

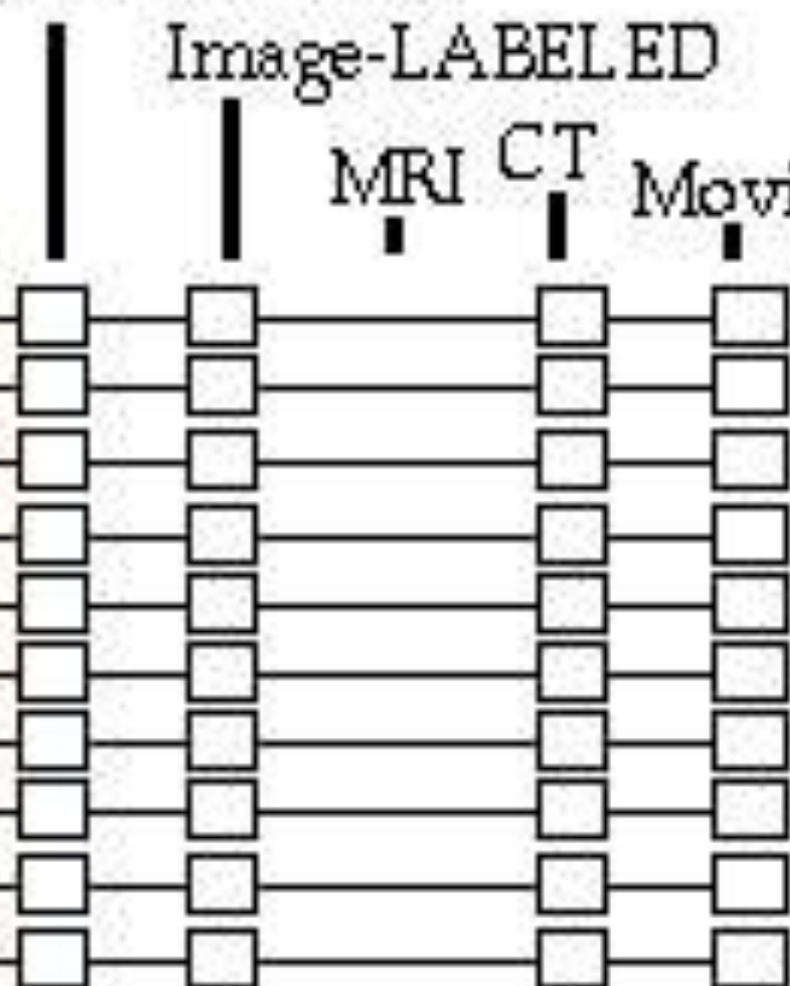
THE THORAX

CHEST

Image-UNLABELED

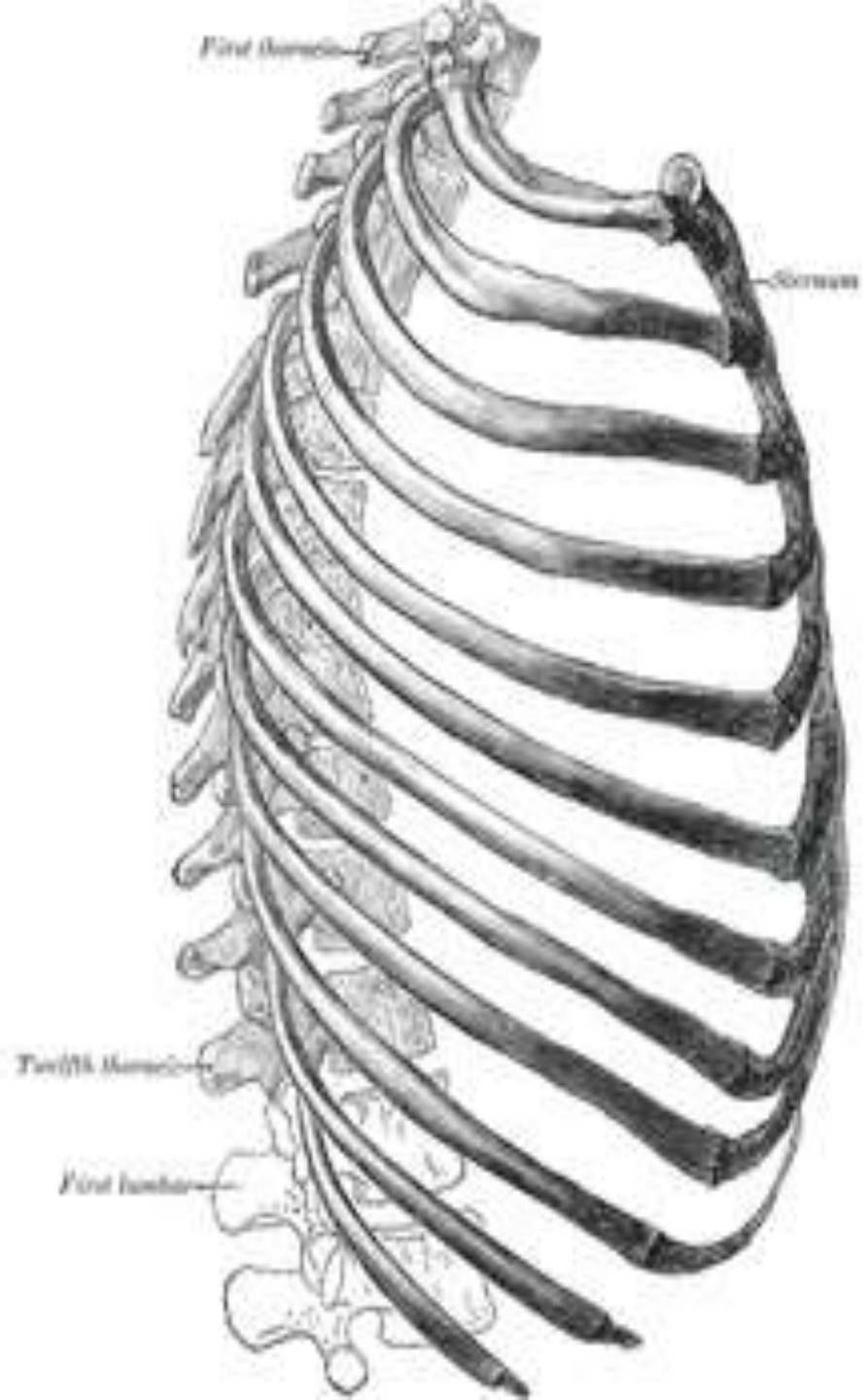
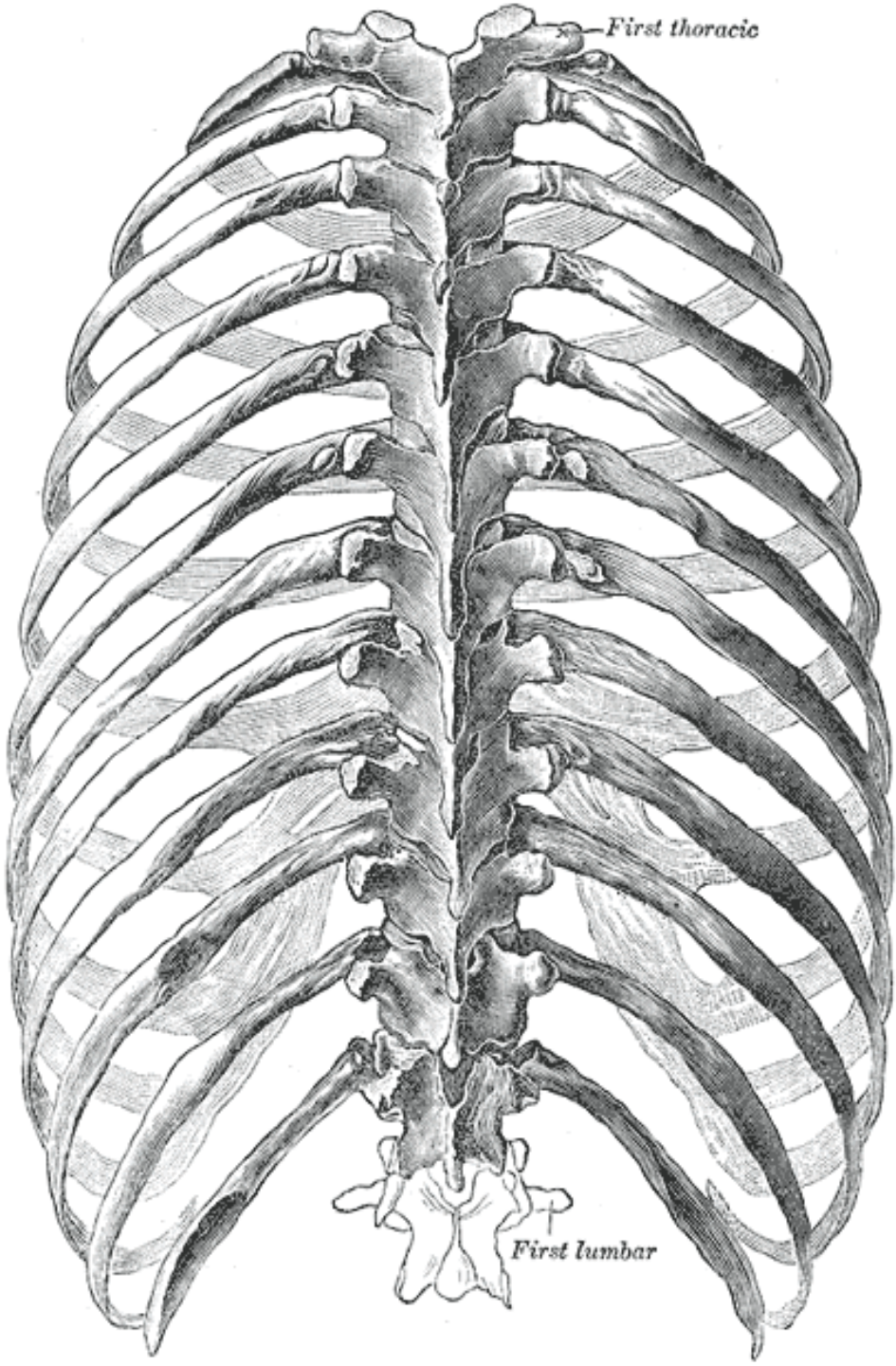
Image-LABELED

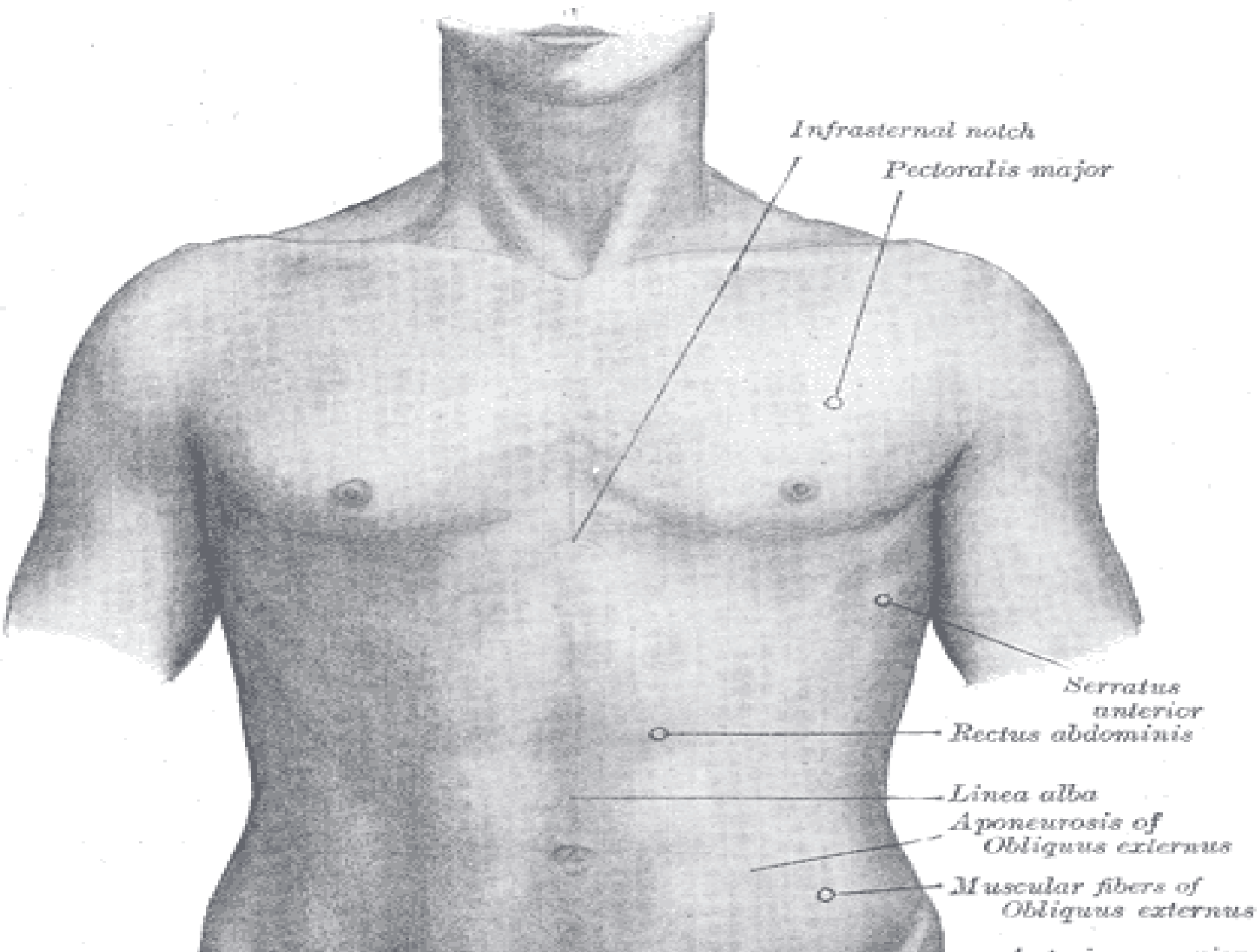
MRI CT Movie



The thorax :

- It's region of body between the **neck** superiorly & **abdomen** inferiorly separated by the **diaphragm** .
- The walls of thorax called **Thoracic cage** formed by :
 - Vertebral column behind
 - Ribs & intercostal spaces on either side
 - Sternum & costal cartilages in front
- Thoracic cage protects lungs & heart & affords attachment for muscles of thorax , upper limb , abdomen & back .
- Thoracic cavity divided into a median partition called the **mediastinum** & the laterally placed **pleurae & lungs** .





