Respiratory system

Lung & Pleura

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By the end of this lecture you must know:

- Lung (shape, surfaces and borders).
- Contents of the root of the lung.
- Relations of mediastinal surface of the lung.
- Blood supply and nerve supply of the lung.
- Comparison between right and left lung.
- Parts of the pleura, blood supply and nerve supply of pleura.
- Surface anatomy of the lung and pleura.

THE LUNGS

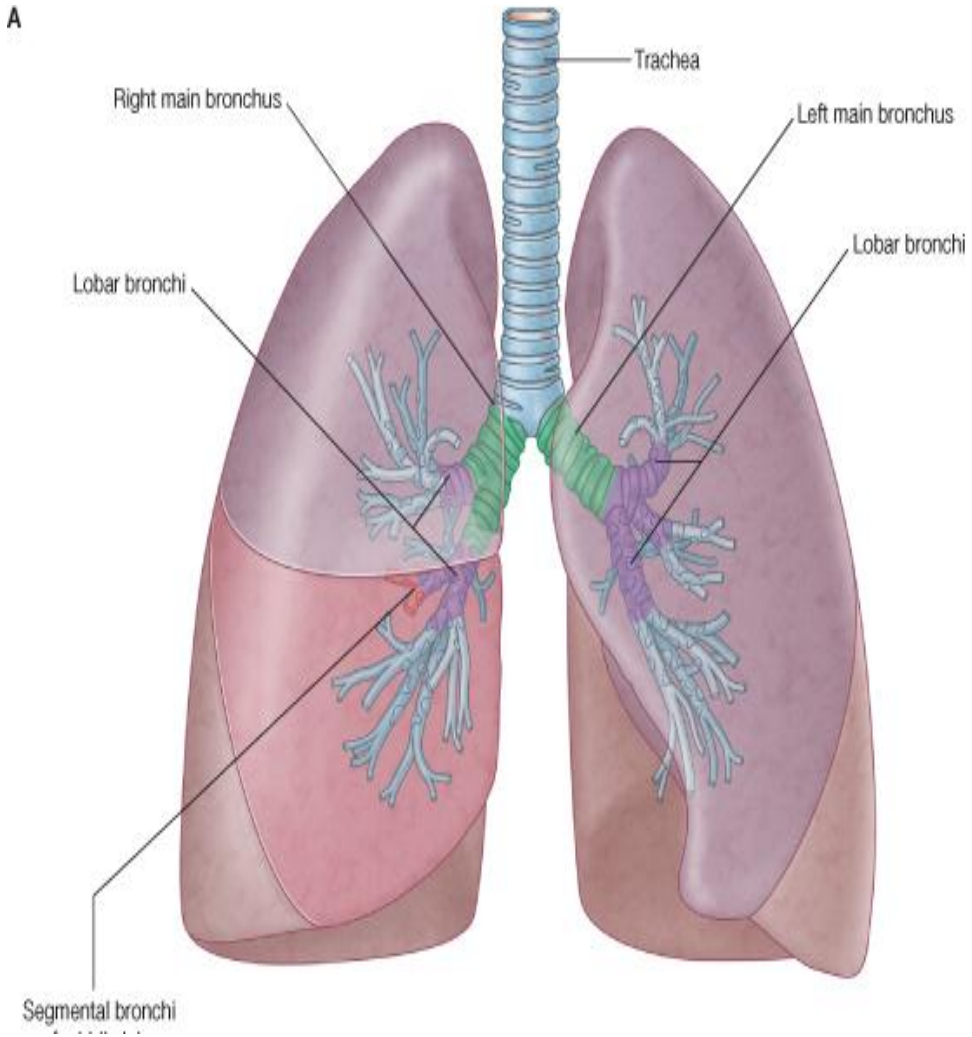
@ **Lungs are the chief respiratory organs.**

@ **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?



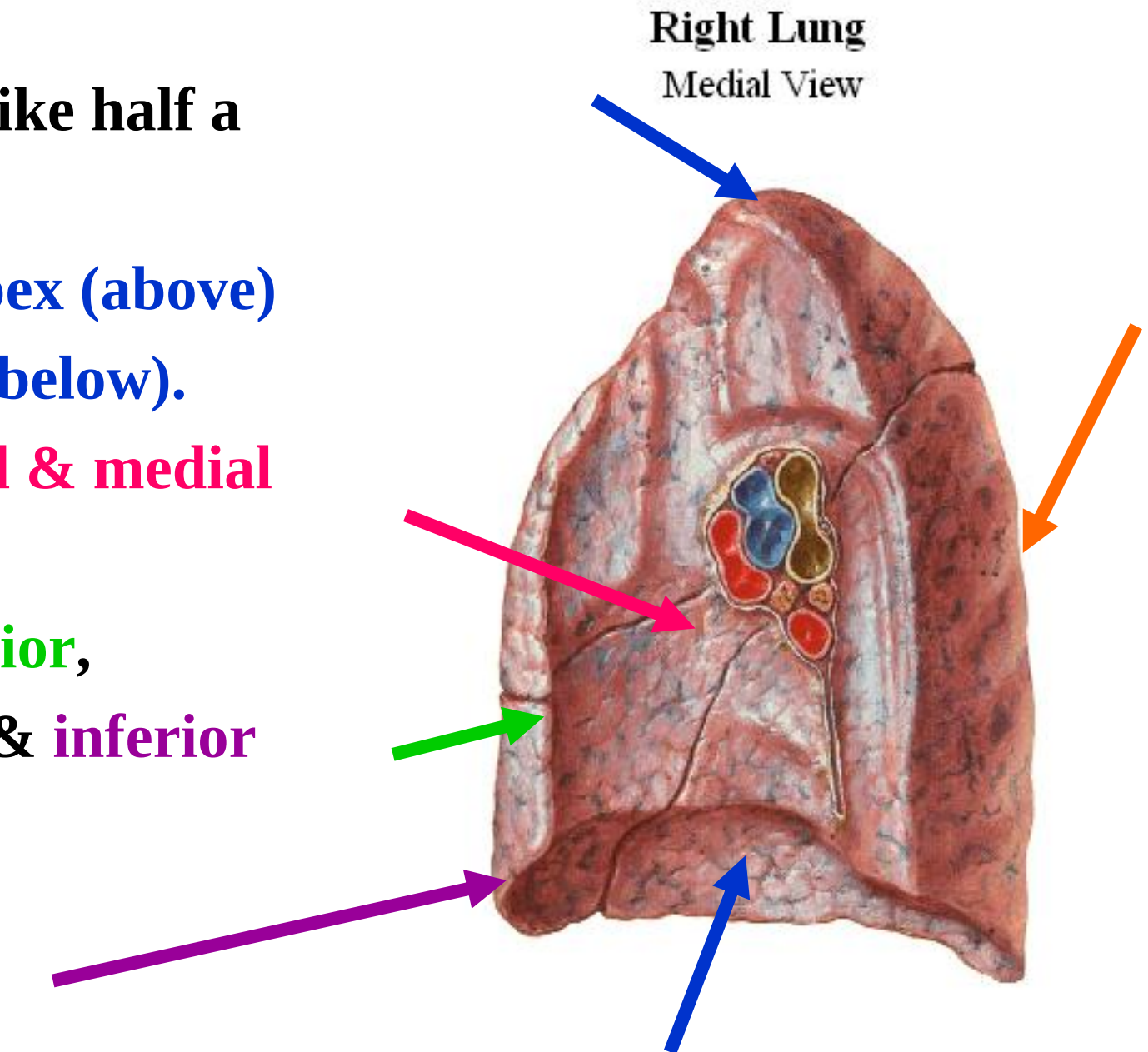
Shape, Surfaces & Borders of lungs

@ Shape→ like half a cone.

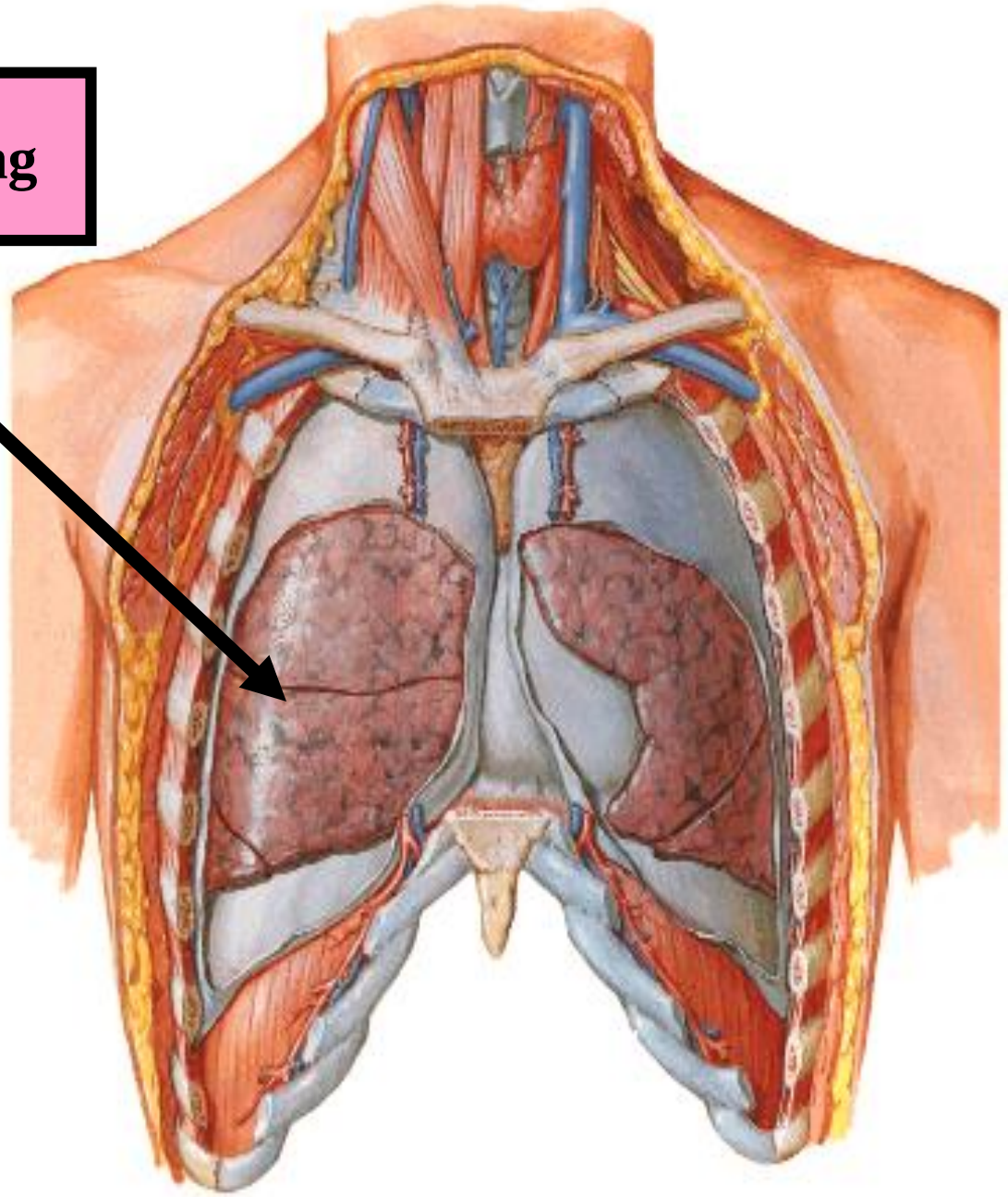
@ Has an apex (above) & a base (below).

@ Has costal & medial surfaces.

@ Has anterior, posterior & inferior borders.

