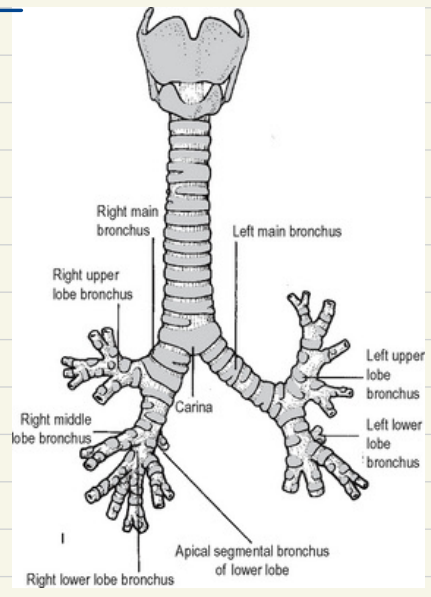
Right Principal bronchus

- * Shorter
- * wider
- * more vertical

* inhalation of foreign bodies into lower respiratory tract is common, especially in children

Left Principal bronchus

- * longer
- * narrower
- * more horizontal
- * less common

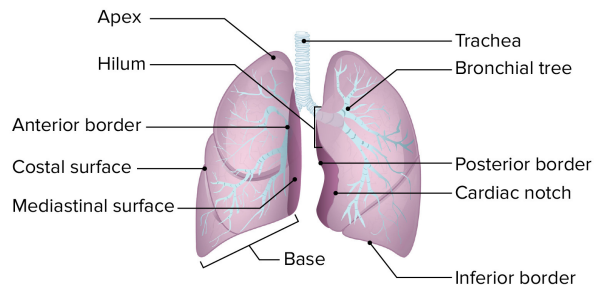
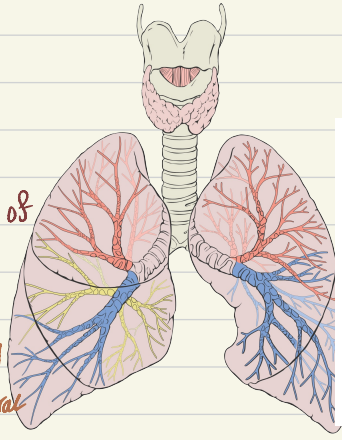


Lungs

essential organs of respiration

each lung is conical covered with visceral pleura

each lung has an apex, base, 3 borders (anterior-posterior & inferior) and 2 surfaces (costal & medial)



* Apex: blunt and project upward towards the neck for about 2.5 cm above clavicle

* Base: concave and related to diaphragm

* Costal surface: convex, related to ribs and costal cartilage

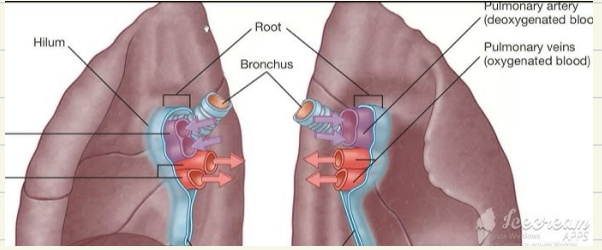
* Posterior: thick and lies beside vertebral column

* mediasternal surface: concave relates to mediastinum and contains the hilum

* anterior border: thin and overlaps the heart. Has a cardiac notch

Hilum

group of structures that enter or leave lung through hilum



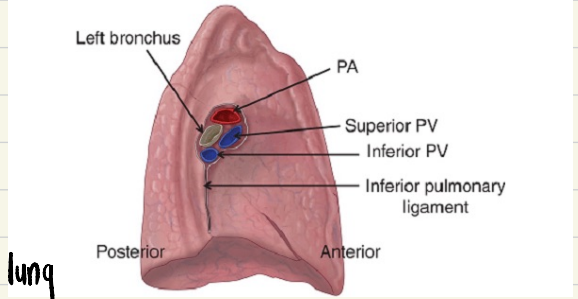
Content → *Bronchus

* Pulmonary artery

* Superior pulmonary vein

* inferior pulmonary vein

* vessels, nerves & lymphatics



difference between left & Right lung

Right

Left

* larger

* smaller

* 2 fissures oblique and horizontal

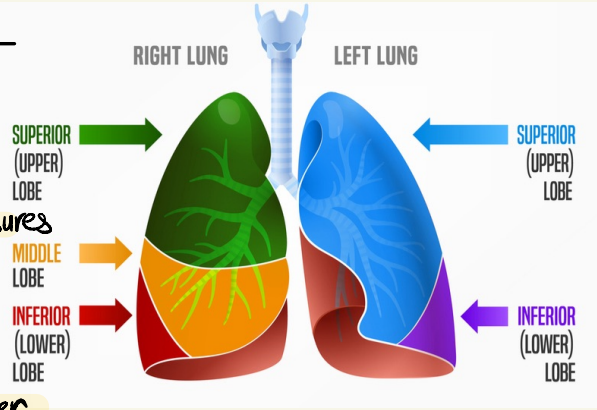
* oblique fissures only

* 3 lobes: upper, middle & lower

* Two lobes: upper & lower

* shorter

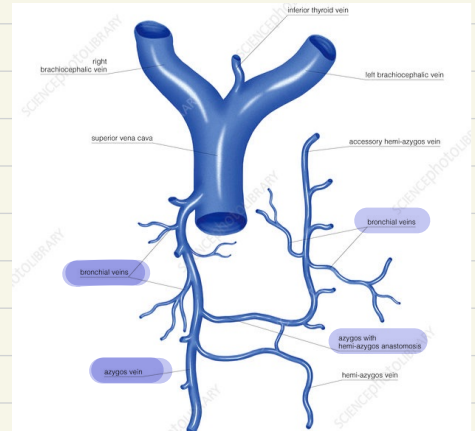
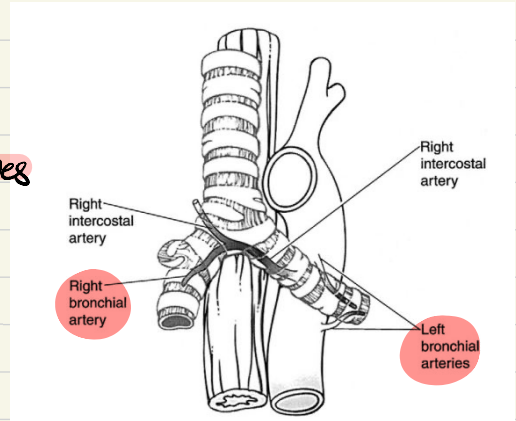
* taller



Blood supply of the lungs

The bronchi, the CT of the lung, and visceral pleura receive their blood supply from **Bronchial arteries**, which are branches of descending aorta

Bronchial veins → drain into azygos and hemiazygos



سبحانك اللهم وبحمدك اشهد
أن لا اله الا انت استغفرك
واتوب اليك