Infrasternal notch

Pectoralis major

Serratus anterior

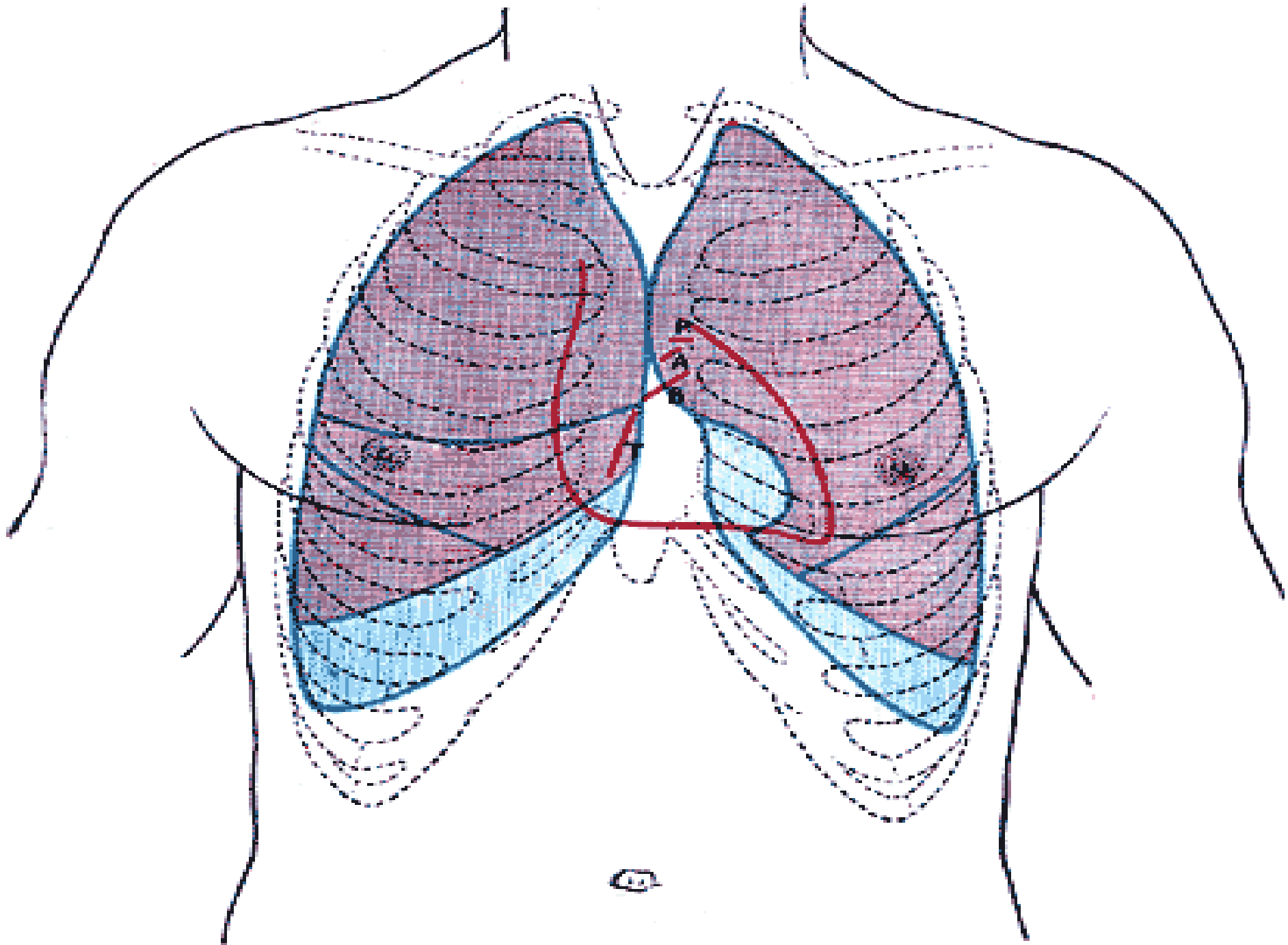
Rectus abdominis

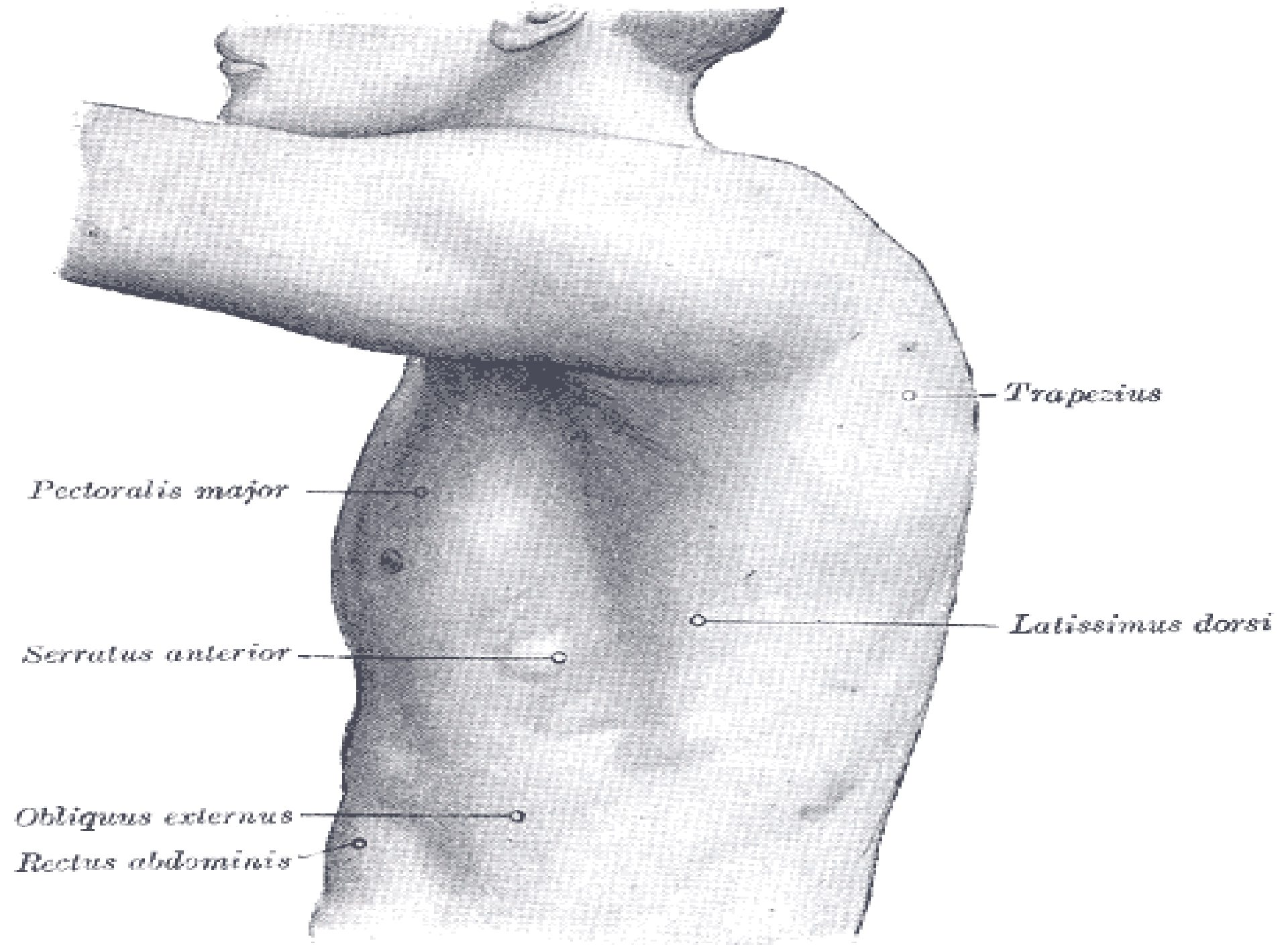
Linea alba

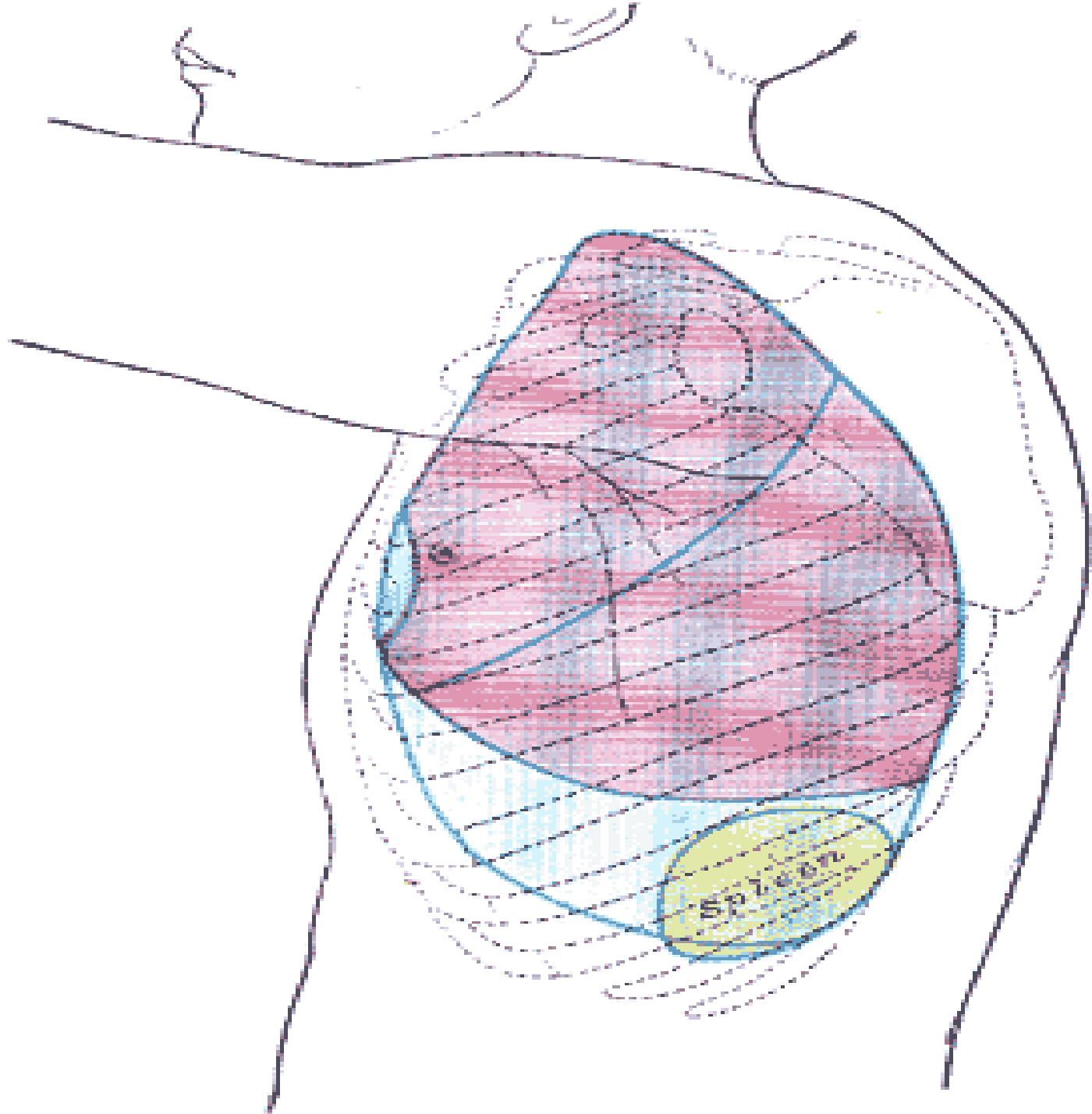
Aponeurosis of Obliquus externus

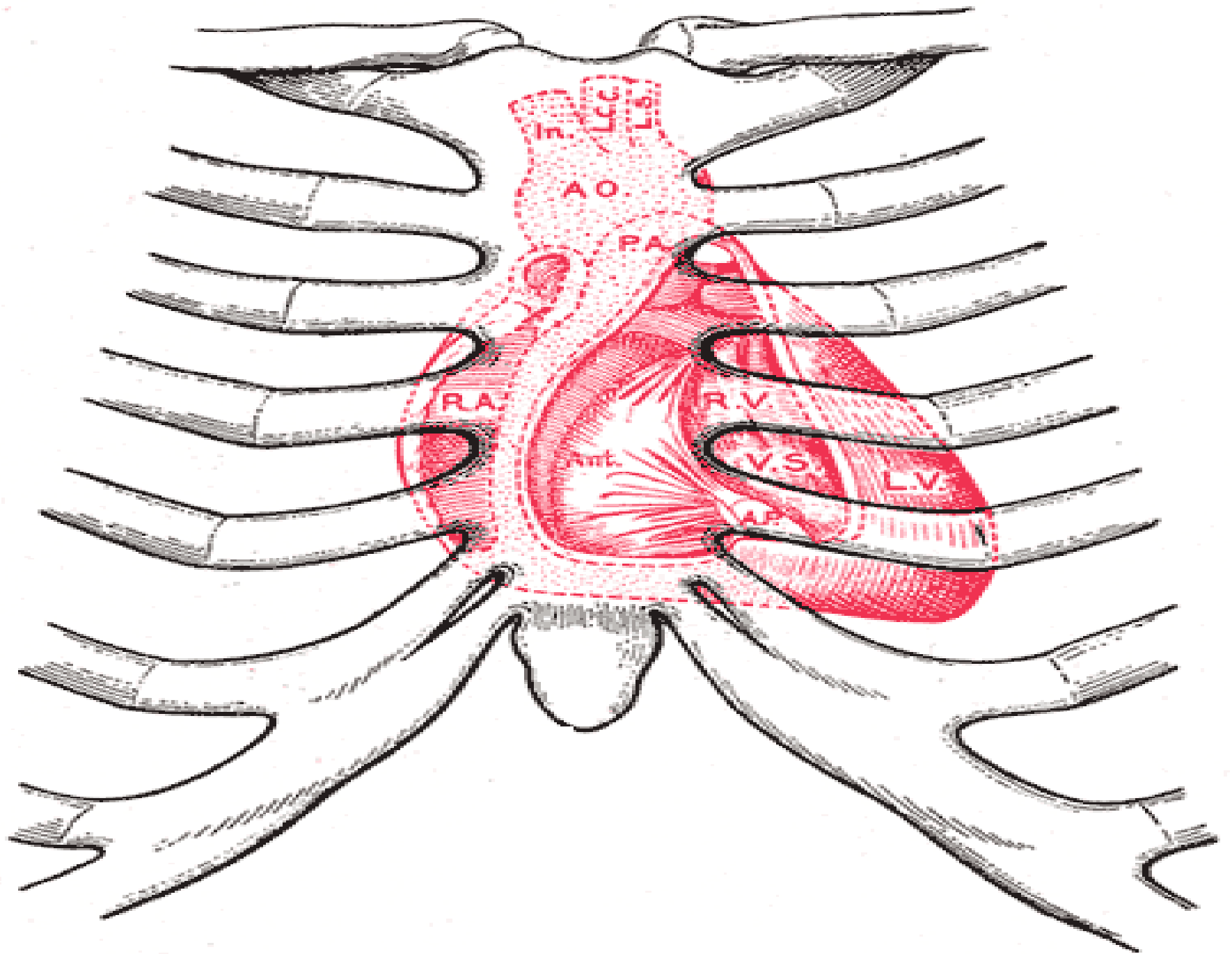
Muscular fibers of Obliquus externus

Anterior superior



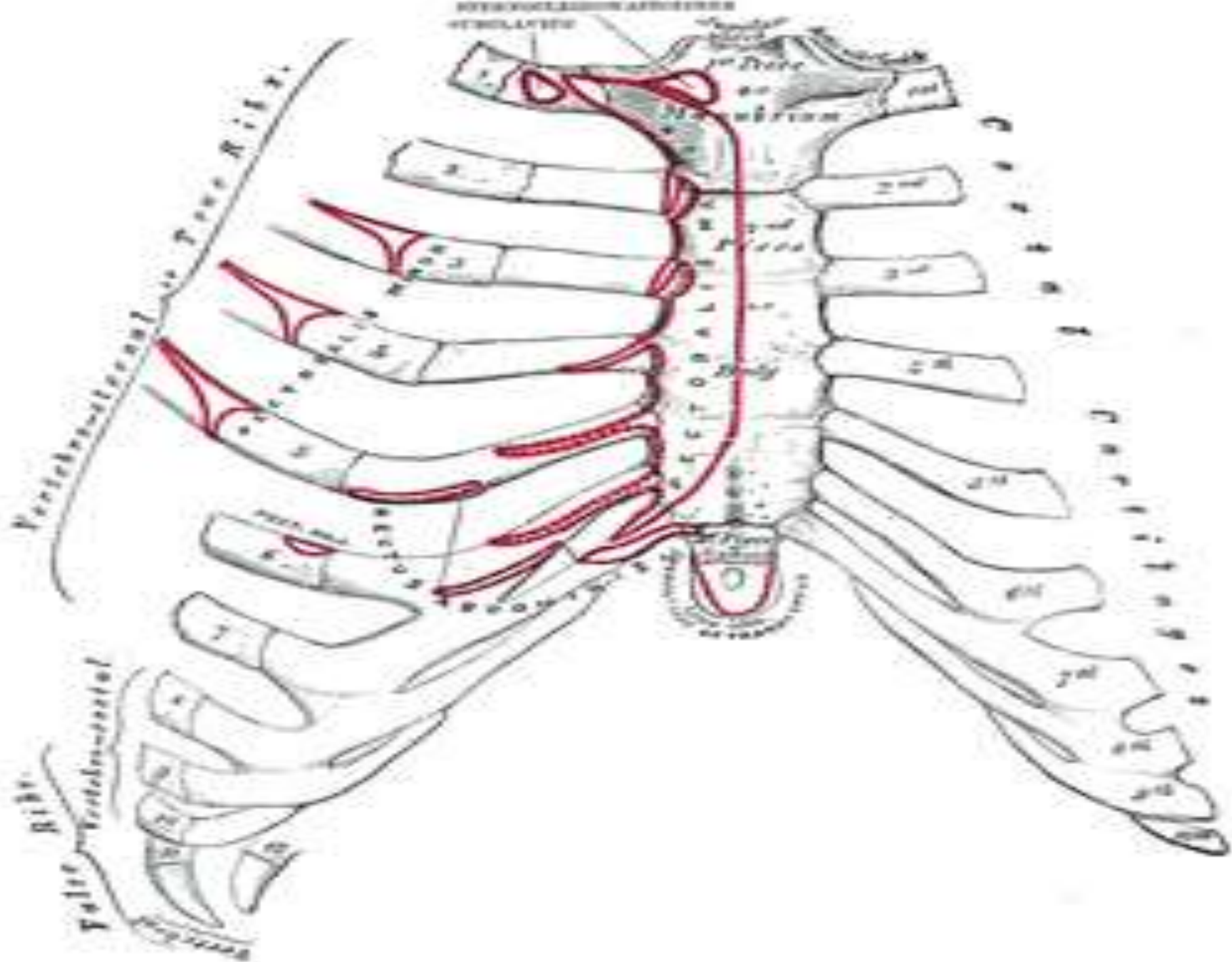


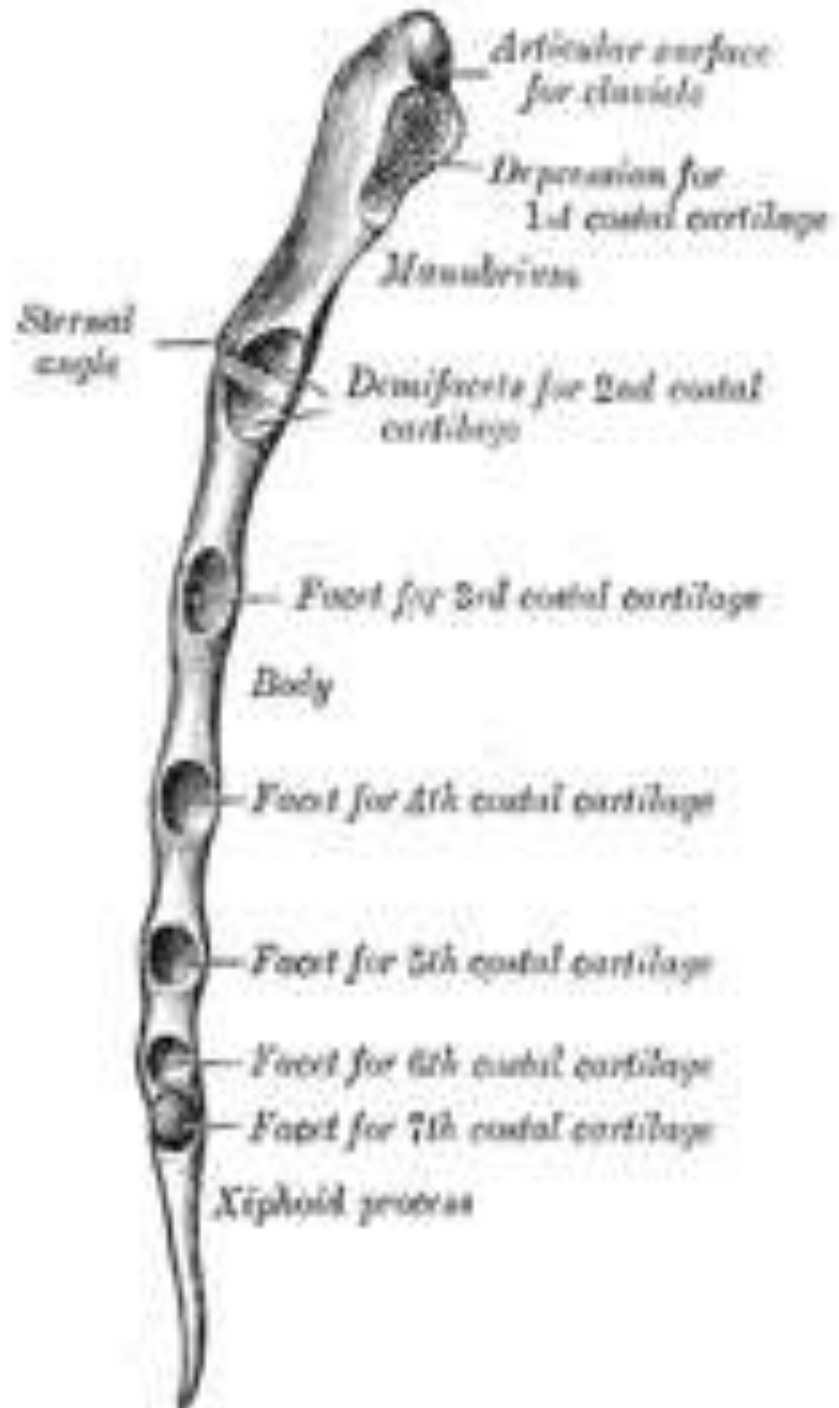
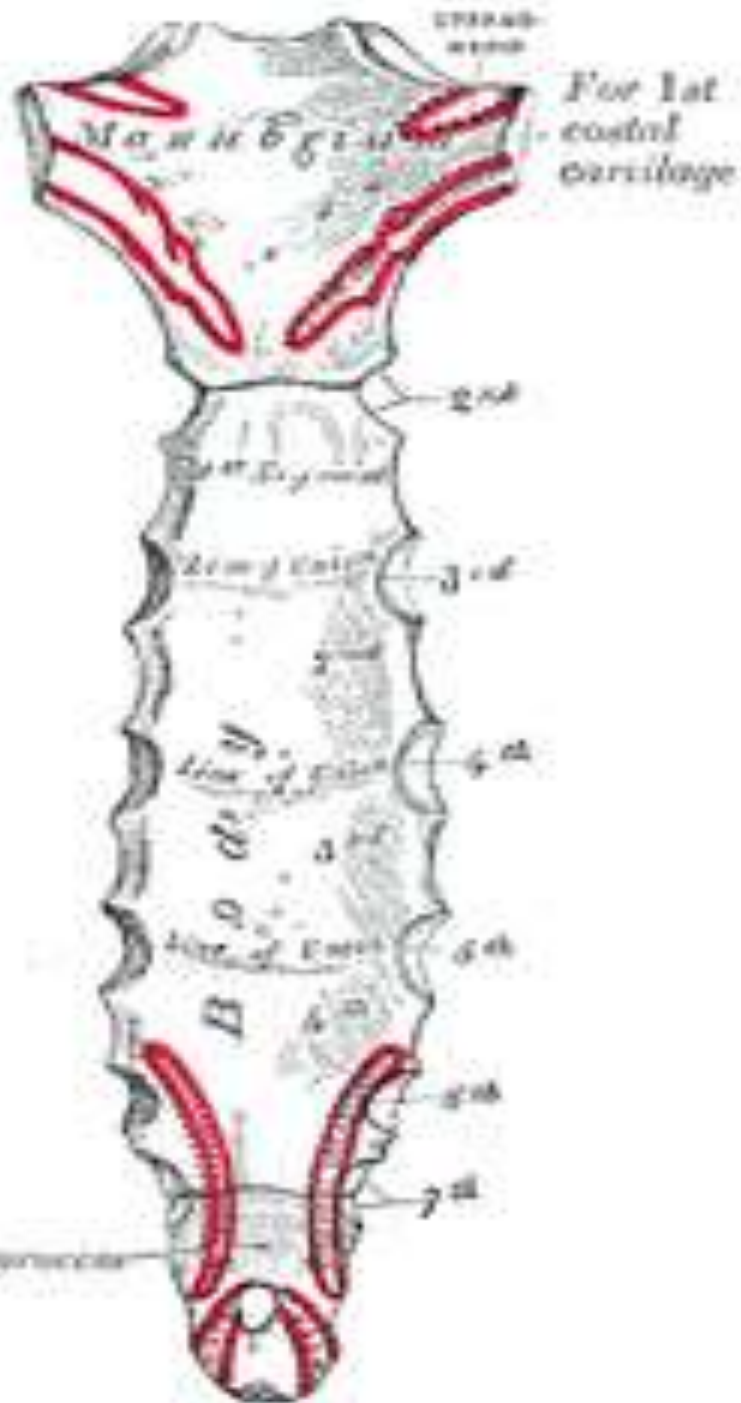