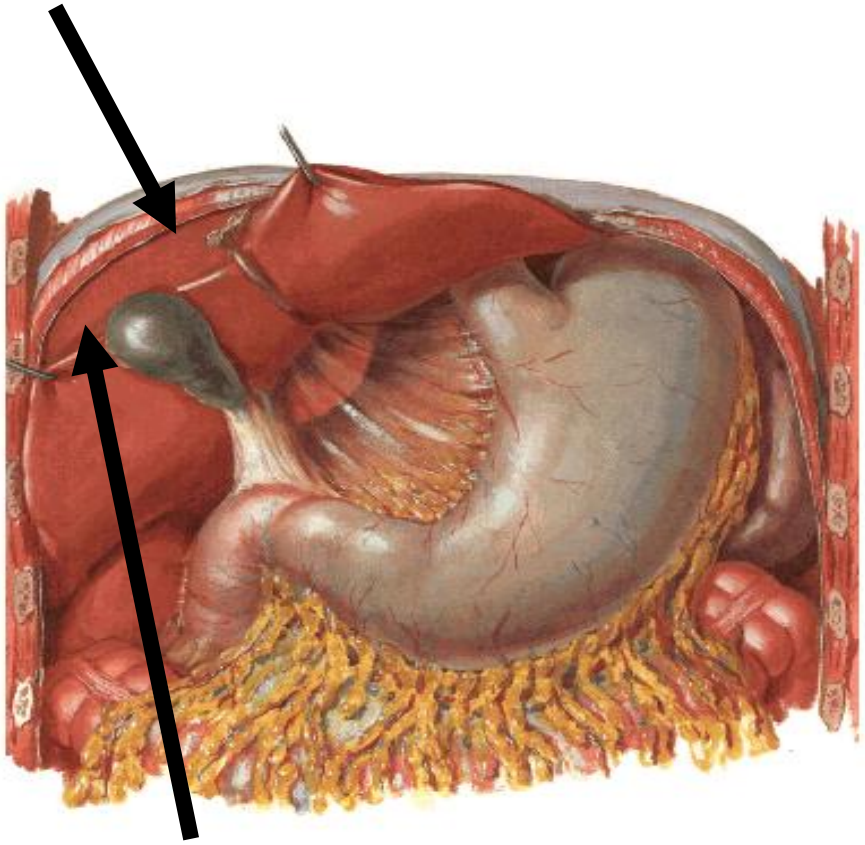


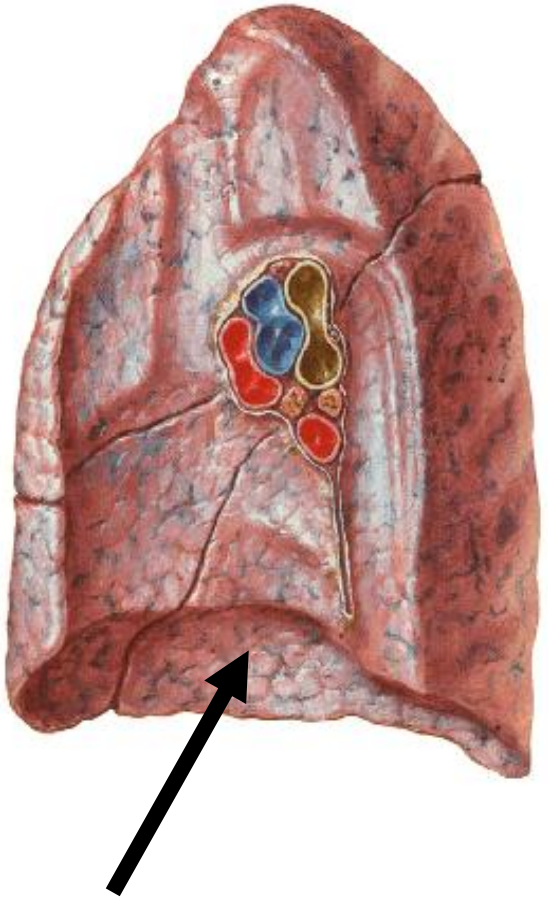
Costal surface of lung



Base of right lung

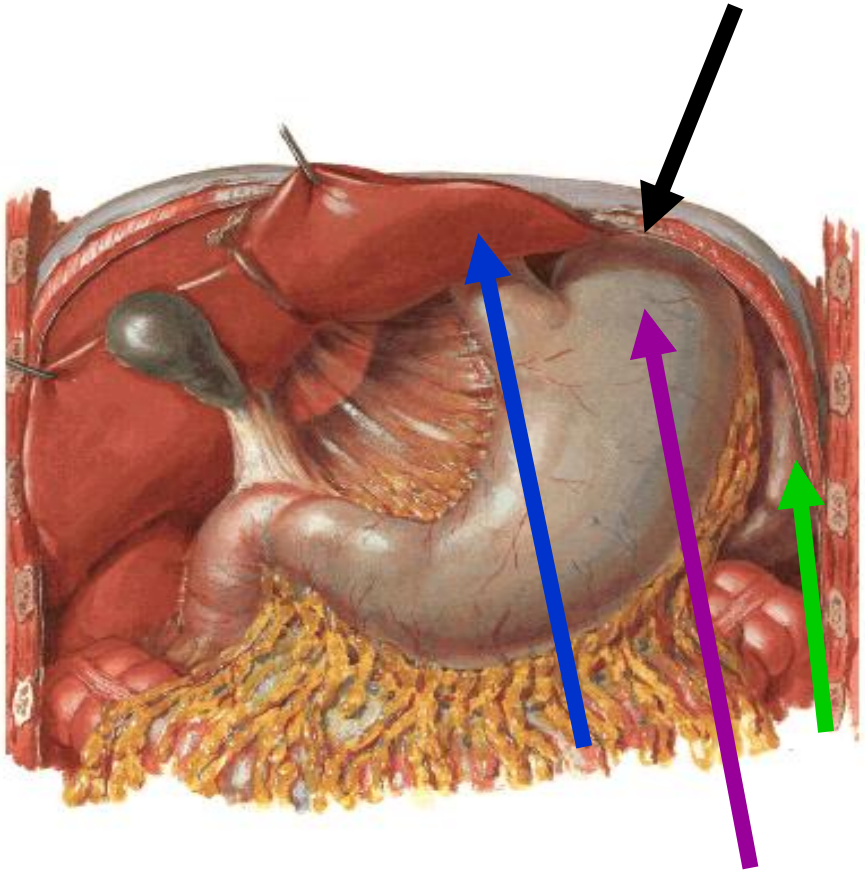
- **More concave on right lung which lies over right ½ of diaphragm that separates right lung from right lobe of liver.**

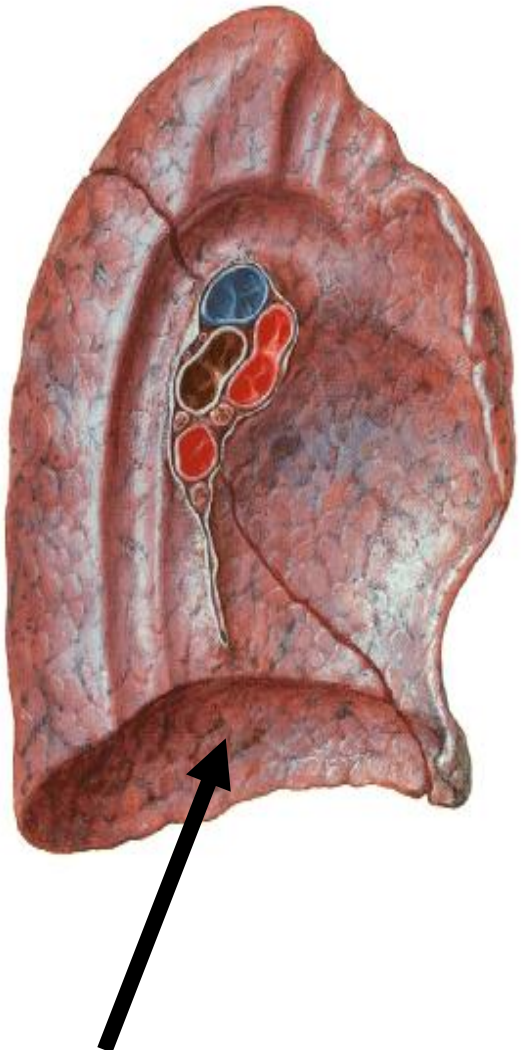




Base of left lung

- **Less concave on left lung which lies over left ½ of diaphragm that separates left lung from left lobe of liver, stomach & spleen.**



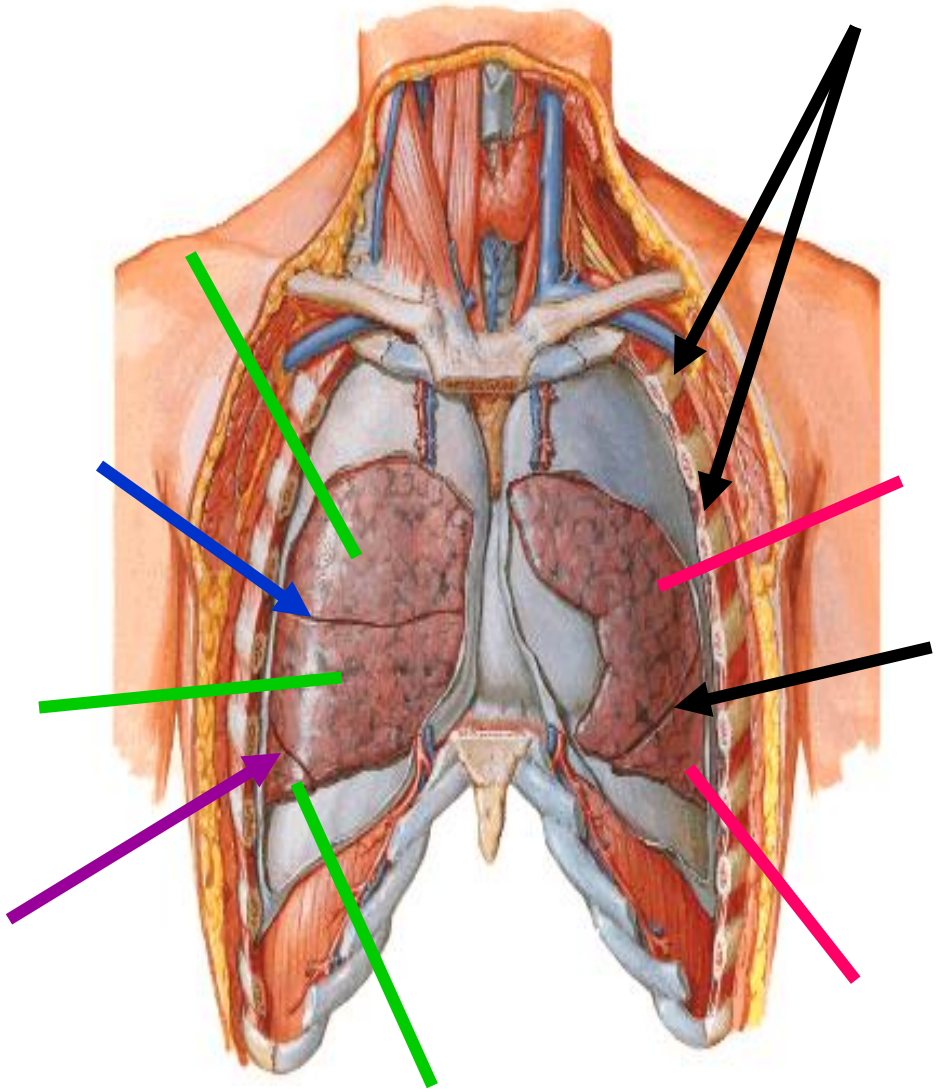


Costal surface of lung

@ Convex & related to ribs & intercostal spaces.

@ 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.