STERNUM

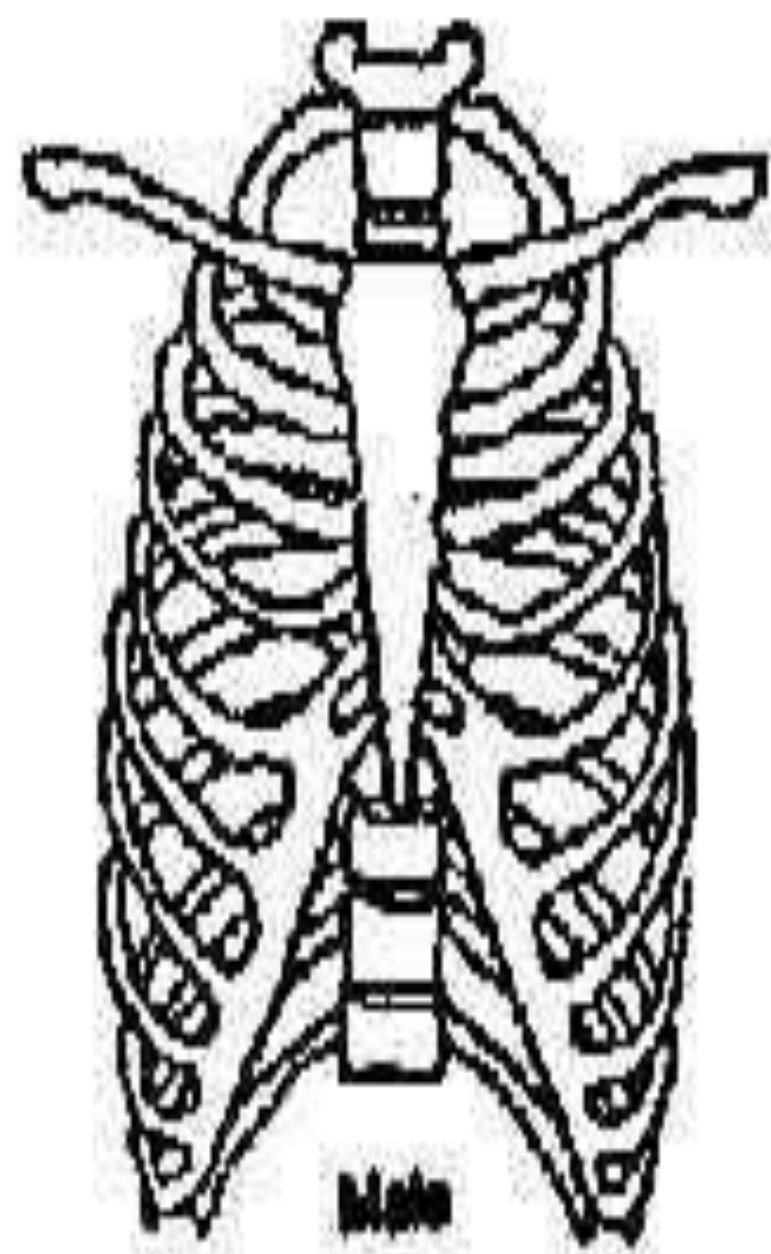
- Flat bone lies in the midline of anterior chest wall divided into three parts :
 1. *Manubrium sterni*
 2. *Body of the sternum*
 3. *Xiphoid process*
- **Sternal angle** (angle of Louis) : articulation of manubrium with body of sternum (T4).
- **Suprasternal notch** : superior margin of manubrium sterni { easily felt between prominent medial ends of clavicles in the midline } .



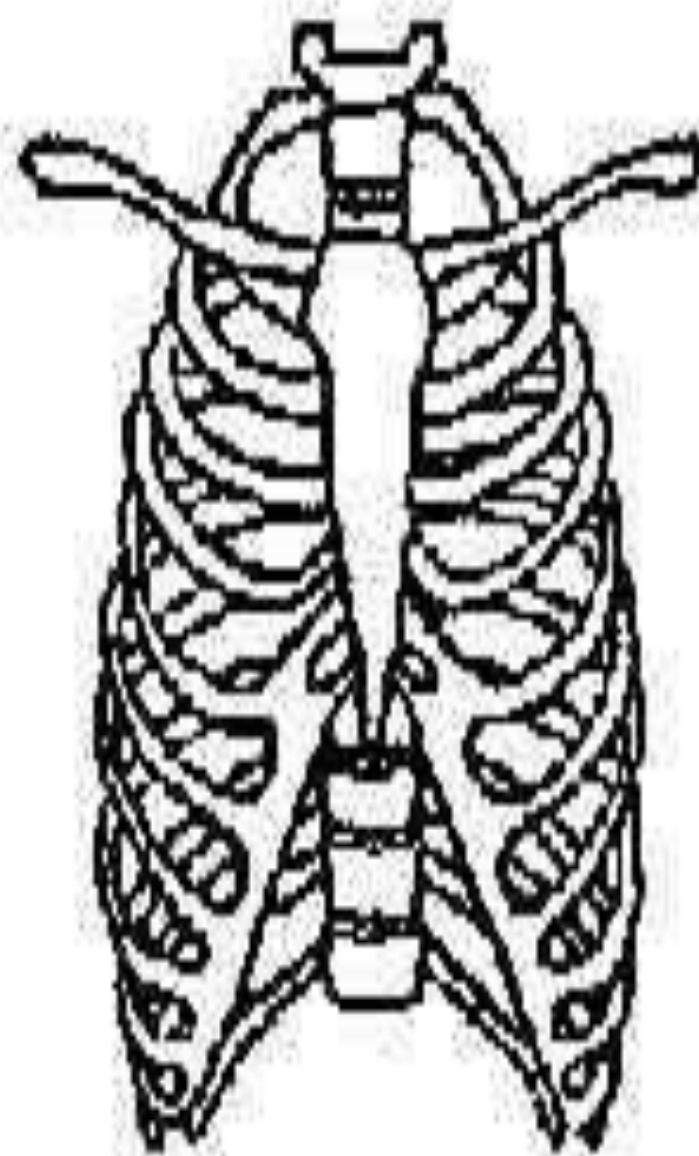


RIBS

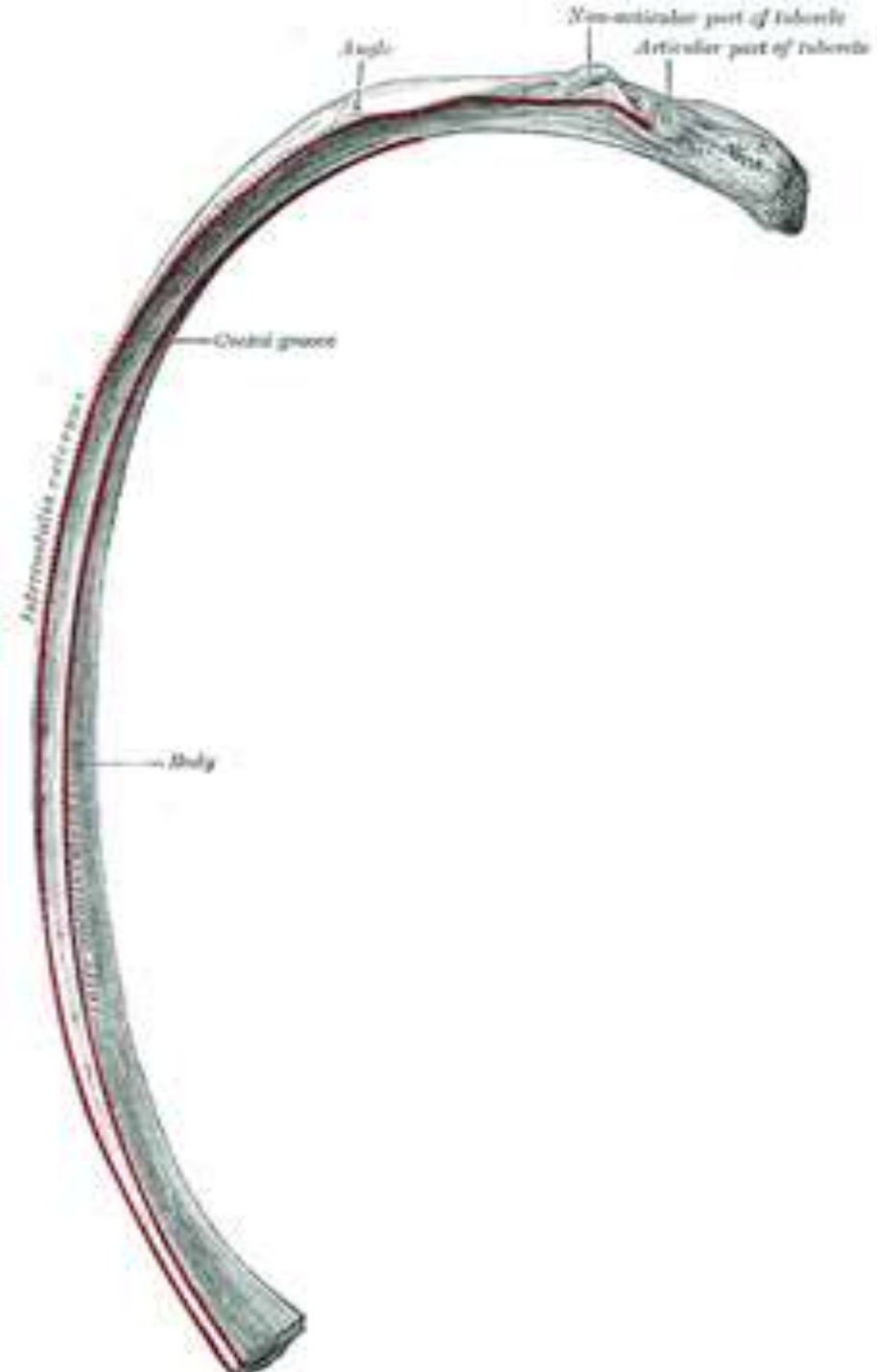
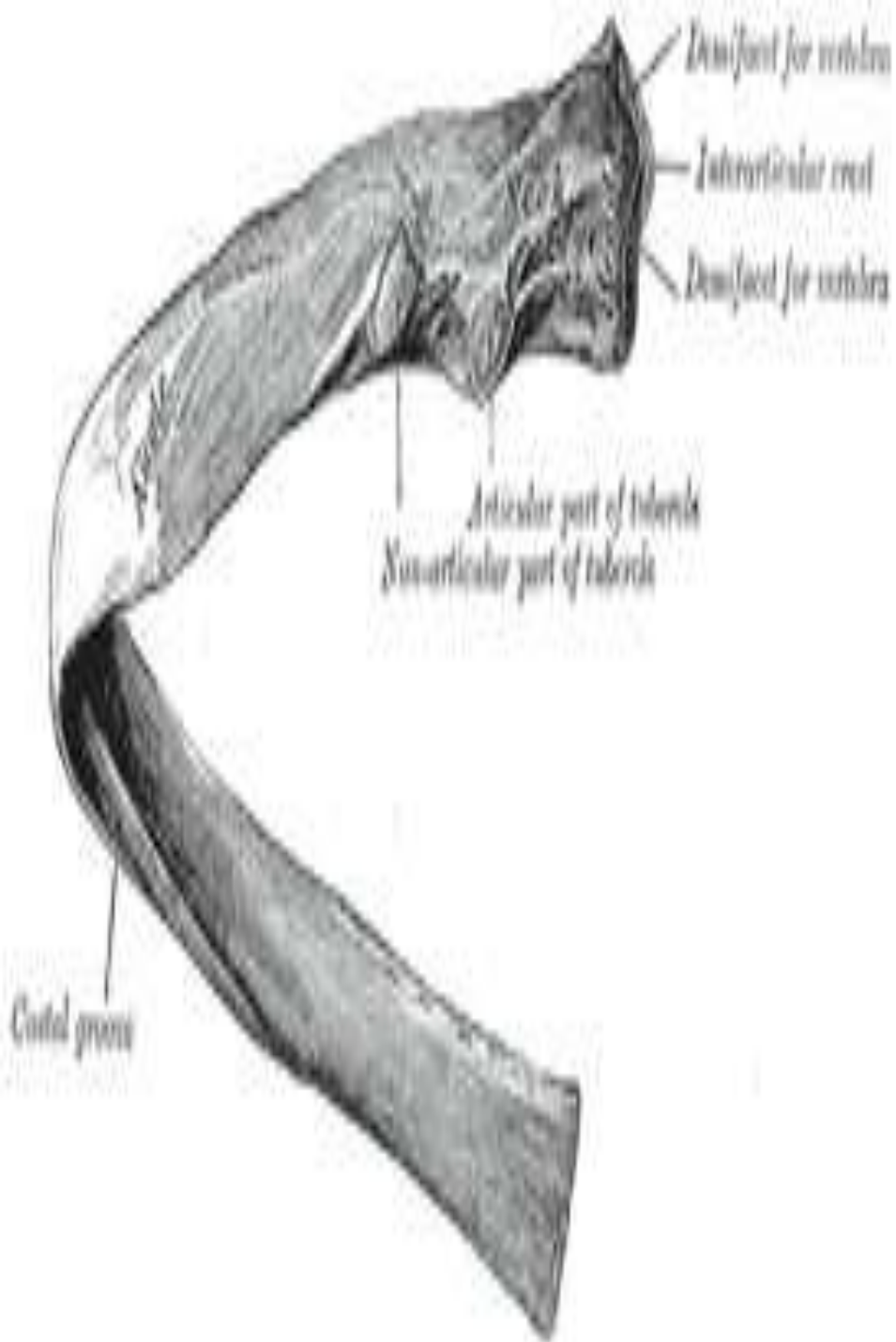
- Twelve pairs of ribs
- All attached posteriorly to the thoracic vertebrae .
- *Upper seven pairs* attached anteriorly to the sternum by their **costal cartilages** .
- The **11th. & 12th**. Pairs have no anterior attachment & called ***Floating ribs*** .



Mas



Femalo

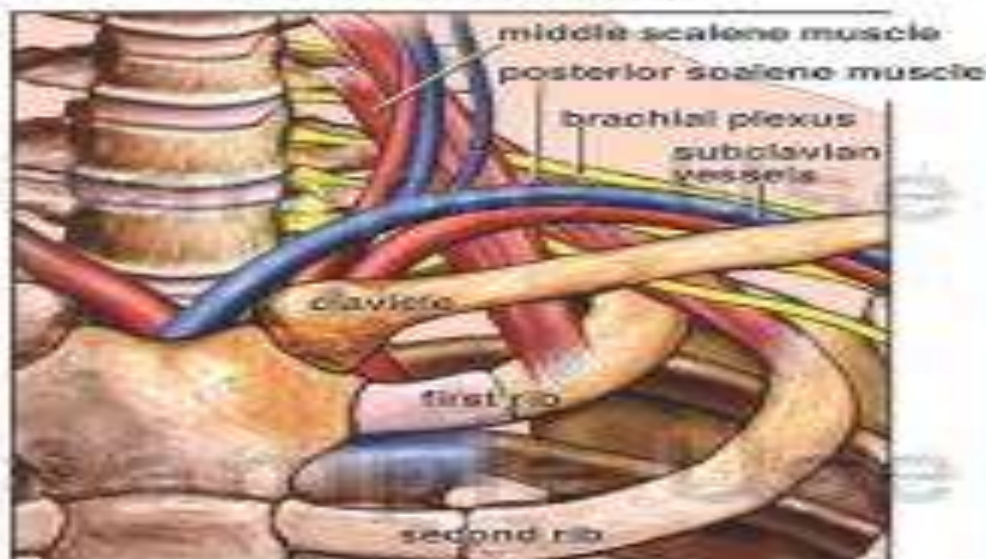


Openings of the Thorax

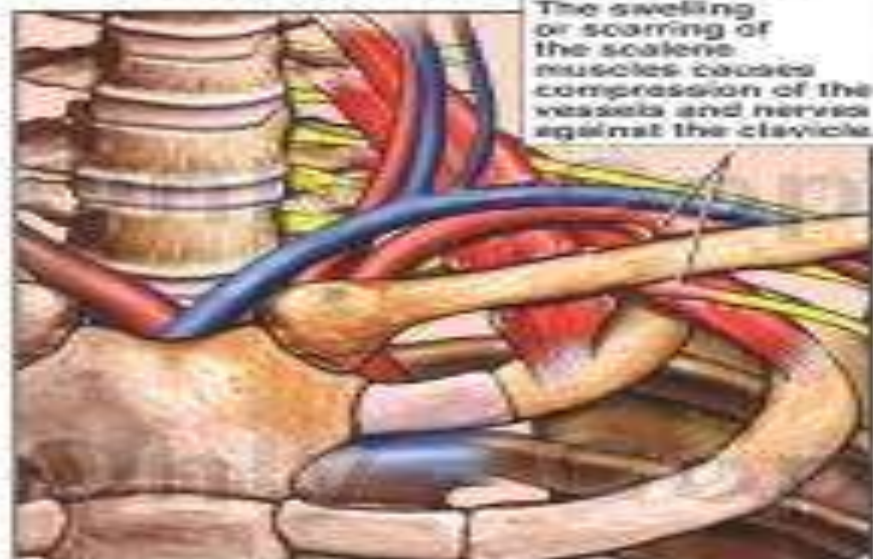
- (1) **Thoracic Outlet** (thoracic inlet) : an opening communicates thoracic cavity with root of the neck.
- Important vessels & nerves emerge from thorax to enter the neck & upper limbs :
 - * *Cervical dome of pleura* on lt. side of body
 - * *Brachial plexus*
 - * *Subclavian vessels*
- (2) **Esophageal Opening** (T10) : large opening closed by the diaphragm communicates thoracic cavity with abdomen , it passes :
 - * *Esophagus*
 - * *Large vessels & nerves (pierce the diaphragm) { Lt. Vagus N. }*