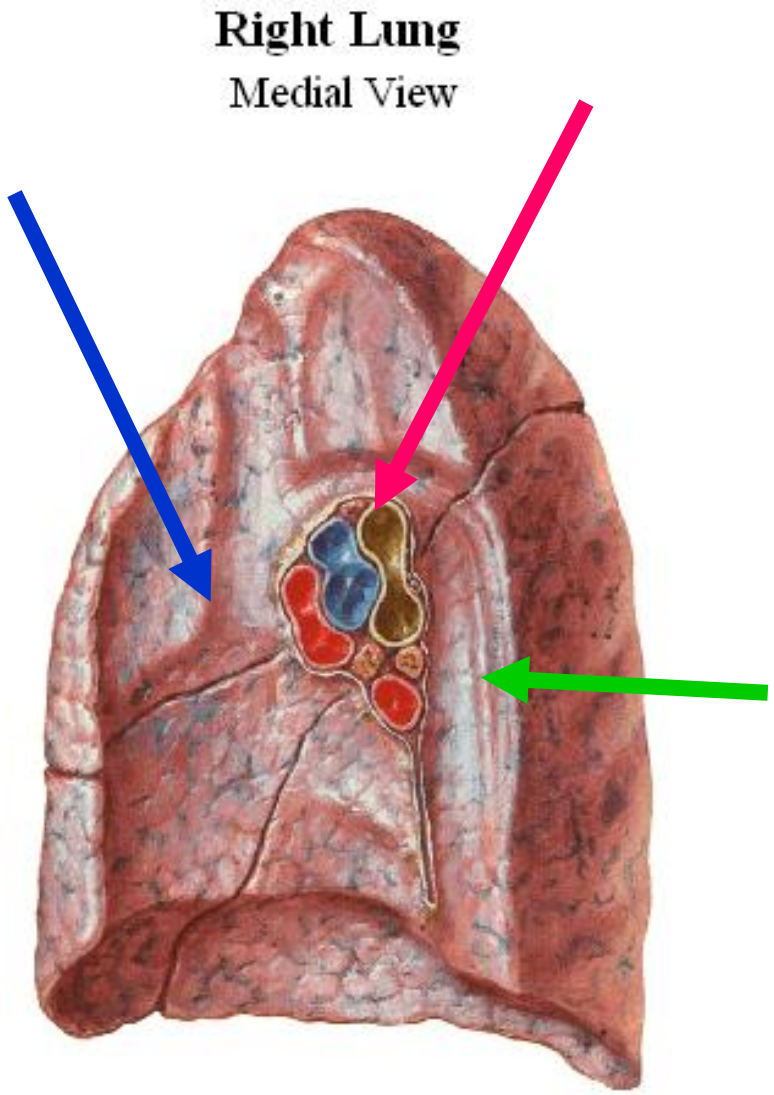


Medial surface of lung

@Contains hilum of lung (area which gives passage to structures forming root of lung).

@Area infront of hilum→ is anterior or mediastinal part.

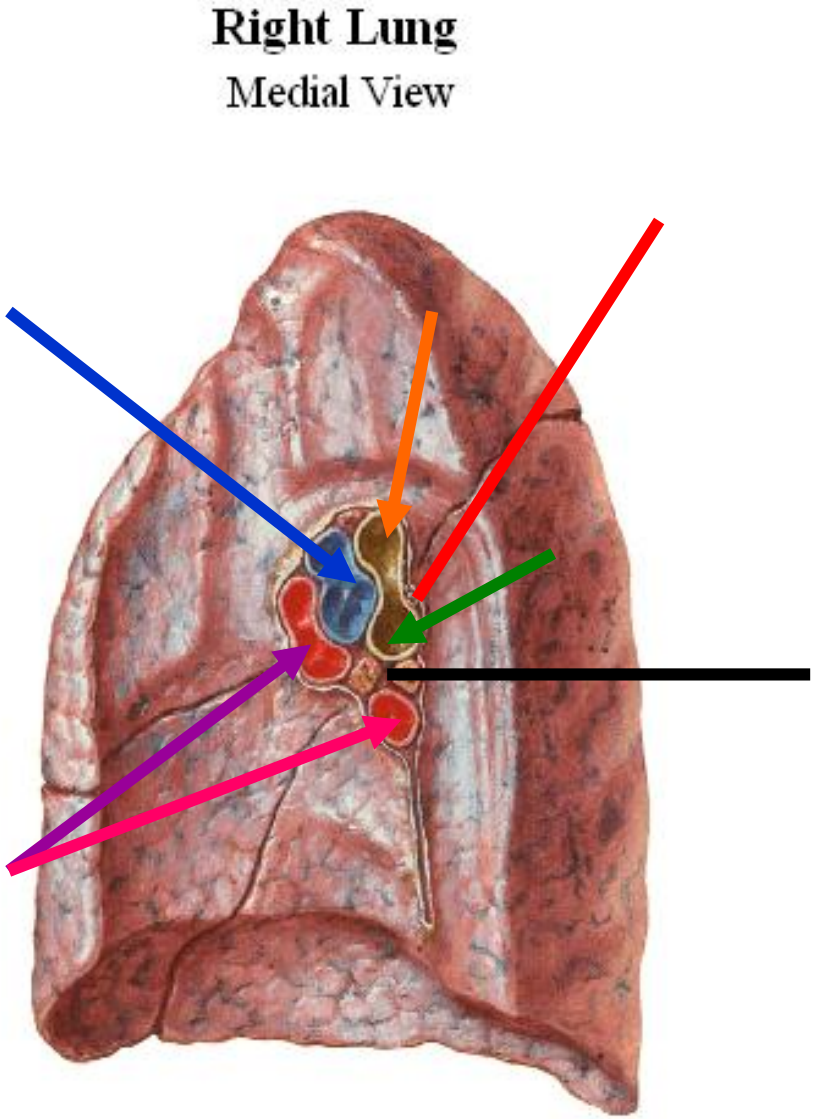
@Area behind hilum→ is posterior or vertebral part.



Root of right lung

@Contains 3 major structures → two bronchi(eparterial & hyparterial), one pulmonary artery & 2 pulmonary veins (upper& lower).

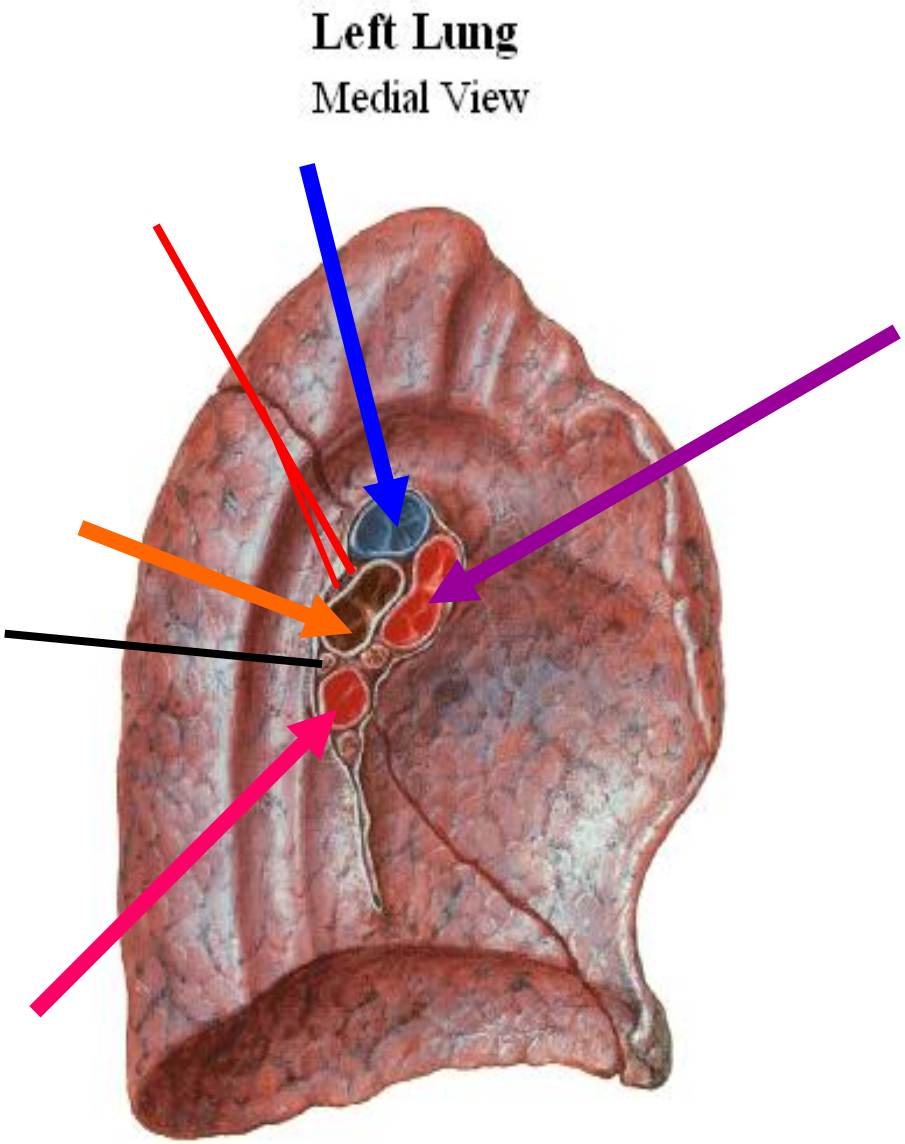
@Contains 3 minor structures → bronchial vessels, pulmonary plexuses & bronchopulmonary LNs.



Root of left lung

@Contains 3 major structures → one main bronchus , one pulmonary artery & 2 pulmonary veins (upper& lower).

@Contains 3 minor structures → bronchial vessels, pulmonary plexuses & bronchopulmonary LNs.



Relations of mediastinal surface of right lung

@ Has impressions & grooves made by structures on right side of mediastinum.

@ Pericardial impression formed by right atrium.

@ Groove for IVC.

@ Groove for SVC.

@ Ascending aorta & remains of thymus.

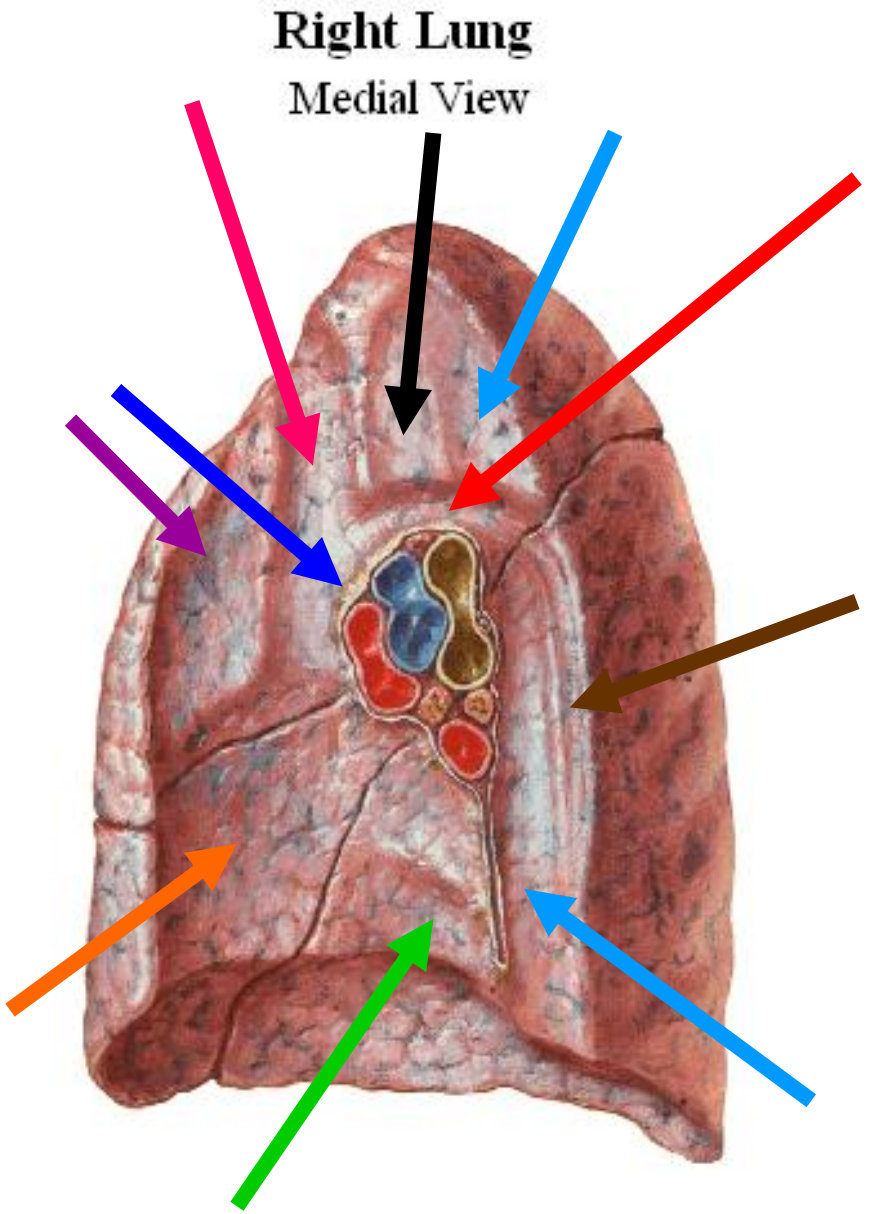
@ Arch of azygous.

@ Right brachiocephalic vein & right phrenic nerve.

@ Trachea & right vagus.

@ Oesophagus.

@ Azygous vein.



Relations of mediastinal surface of left lung

@ Has impressions & grooves made by structures on left side of mediastinum

@ Pericardial impression formed by Lt. ventricle.

@ Groove for arch of aorta.

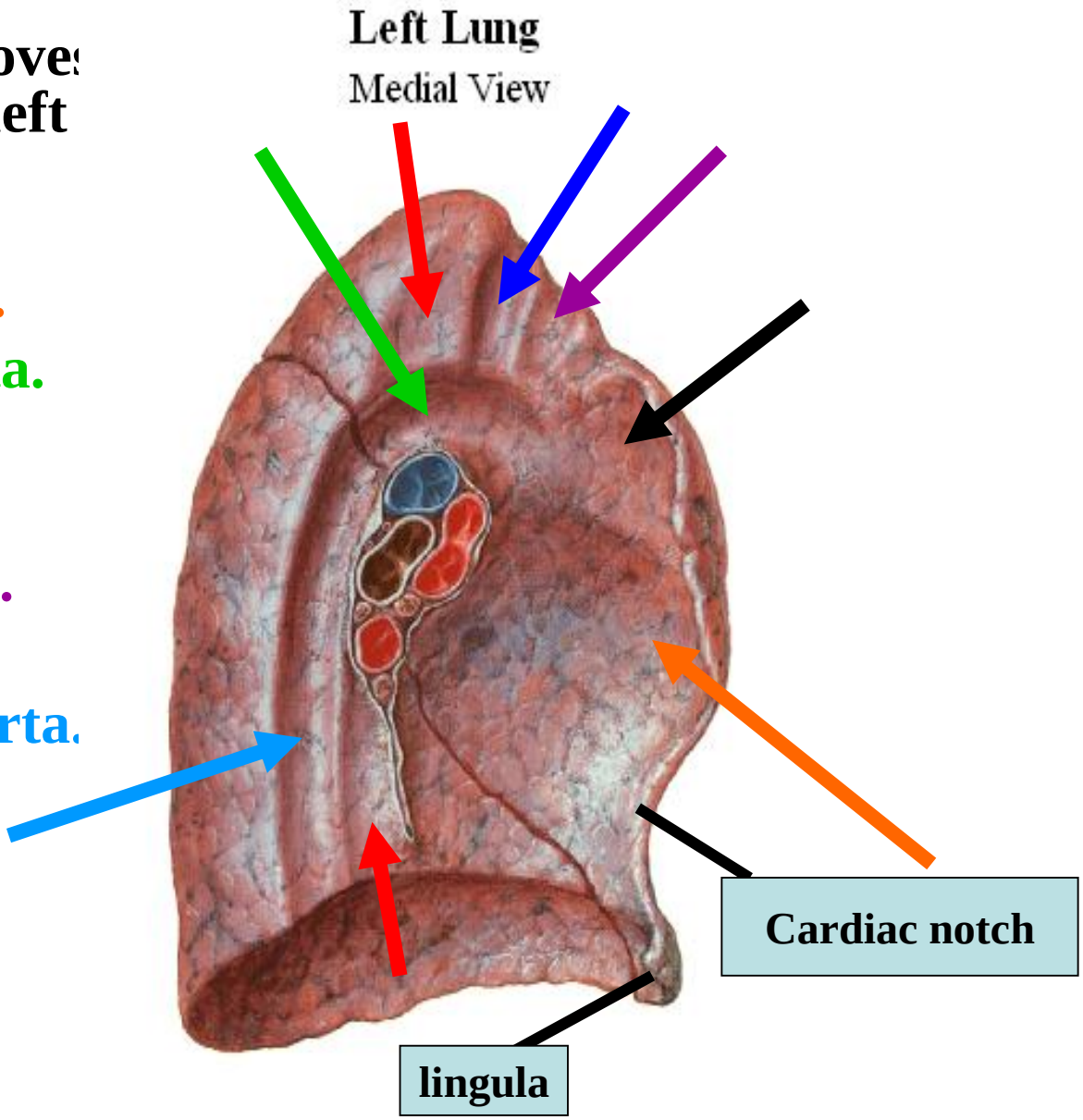
@ Oesophagus.

@ Left subclavian artery.

@ Left common carotid A.

@ Remains of thymus.

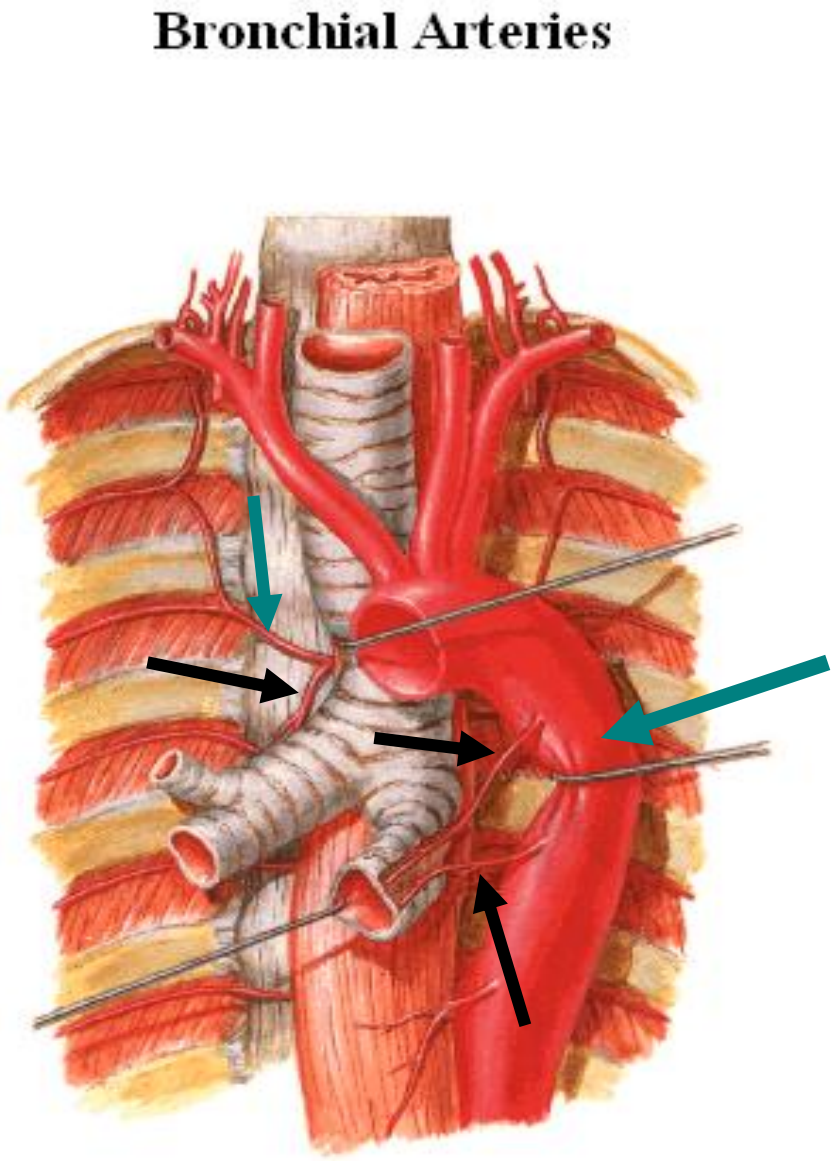
@ Descending thoracic aorta.



Arterial supply of lungs

@Right lung→ one bronchial artery from right 3rd posterior intercostal artery.

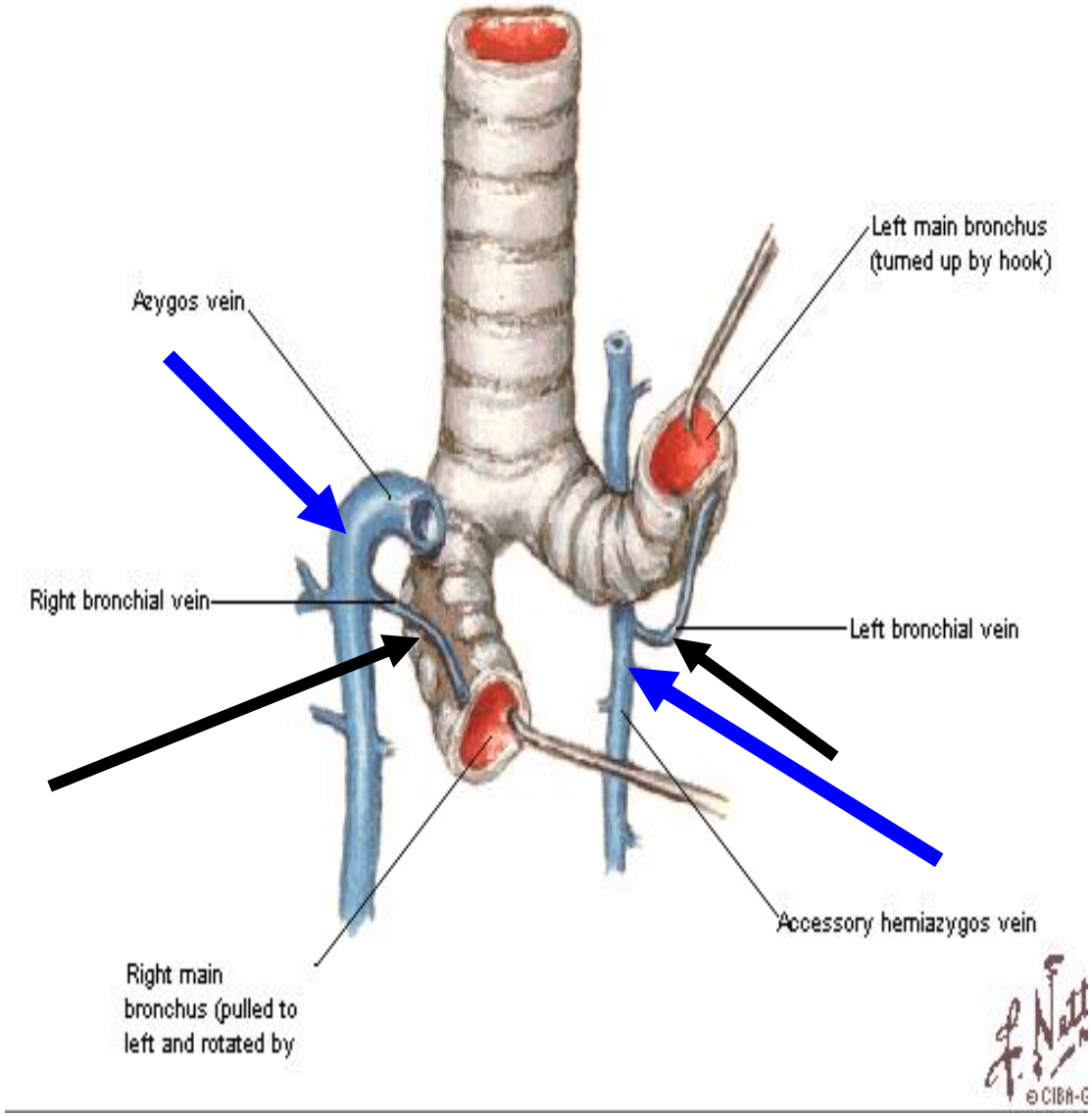
@Left lung → 2 bronchial arteries; superior & inferior from descending thoracic aorta.