Thoracic Outlet with Resection of the First Rib and Scalene Muscles

Normal Anatomy

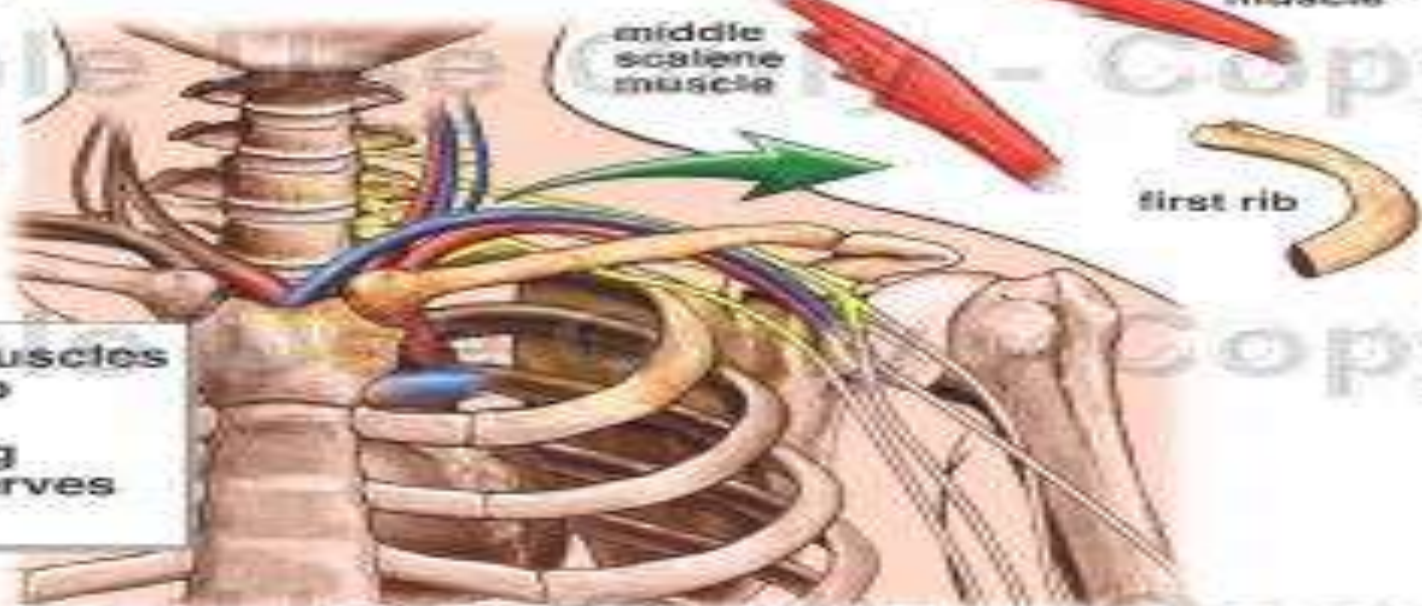
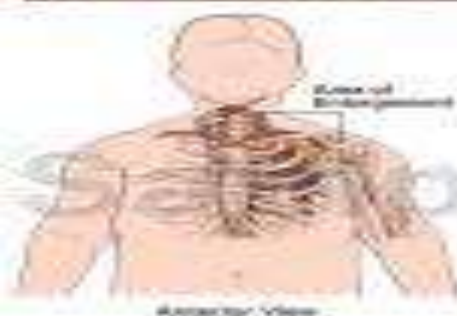


Post-Accident Condition

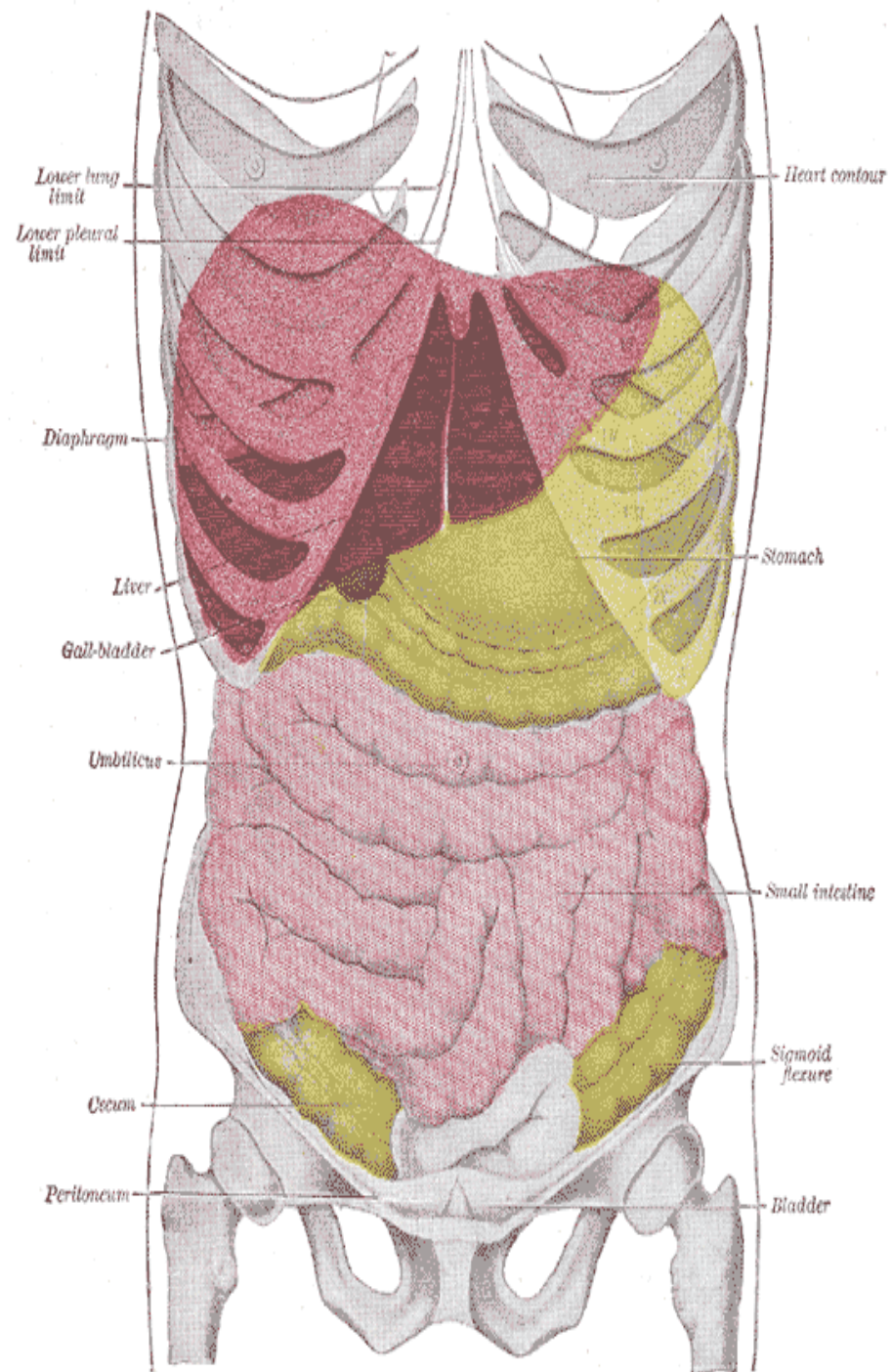
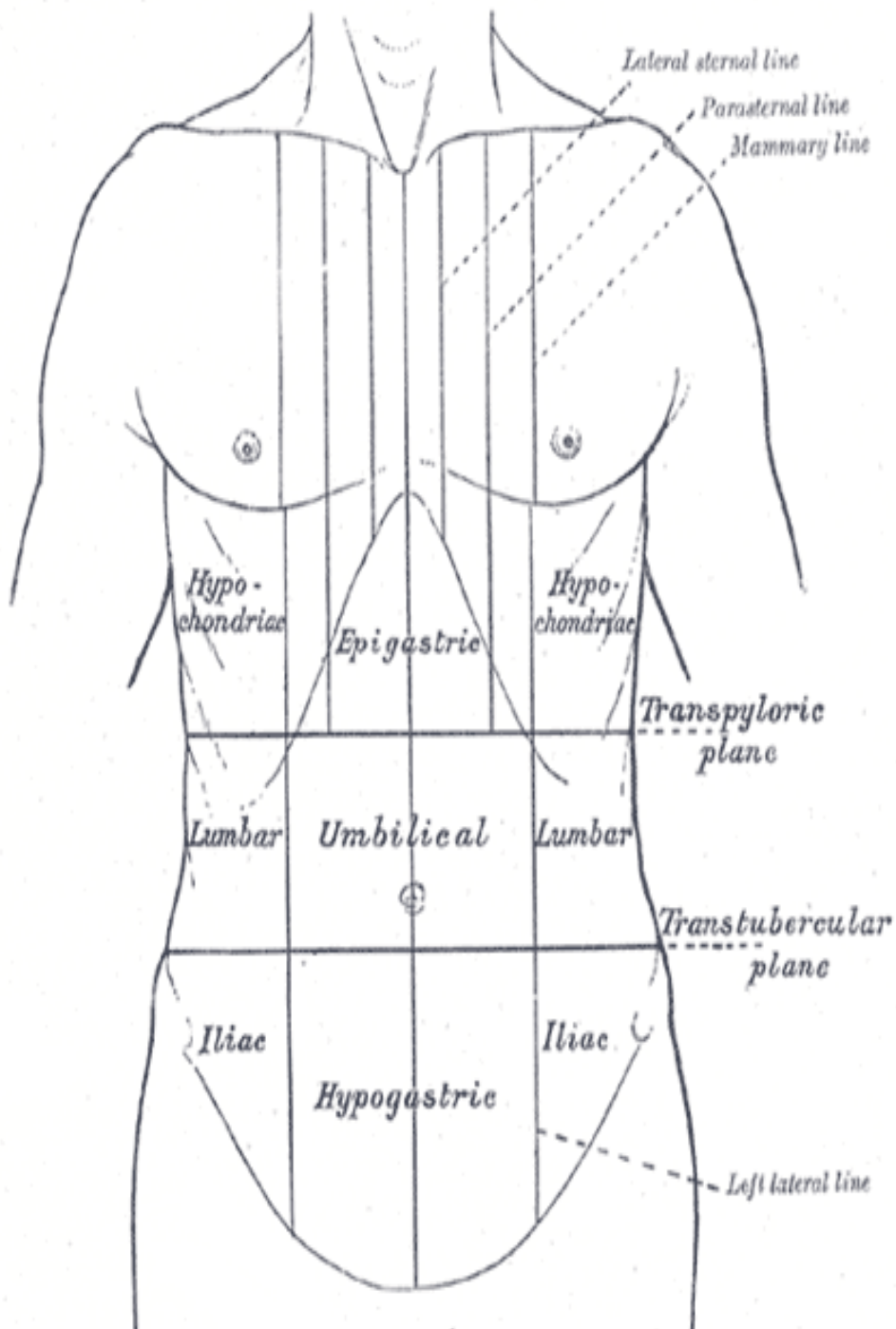


ANTERIOR VIEW OF LEFT SHOULDER REGION

Post-Operative Condition

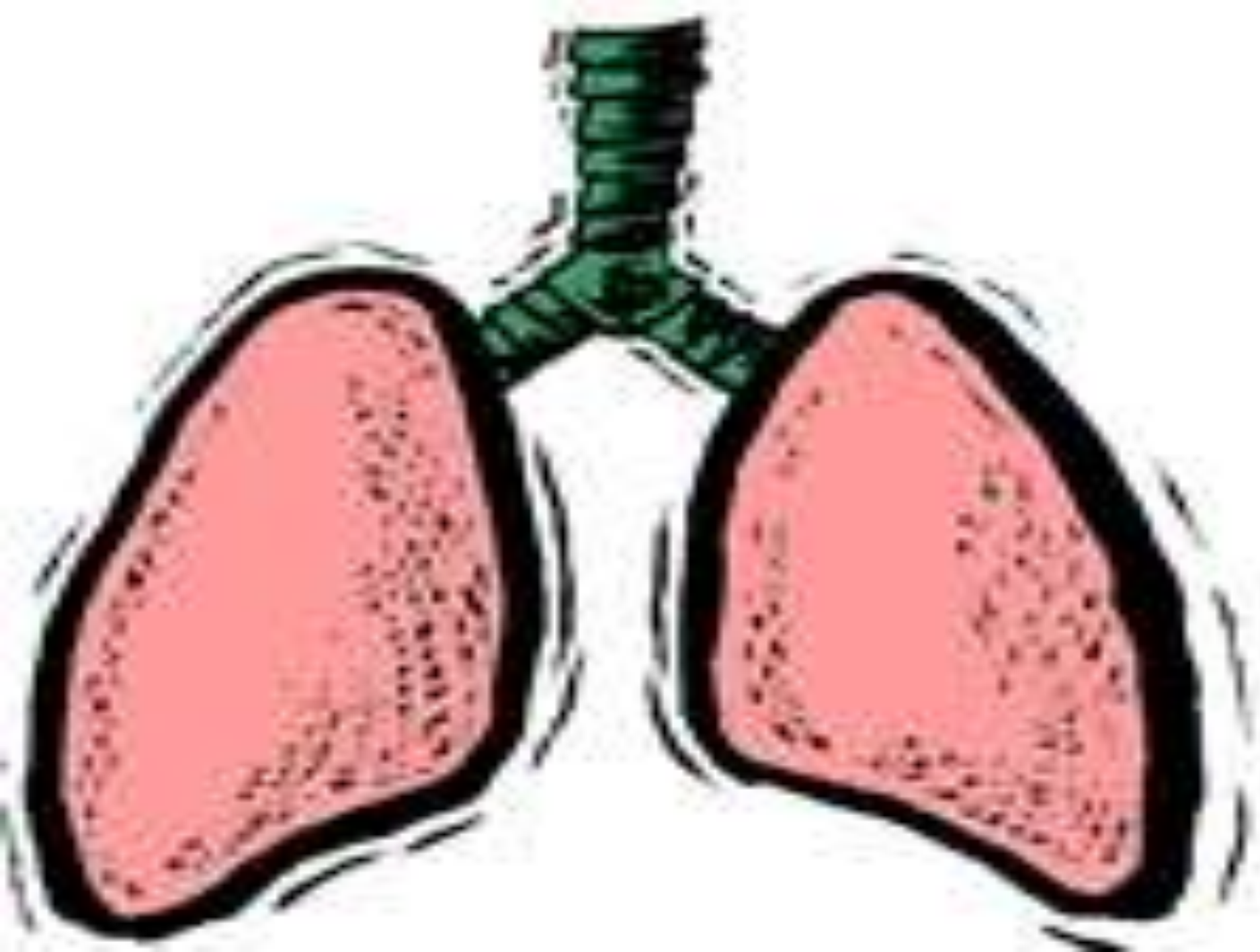


The scalene muscles and the first rib are removed, decompressing the brachial nerves and vessels.