Venous drainage of lungs

@Right bronchial vein→ ends in azygos vein.

@Left bronchial veins →end in accessory (sup) hemiazygos vein.



Lymphatic drainage of lung

@Intrapulmonary

LNs.→

bronchopulmonary

LNs. →

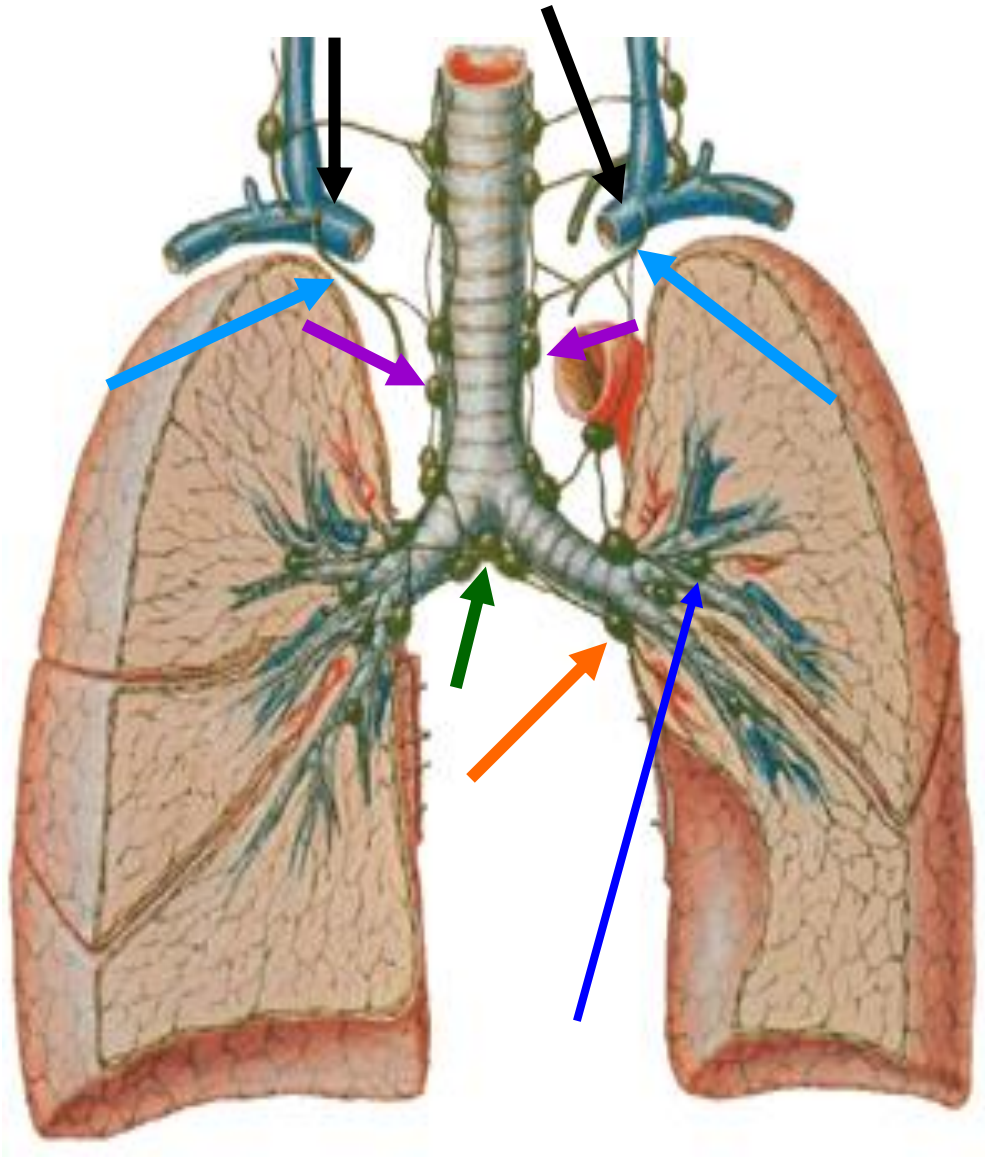
tracheobronchial

LNs.→ paratracheal

LNs.→ mediastinal

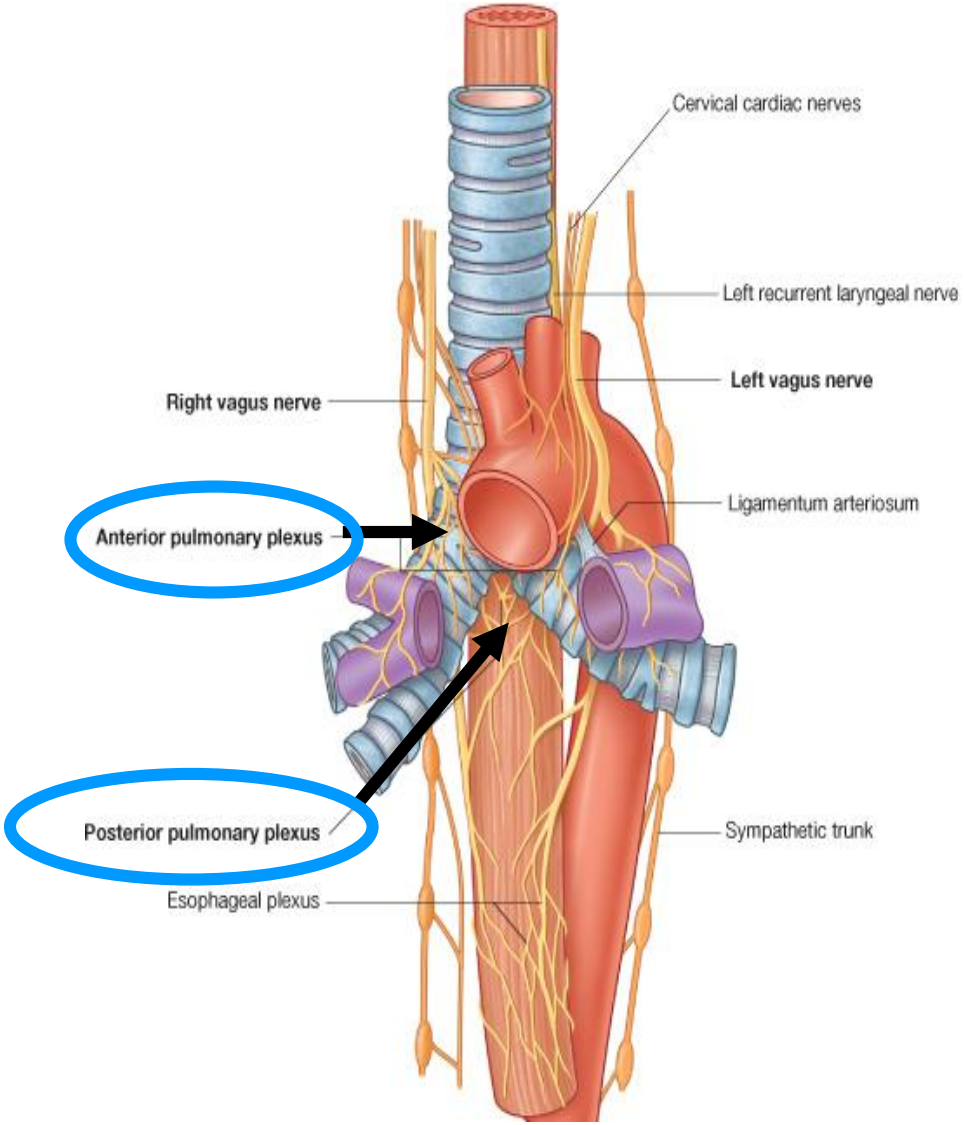
lymph trunk→

brachiocephalic vein.



Nerve supply of lungs

@Sympathetic & parasympathetic innervation by the anterior and posterior pulmonary plexuses.

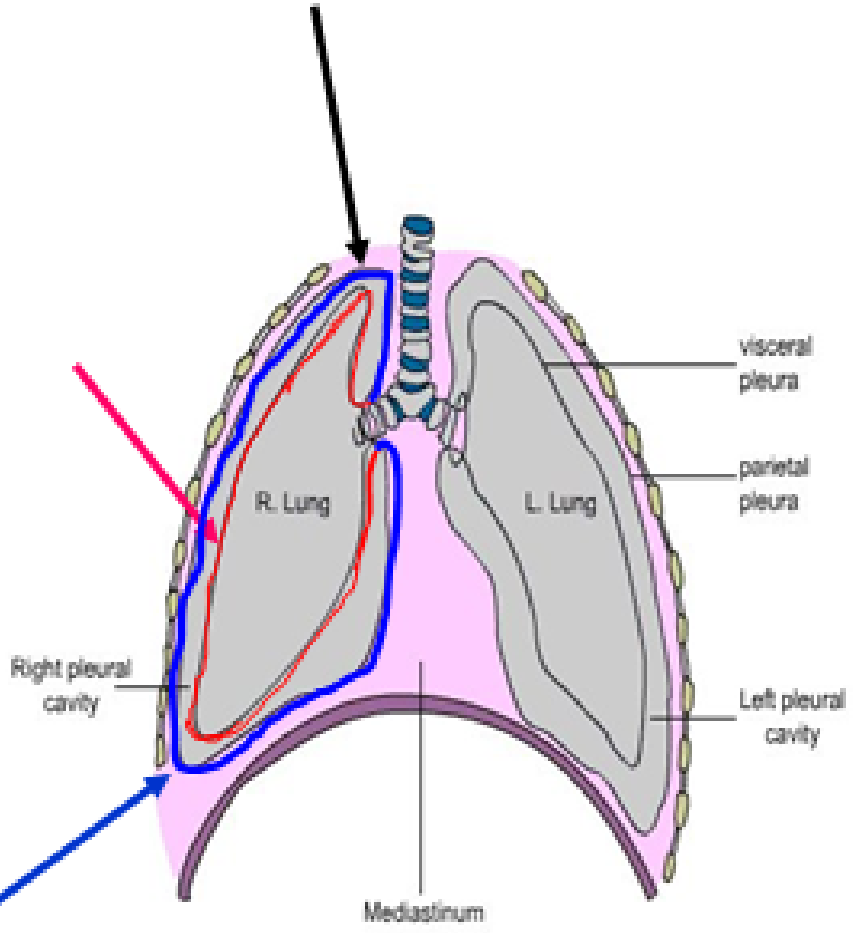


Pleura

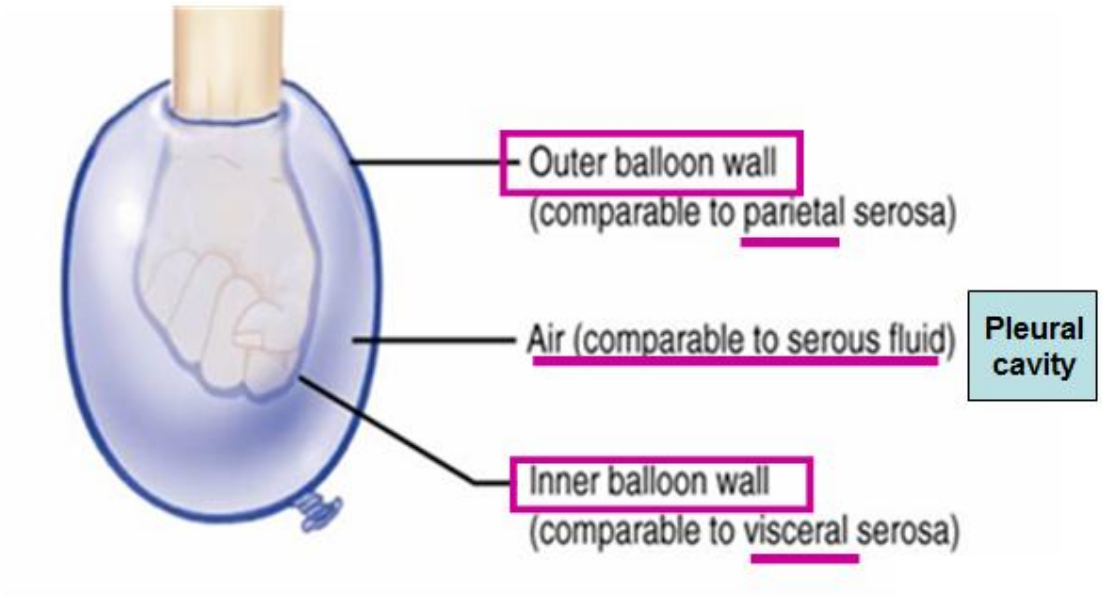
@It is a completely closed sac invaginated by the lung from its medial aspect.

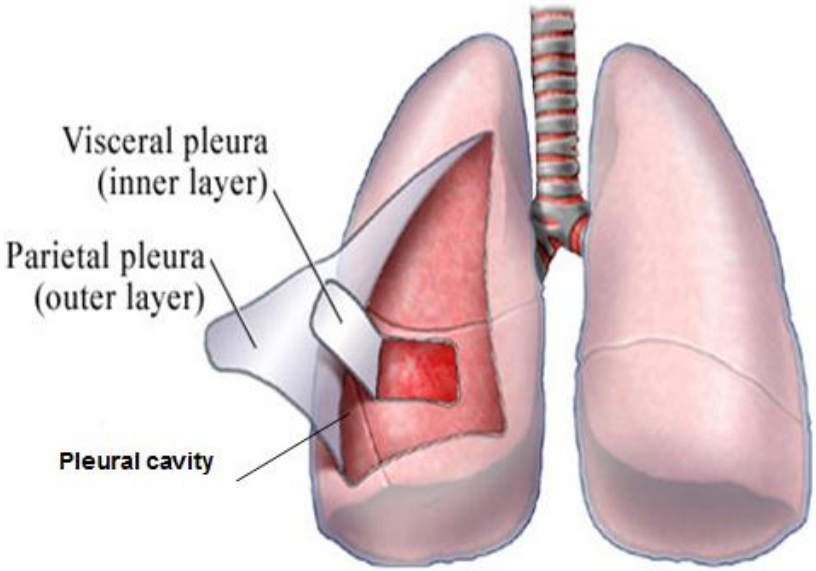
@Part of pleura covering the lung→ visceral pleura.

@Part of pleura lining thoracic wall→ parietal pleura.



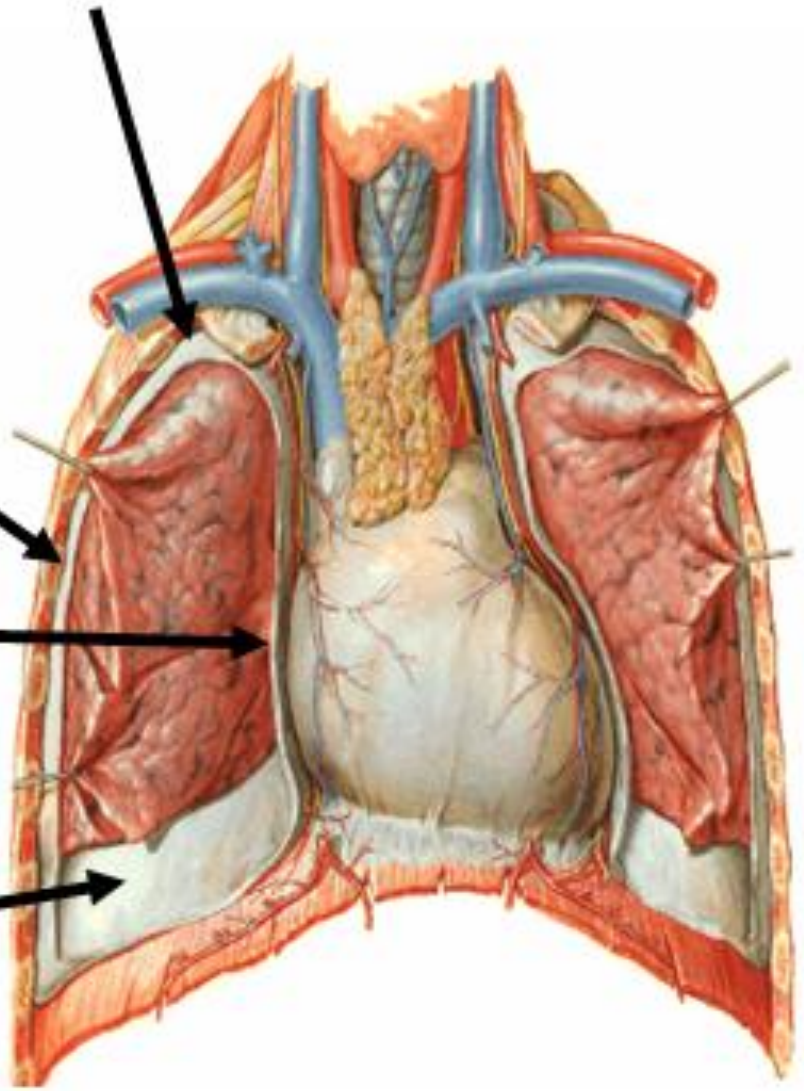
Lung is like the hand pushing into the balloon





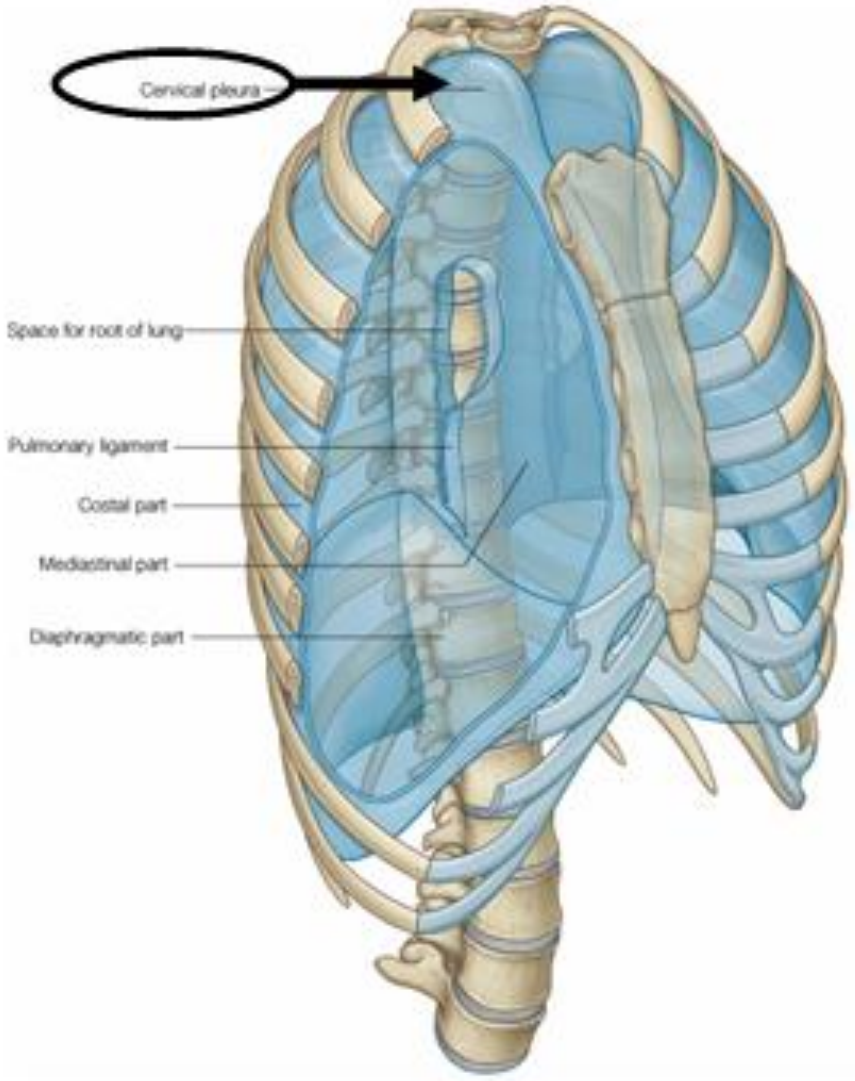
@ Subdivisions of parietal pleura:

1. Cervical pleura
2. Costal pleura.
3. Mediastinal pleura.
4. Diaphragmatic pleura.



Subdivisions of Parietal Pleura

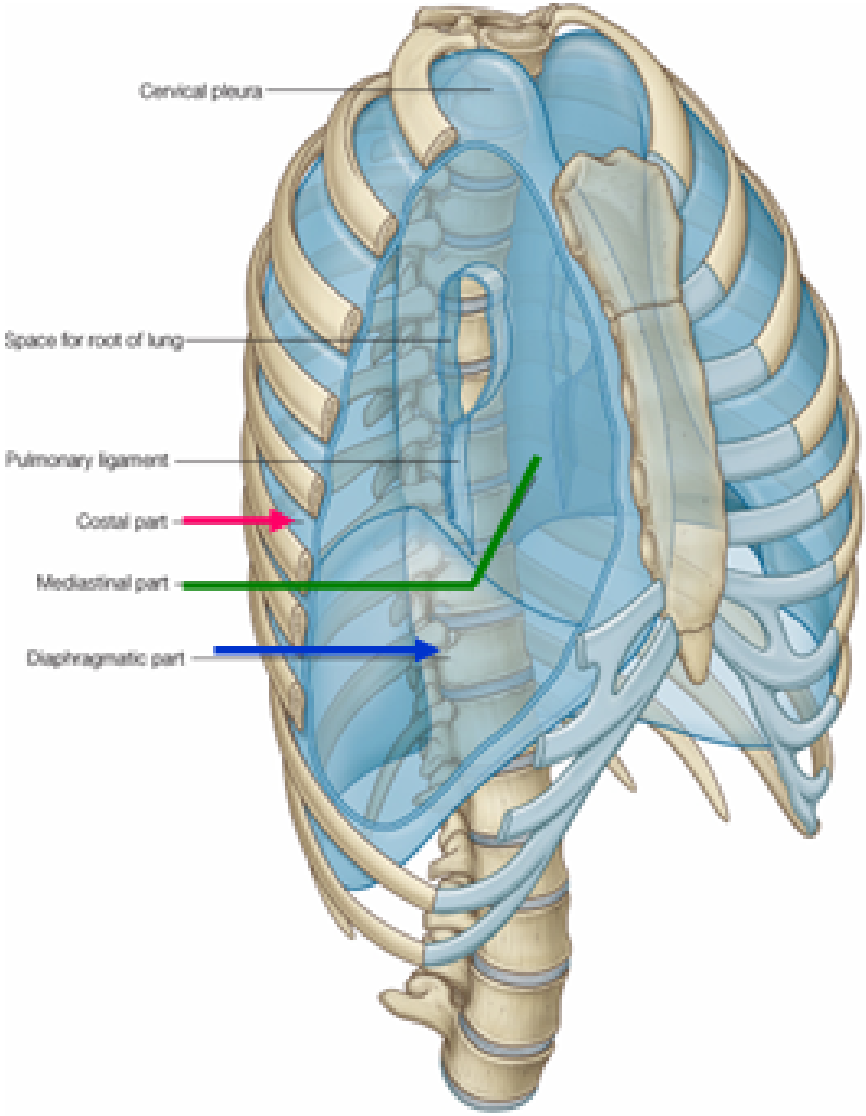
1. **Cervical Pleura** → part of parietal pleura bulging up through the thoracic inlet into root of neck.