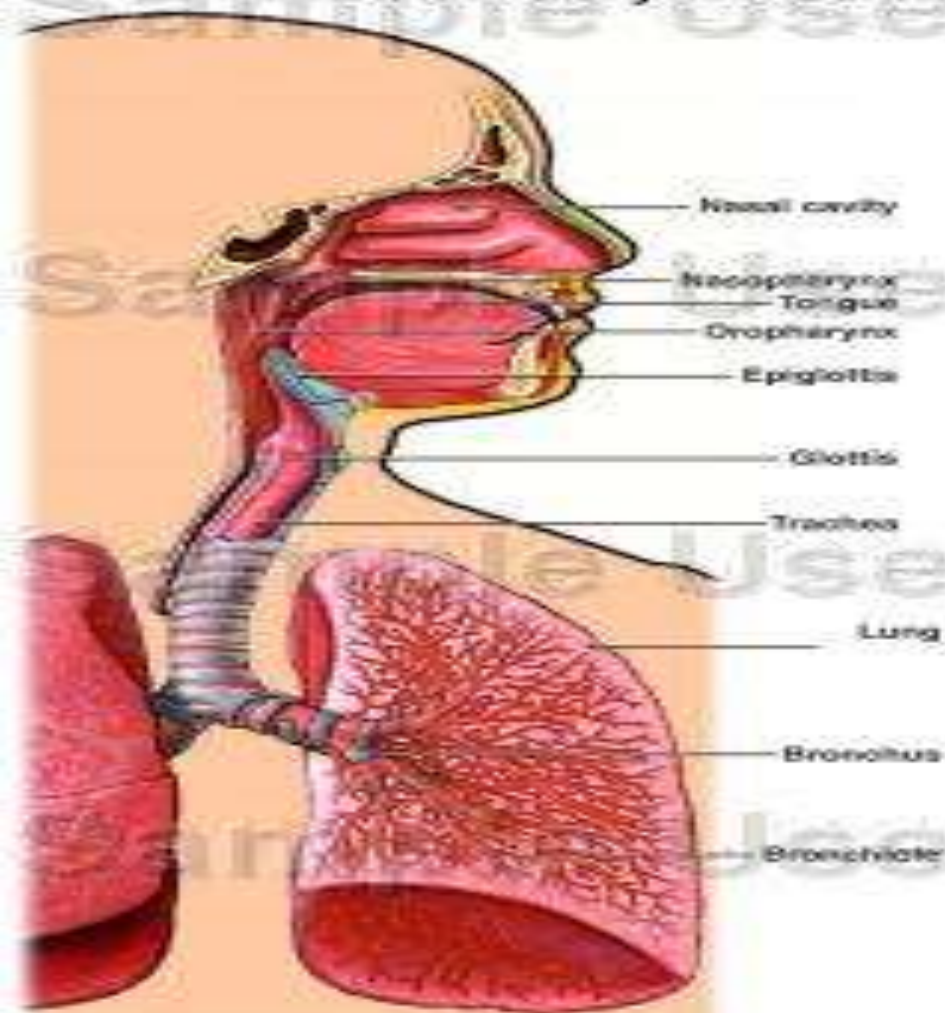
TRACHEA

- It's a mobile tube about (13 cm) long & (2.5 cm) in diameter .
- It has fibroelastic *wall* with patent lumen kept by an embedded series of U-shaped bars of *hyaline cartilage*.
- It extends from lower border of **cricoid cartilage** in the neck (opposite body of C6) to the level of sternal angle in thorax (lower border of T4).
- Trachea divides into Rt. & Lt. **principal (main)** bronchi .
- The bifurcation is called the **Carina** .

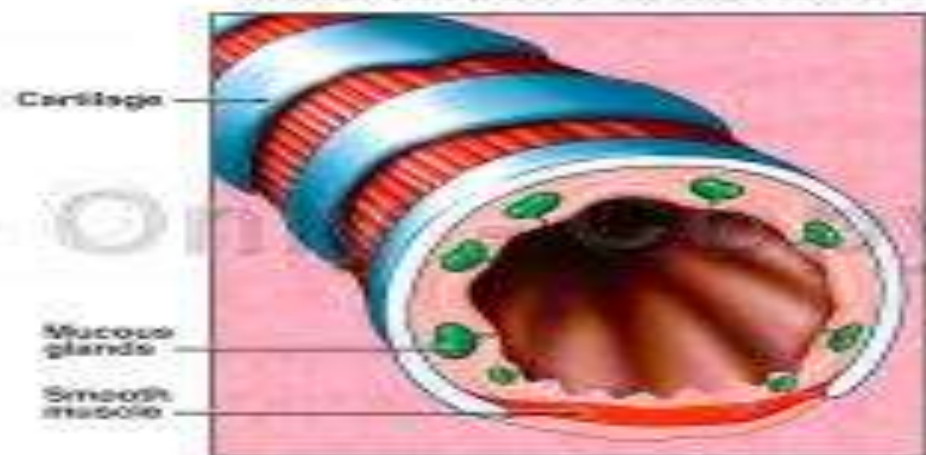




Anatomy of the Respiratory System



Cross-section of a Bronchiole



Gas Exchange within Alveoli

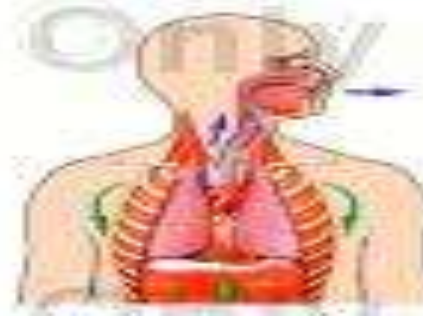


Inspiration



- Respiratory muscles contract, diaphragm descends (flattens)
- Thoracic cavity volume increases
- Lungs expand, intrapulmonary volume increases
- Intrapulmonary pressure drops (to P_{atm})
- Air (spont.) flows into lungs increasing its pressure gradient until intrapulmonary pressure is P_{atm}

Expiration



- Respiratory muscles relax, diaphragm rises (D.C. descends less actively)
- Thoracic cavity volume decreases
- Elastic lungs recoil passively; intrapulmonary volume decreases
- Intrapulmonary pressure rises (to P_{atm})
- Air (spont.) flows out of lungs decreasing its pressure gradient until intrapulmonary pressure is P_{atm}

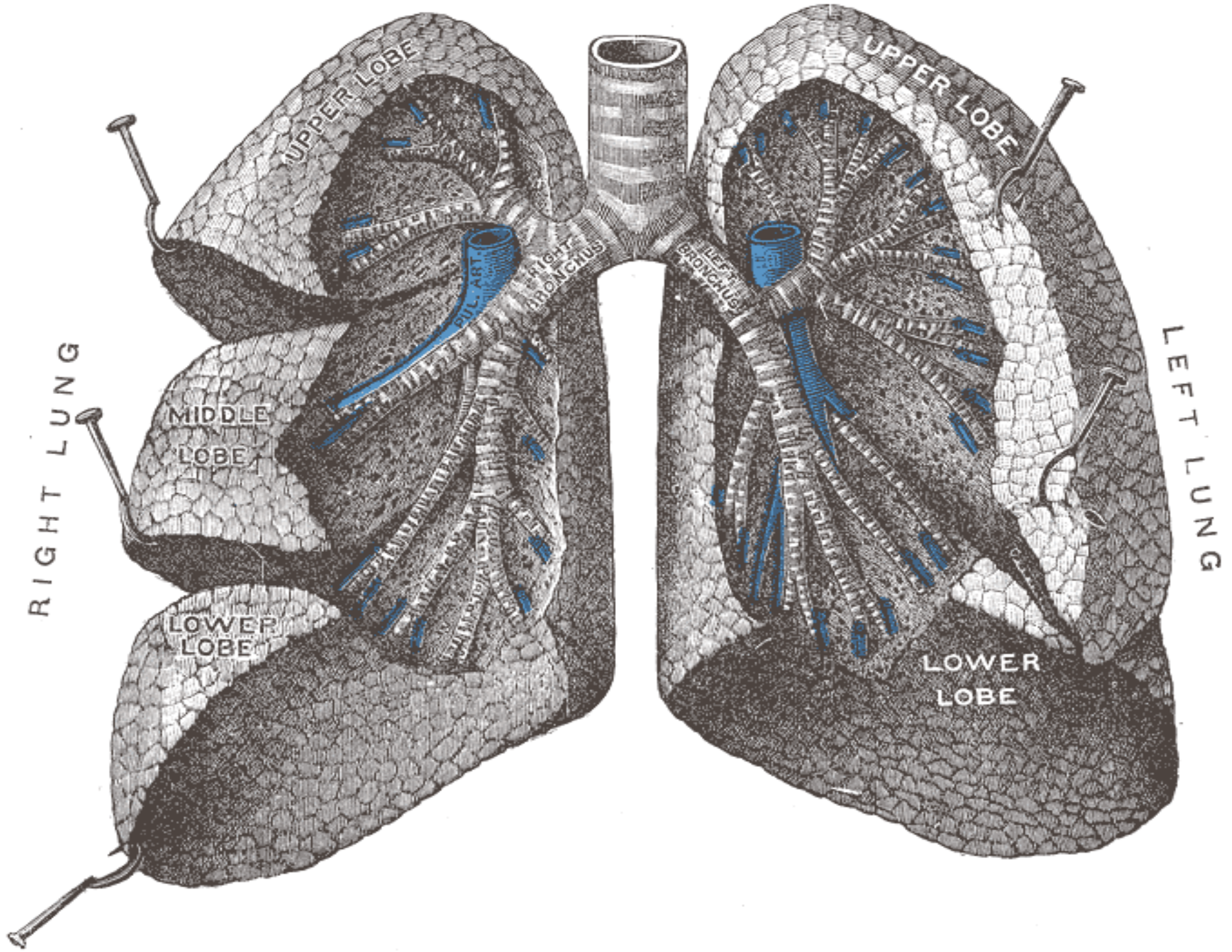
Principal (main) Bronchi

The right principal bronchus :

- It's wider , shorter, & more vertical .
- It gives off the **superior lobar bronchus** .
- It enters the hilum of Rt. Lung & divides into a **middle & inferior lobar bronchus** .

The left principal bronchus :

- It's narrower , longer, & more horizontal .
- It enters the hilum of Lt. lung & divides into a **superior & inferior lobar bronchus**



RIGHT LUNG

LEFT LUNG

UPPER LOBE

UPPER LOBE

MIDDLE LOBE

LOWER LOBE

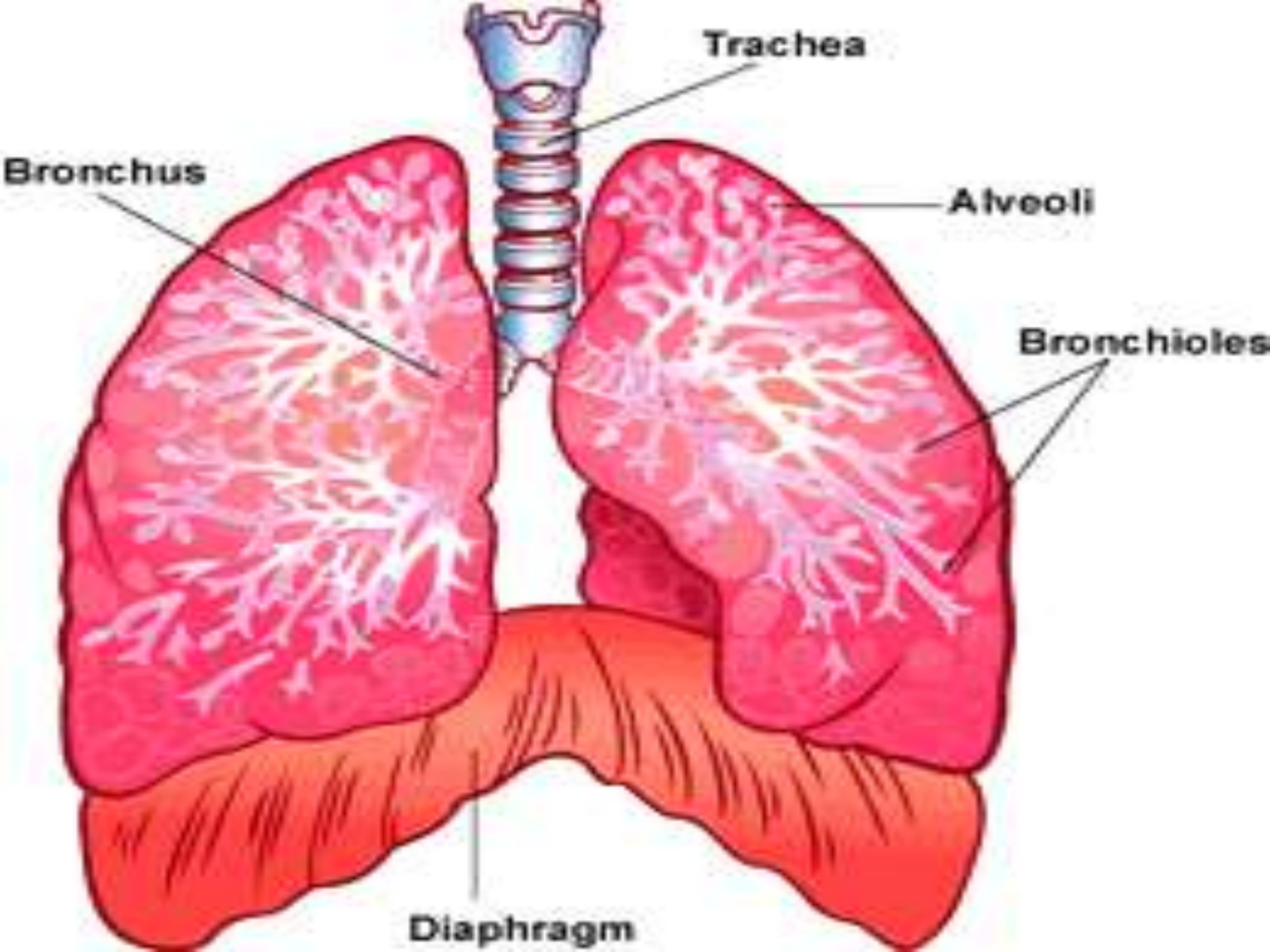
LOWER LOBE

RIGHT BRONCHUS

LEFT BRONCHUS

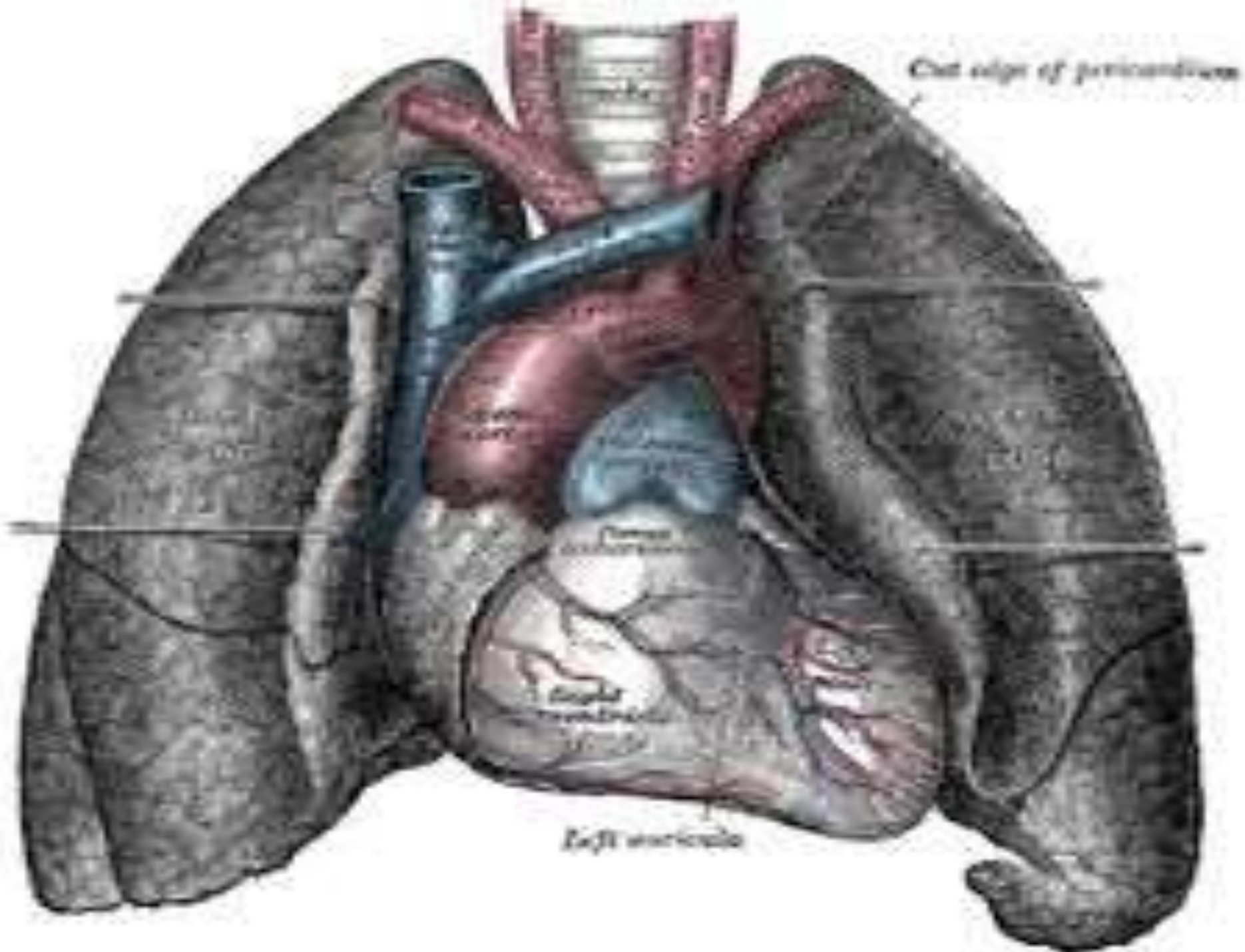
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* LUNGS

- The **Rt.** & **Lt.** lungs are soft, spongy & very elastic .
- They lie one on each side of the mediastinum separated from each other by the heart , great vessels & other mediastinal structures .
- Each lung covered with **visceral pleura** & suspended free in it's own **pleural cavity** , attached to medias. Only by it's **root** .