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.

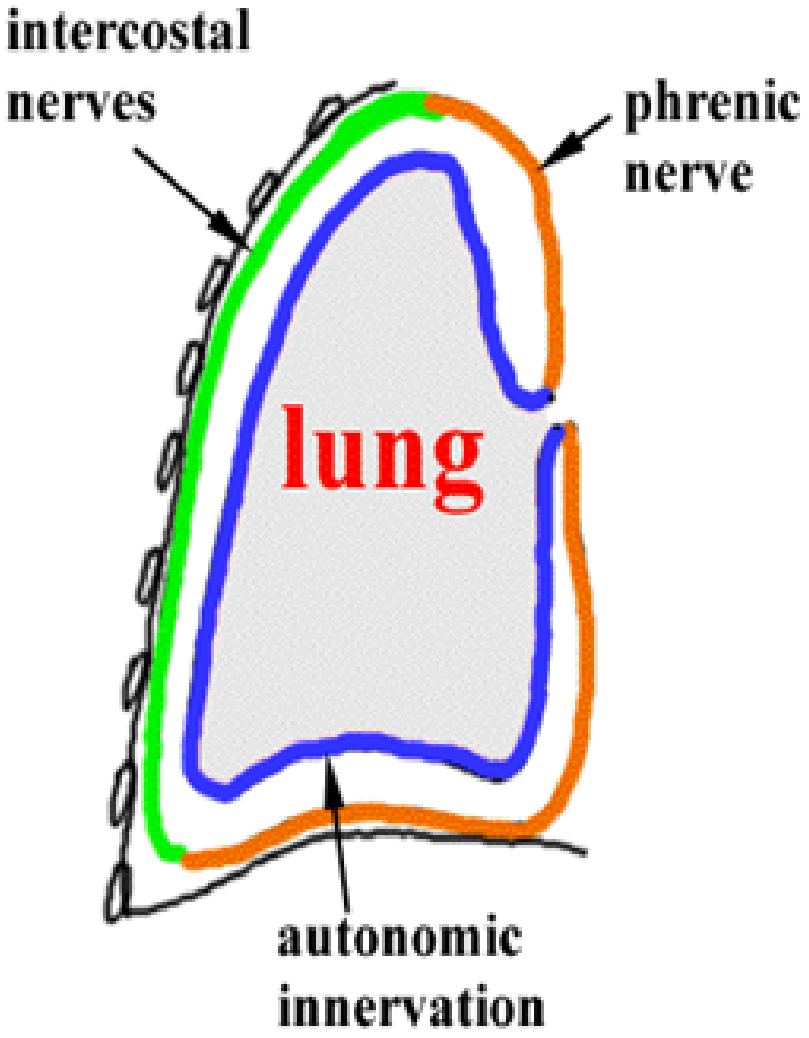


Nerve supply of pleura

@Parietal pleura is highly sensitive to pain.

@Visceral pleura is not sensitive to pain.

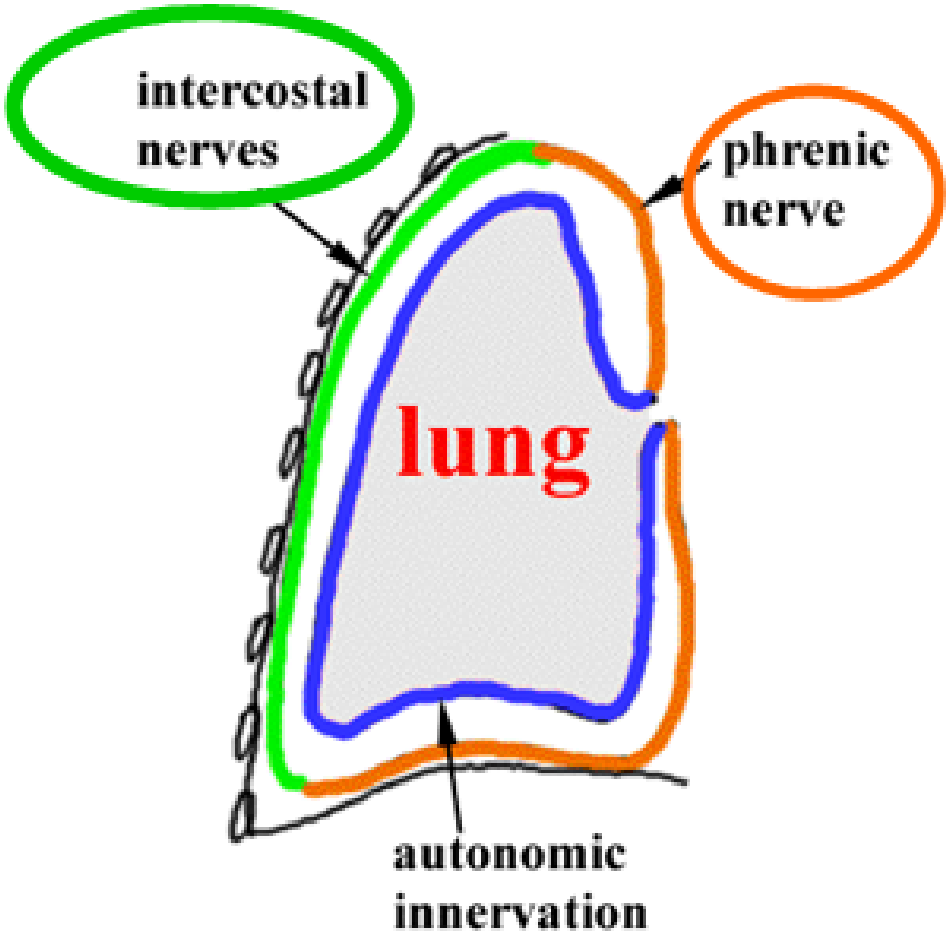
@Visceral pleura is supplied by autonomic nerve plexuses.



Nerve supply of pleura

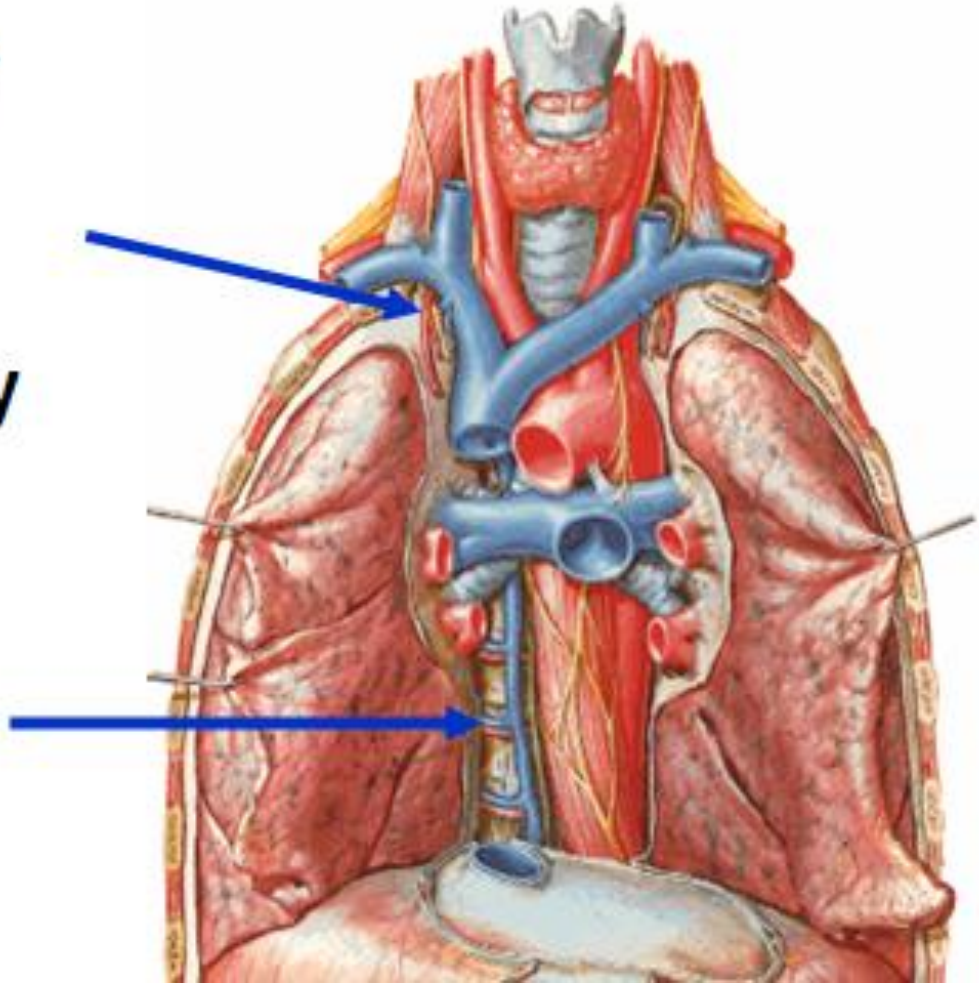
@Costal pleura & peripheral part of diaphragmatic pleura → are supplied by intercostal nerves.