Structure of the Lungs

Each lung is conical in shape , it has :

- **Apex** , which projects upward into the neck about (2.5 cm) above the clavicle .
- **Base** , concave sits on the diaphragm .
- **Costal surface** , convex corresponds to concave chest wall .
- **Mediastinal surface** , concave molded to pericardium & other mediastinal structures .
- **Hilum** ,a depression at about the middle of mediastinal surface in which the bronchi , vessels & nerves that form the **root** enter & leave the lung .
- **Anterior border** , thin & overlaps the heart [on Lt. lung **cardiac notch** is found]

Lobes and Fissures

Right lung :

- It's slightly larger than Lt. lung .
- It's divided by *oblique* & *horizontal* fissures into three lobes :-
 - * Upper lobe
 - Middle lobe
 - Lower lobe

Left lung :

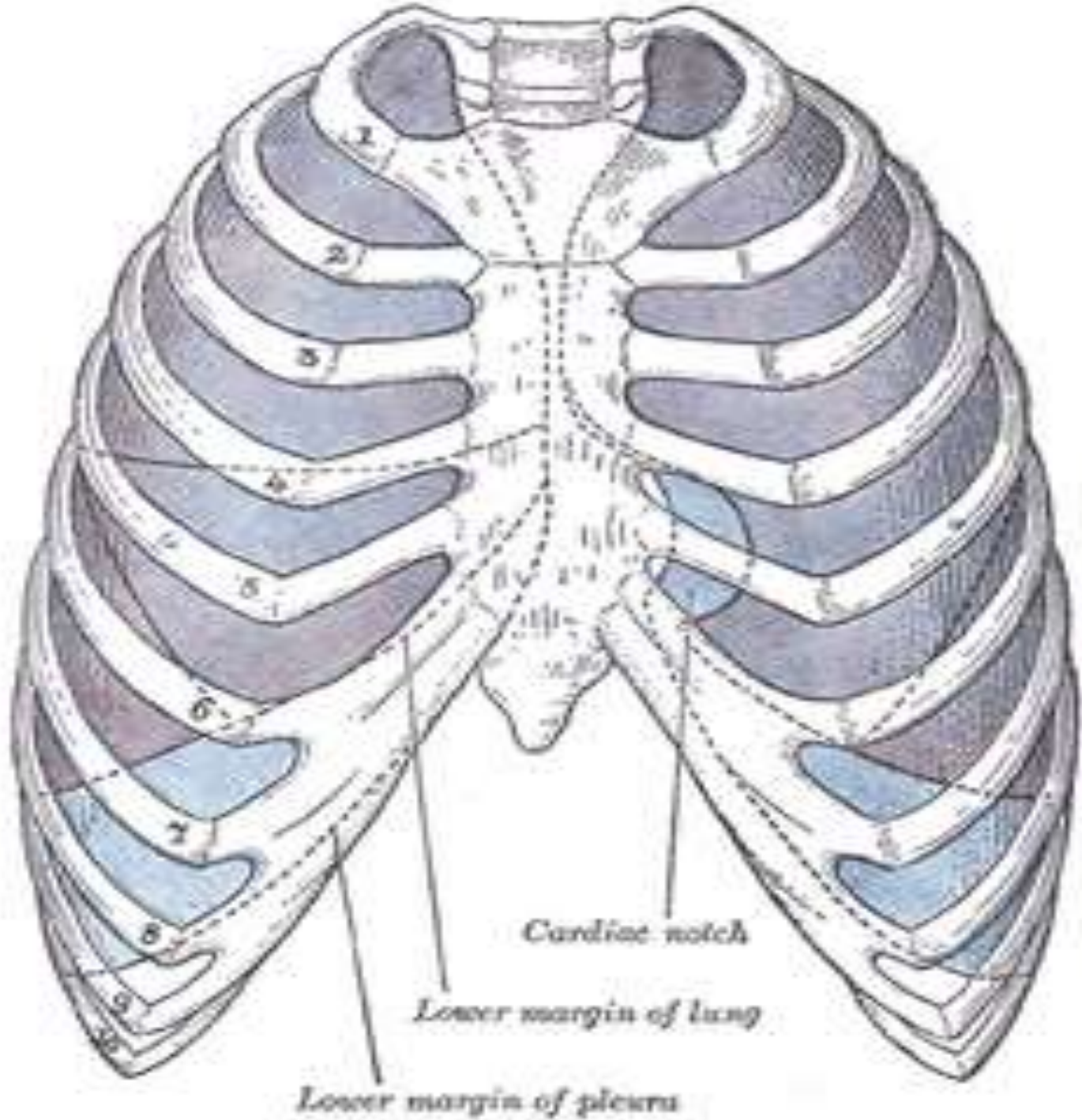
- It's divided by *oblique* fissure into two lobes :-
 - * Upper lobe
 - Lower lobe



PLEURAE

Each pleura has two parts :

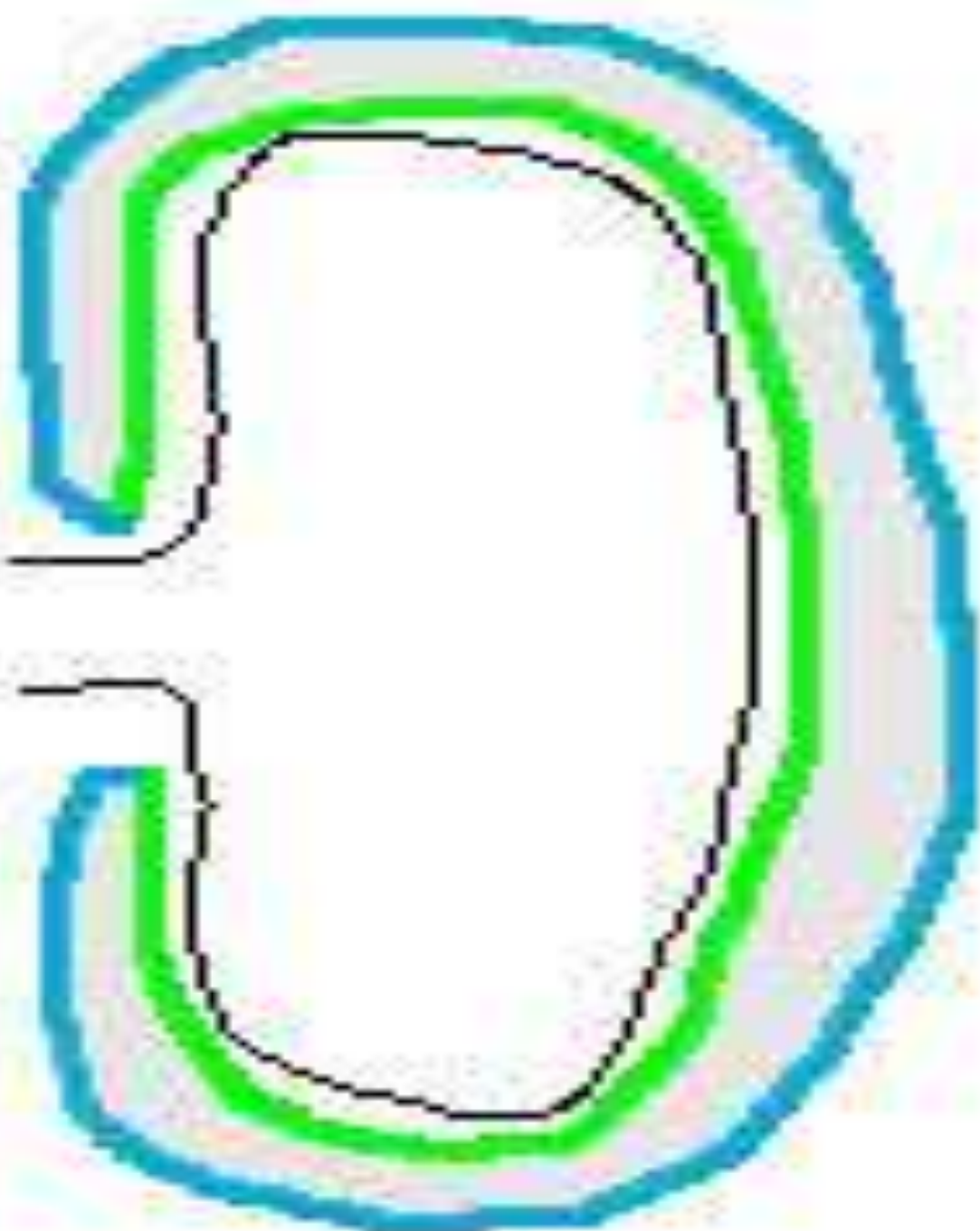
- **A- Parietal layer**
- **B- Visceral layer**
- *Parietal layer* :
 - It lines the thoracic wall, covers thoracic surface of diaphragm & lateral aspect of mediastinum.
 - It extends into the root of neck to line the undersurface of suprapleural membrane at thoracic outlet .
- *Visceral layer* :
 - Completely covers the outer surfaces of lungs & extends into depths of the interlobar fissures .



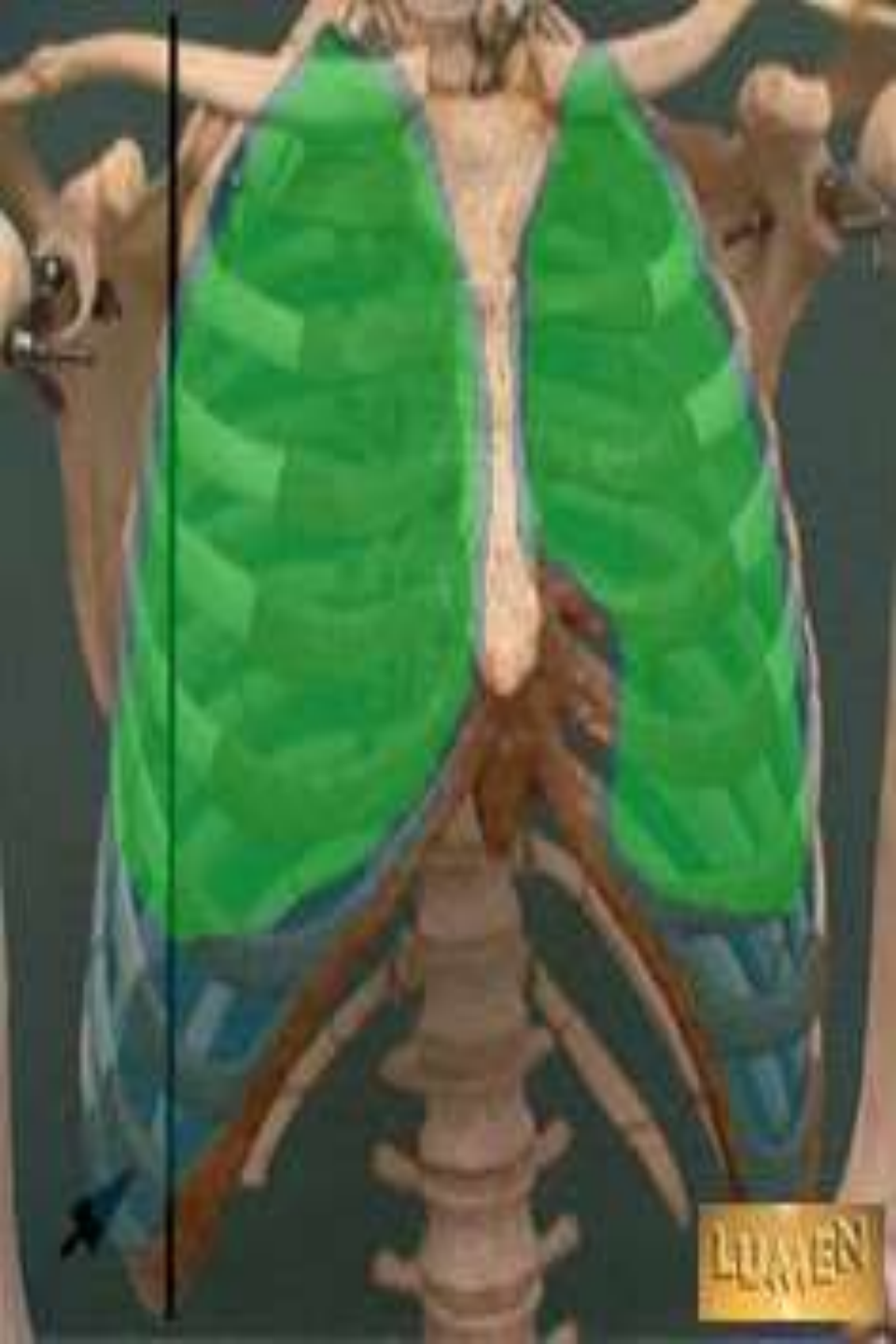
The two layers of pleura :

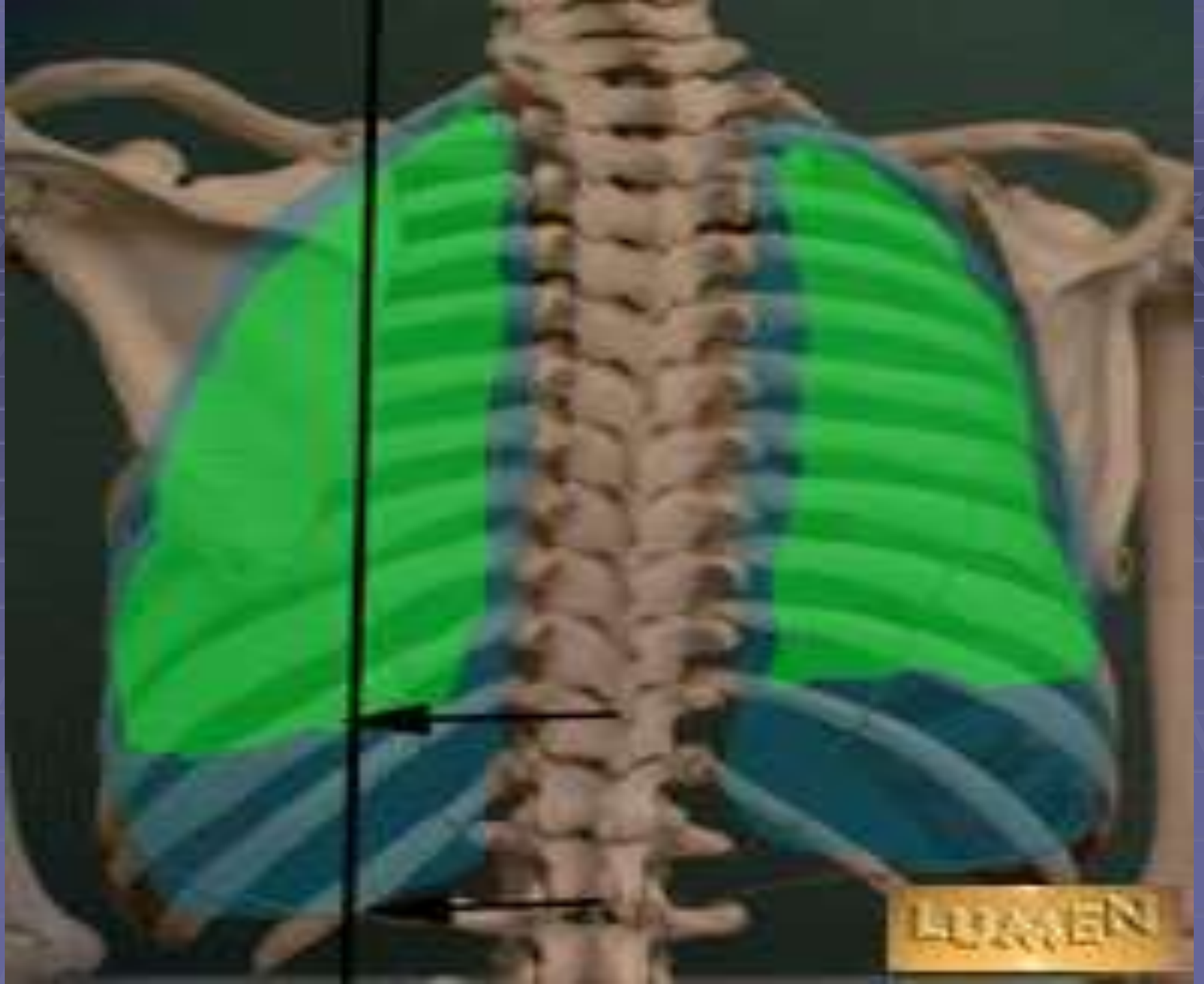
- Become continuous with one another by a *cuff of pleura* surrounds the structures entering & leaving the lung at it's hilum .
- They are separated from one another by a *slitlike space* called **pleural cavity** (*pleural space*) .
- Pleural cavity contains small amount of tissue fluid called **pleural fluid** , as thin film covers the surfaces of pleura & permits movement of it's two layers on each other with minimum of friction .

Hilum



LUAYEN

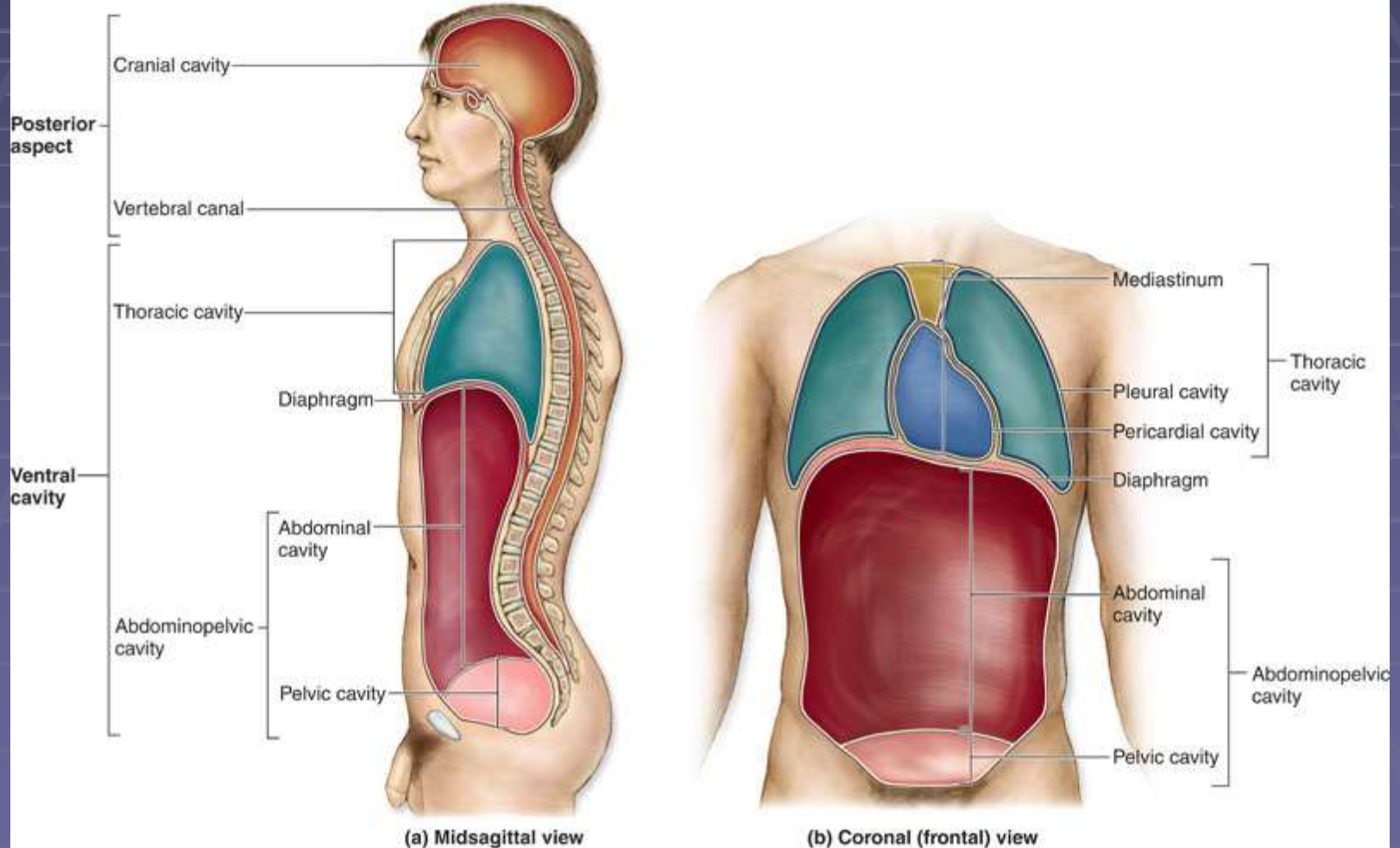




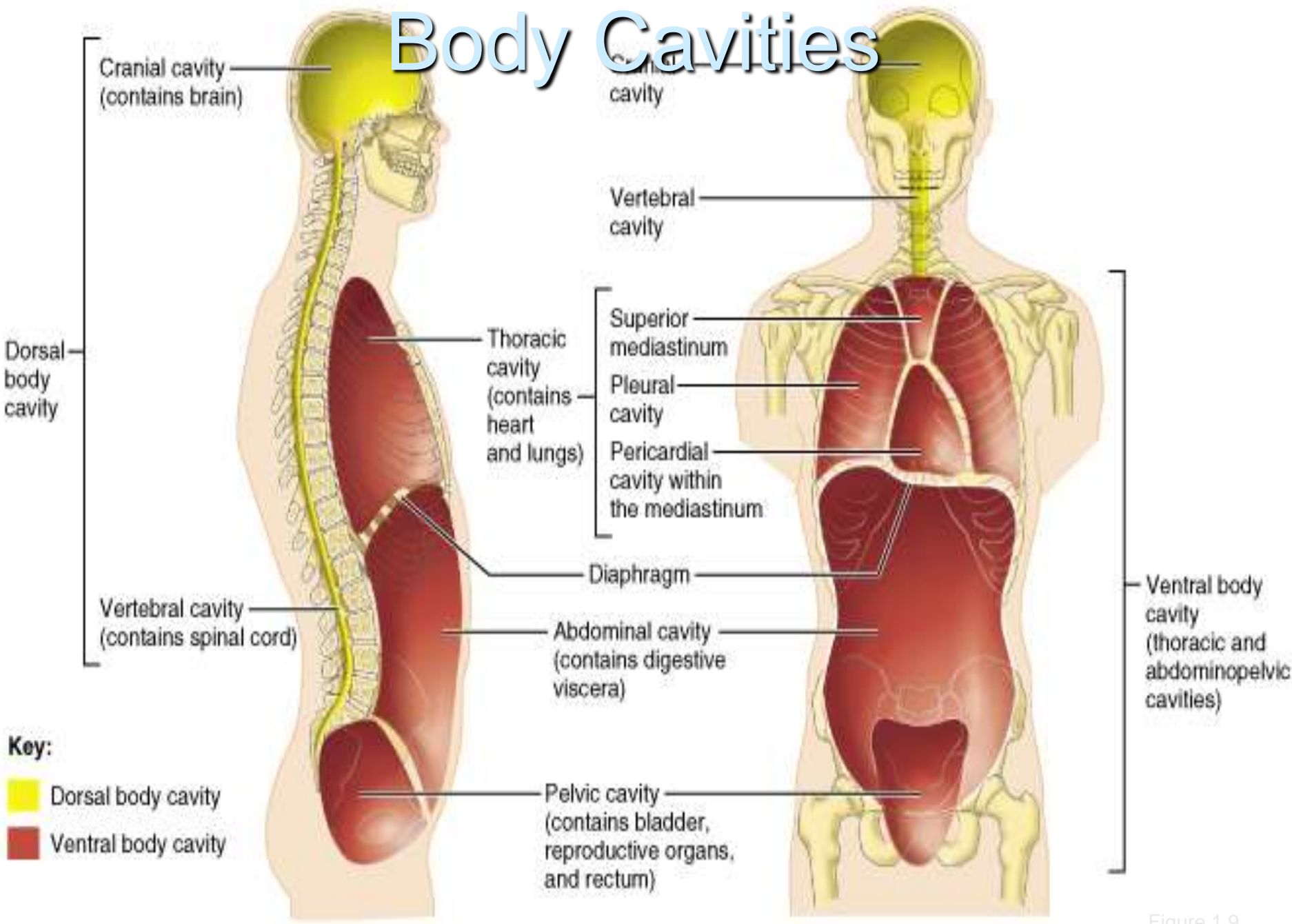
LUNGEN

Body Cavities

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Body Cavities



(a) Lateral view

(b) Anterior view

Figure 1.9

Ventral Body Cavity Membranes

- Parietal serosa covering the body walls
- Visceral serosa covering the internal organs
- Serous fluid separates the serosae

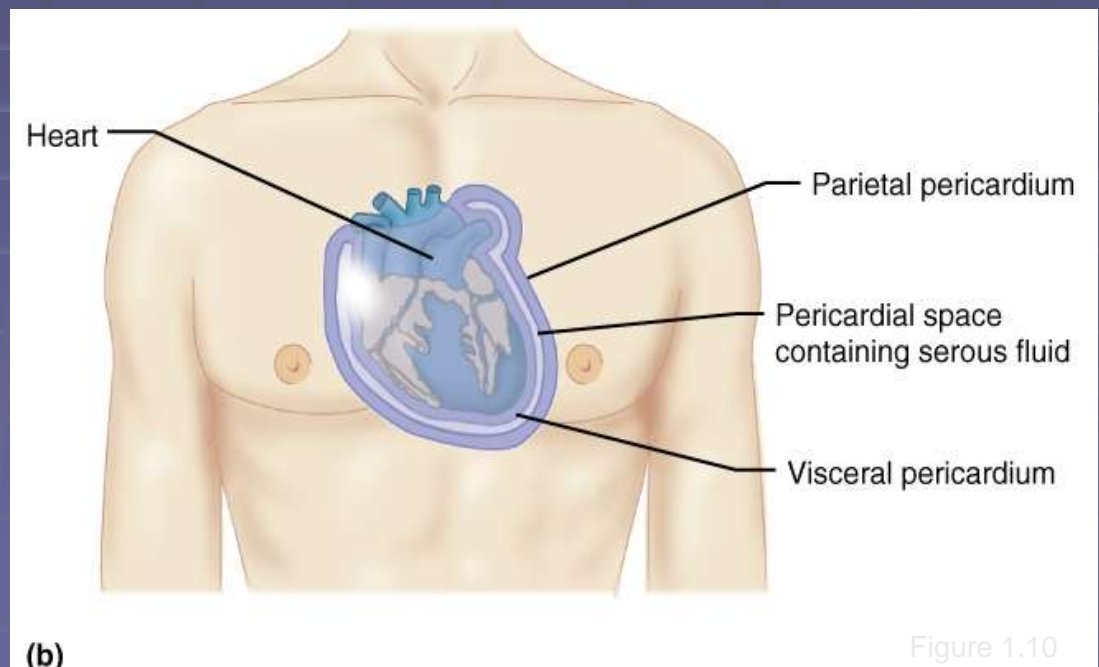
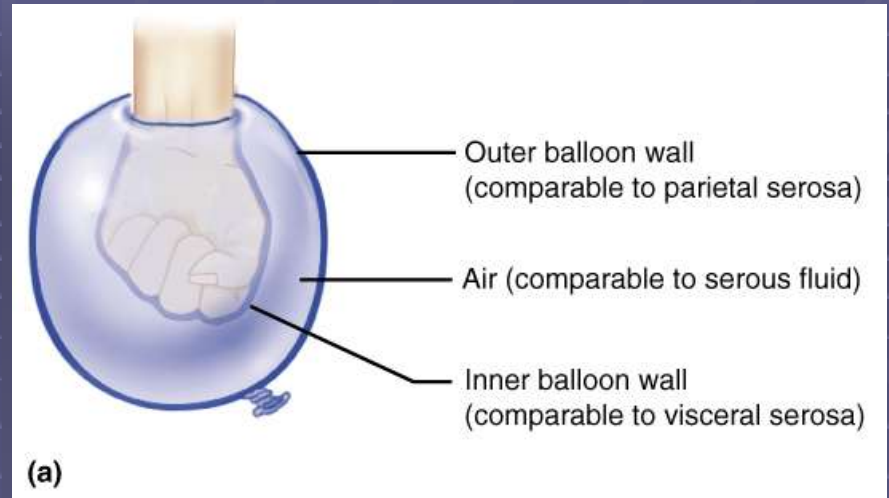


Figure 1.10