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



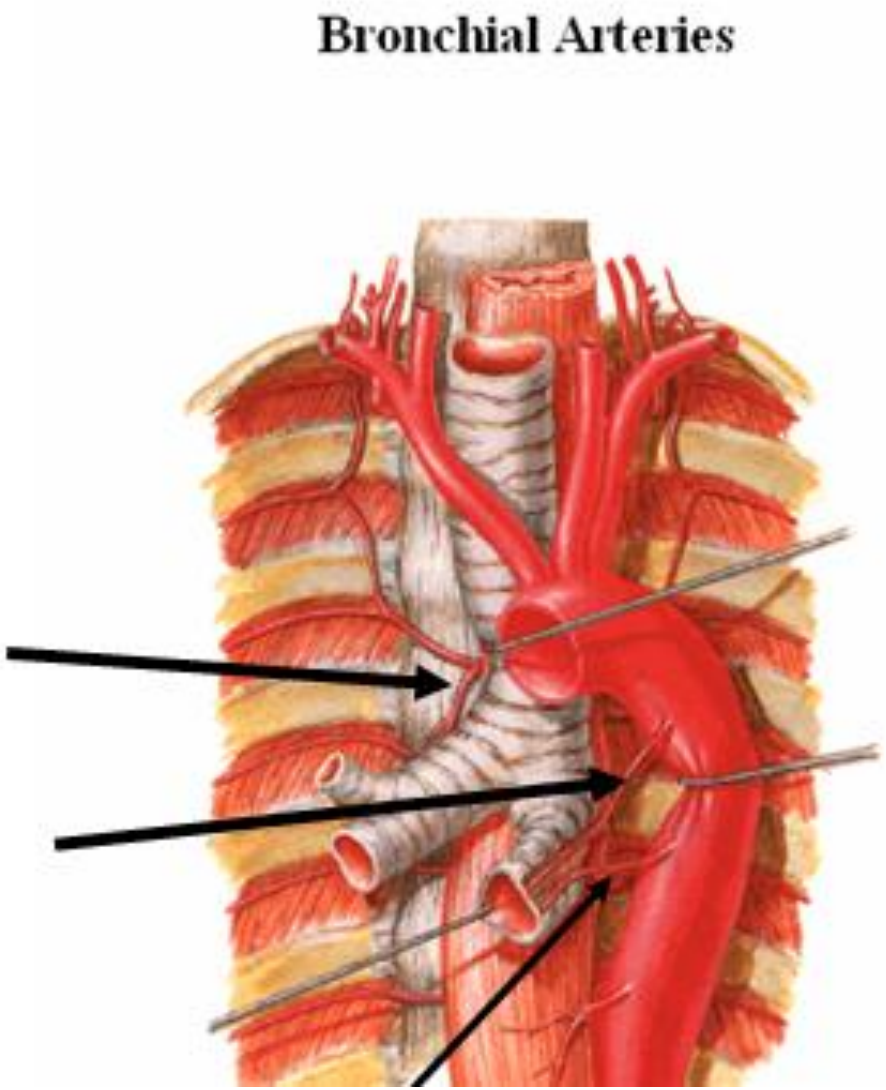
Blood Supply of Pleura

@Parietal pleura → supplied by intercostal & internal mammary (thoracic) vessels.



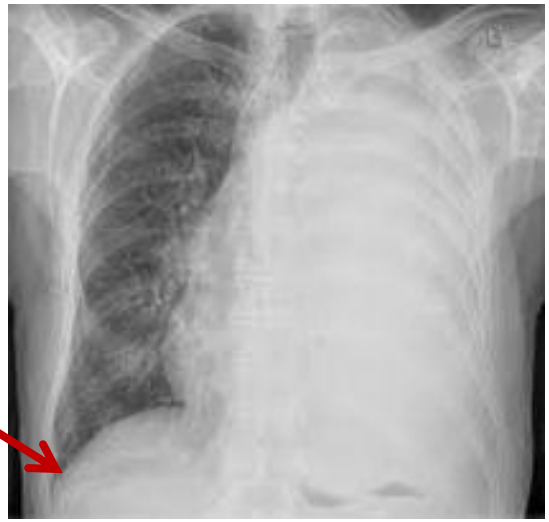
Blood Supply of Pleura

@Visceral Pleura → supplied by bronchial vessels.

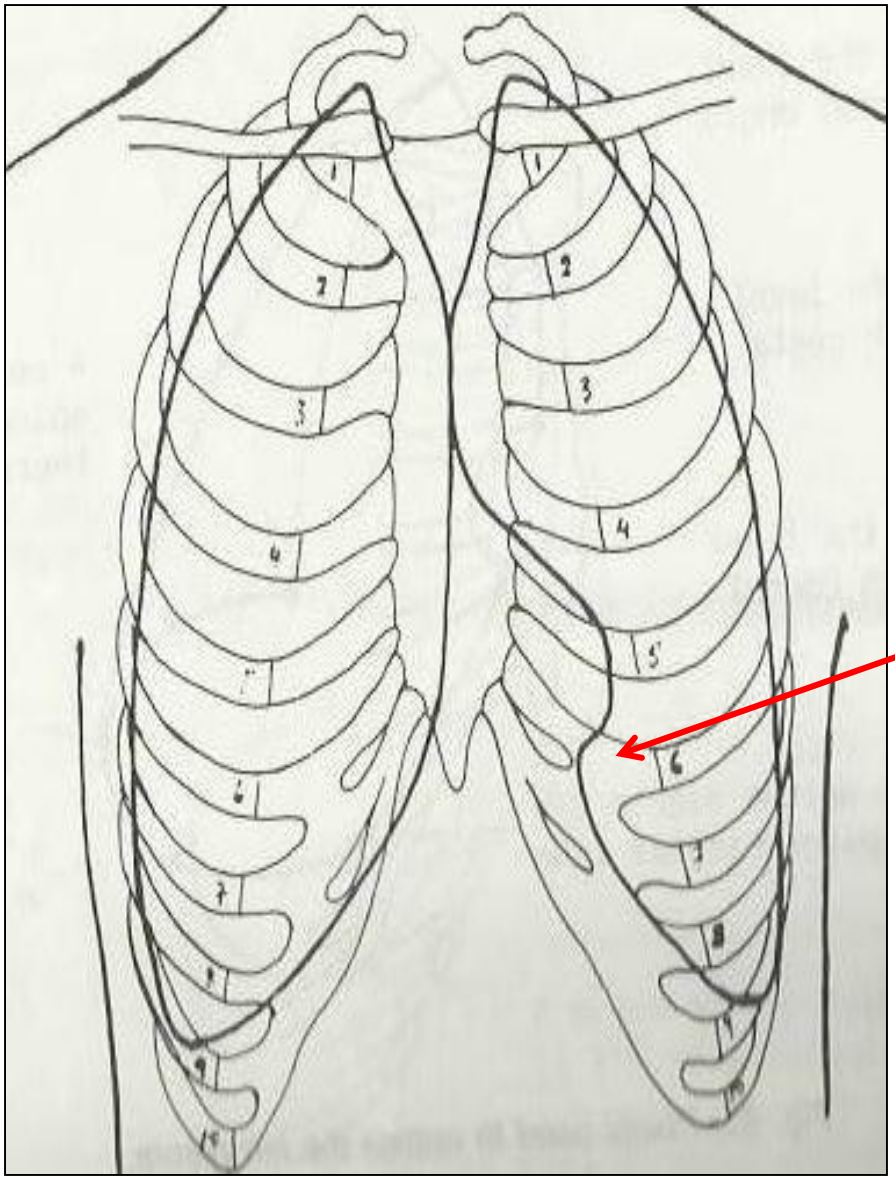


Clinical importance

- **-Accumulation of fluid in the pleural cavity is called pleural effusion. When the patient stand up the fluid accumulate in the costodiaphragmatic recess (angle) so the obliteration of the costodiaohragmatic angle is a demarcated sign in plain chest X-ray.**
- **Accumulation of Air in the pleural cavity is called pnemothorax.**
- **For survival of pnemothorax the intercostal tube (chest tube) should be inserted in the upper border of 4th or 5th rib in the anterior or the midaxillary line to avoid injury of neurovascular bundle(intercostal VAN).**



SUFACE ANATOMY OF PLEURA



Apex:

- lies one inch above the medial 1/3 of the clavicle.

Left pleura:

- The anterior margin extends from sternoclavicular joint to the level of 4th costal cartilage, then deviates for about 1 inch to left at 6th costal cartilage to form cardiac notch.

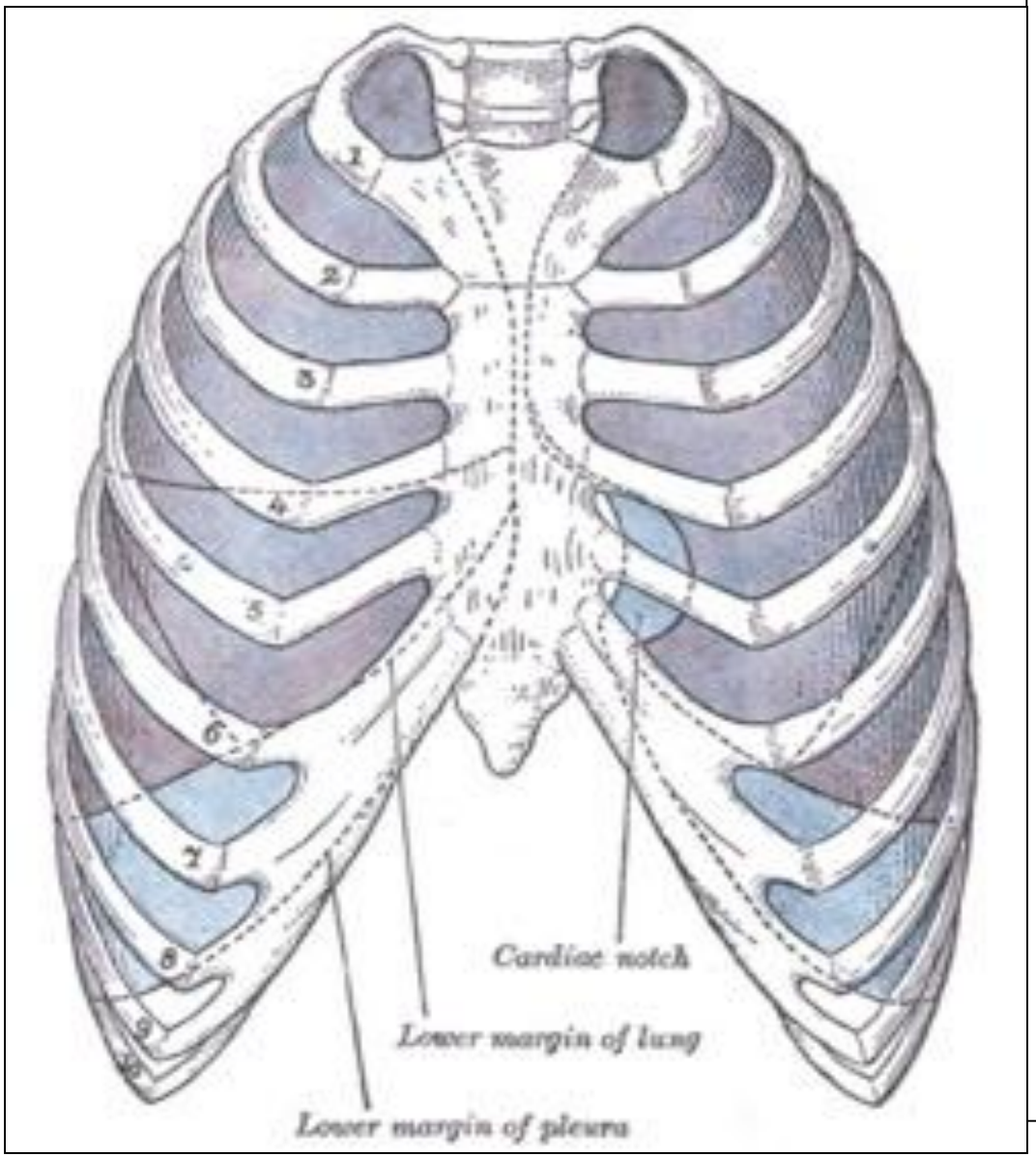
Right pleura:

- The anterior margin extends vertically from sternoclavicular joint to 6th costal cartilage.

- Inferior margin :from behind 6th costal cartilage directed infrolaterally, to cross the 8th rib in midclavicular line, 10th rib in mid-axillary line and finally reaching to the last thoracic spine(T12).

- Posterior margin : along the vertebral column from the apex to the inferior margin.

SURFACE ANATOMY OF LUNG



Apex, anterior border and correspond nearly to the lines of pleura but are slightly away from the median plane.

Inferior border

- The inferior border of the lung is 2 ribs higher than that of the pleura.It crosses the 6th rib in the midclavicular line, the 8th rib in the midaxillary line and crosses the 10th rib to end 2 cm lateral to the 10th thoracic spine.

The posterior border

It extends from the medial end of the inferior border (T10 spine) upwards along the vertebral column to apex.

Oblique fissure:

- represented by a line extending from 3rd thoracic spine, obliquely ending at 6th costal cartilage.

Transverse fissure only in right lung: represented by a line extending from 4th right costal cartilage to meet the oblique fissure.

THANK YOU