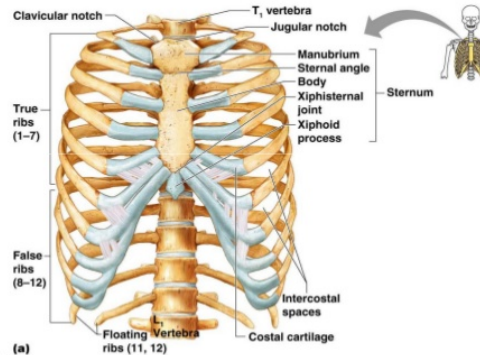
General Anatomy (Thorax)

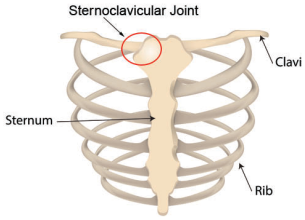
Thorax : trunk (chest, abdomen and pelvis), between the neck and the abdomen, separated from the abdomen by the diaphragm, and the skeleton is thoracic cage (sternum, 12 pairs of ribs and 12 thoracic (dorsal) vertebrae)



Thoracic upper is upper opening : **Thoracic inlet**

Lower opening closer to the diaphragm : **Thoracic outlet**

Sternum subcutaneous bone (thoracic bone) it has three parts: upper part manuboriam, middle part body, lower part xiphoid process



Jugular Notch : upper border of the manuboriam

Manuboriam articulates with median end of clavical and first rib : **sternoclavicular joint**

Sternal angle joins middle and upper part together > anatomical landmark (elevated area) it's important: attachment of the 2nd costal cartilage,

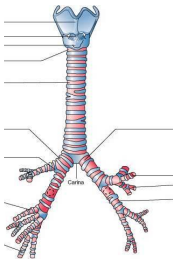
1. count the ribs and spaces between the ribs

The line passes between the 4th and 5th

2. it divides the mediastinum into superior and inferior

Where the trachea divide into primary bronchi is **Carina**

The arch of the aorta starts and ends at the sternal angle

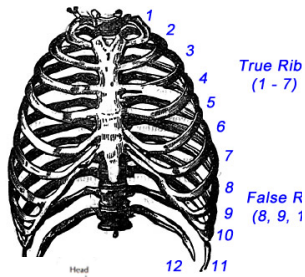


Ribs:

True 1-7 (own costal cartilages)

False 8-10 (8-9-10 attach to 7)

Floating 11-12 (no attachment, end in the anterior wall of the abdomen)

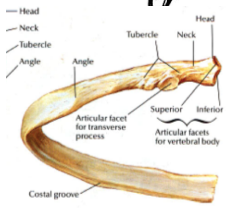


Each rib has a head, neck, tubercle, angle, body

Head has facets is a type of articulation (joining)

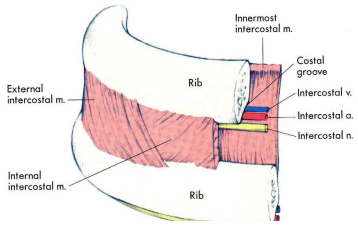
Head joins body of thoracic vertebra (body of the vertebra)

Tubercle articulates with the transverse process of the vertebra



Subcostal groove: under the rib you find subcostal groove, intercostal vein and artery and nerve

Neurovascular bundle inside the subcostal groove



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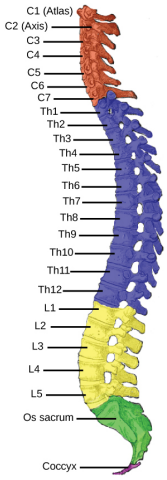
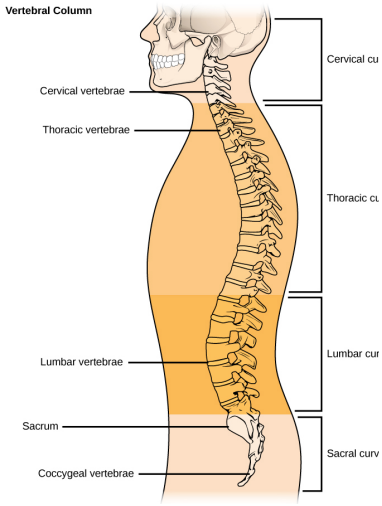
Ventral Rami form intervertebral nerves

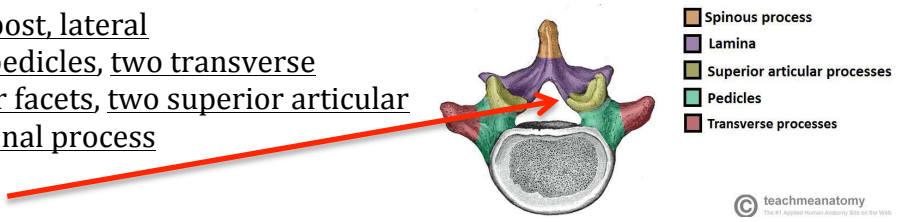




Spine: vertebral column > curvilinear structure
A part of the axial skeletal (one in the midline)
Consists of 33-34 irregular bones > vertebrae
Bones divided into 7 in the neck (C-cervical), 12 in the chest (T-thoracic/dorsal) and 5 in the lower back (L-lumbar) and 5 in the pelvis (S-sacral > form sacrum) and 4-5 in the pelvis (coccygeal > fuse to form coccyx)

total 33-34 Vertebrae divided into two grooves:

Atypical:
Typical: **all thoracic** : they consists of two parts
vertebral body and vertebral arch
We don't have facets in cervical or lumbar it's only in thoracic for articulation with the head of the ribs
Three dimensions: anterior, post, lateral
Vertebral arch includes two pedicles, two transverse process, two inferior articular facets, two superior articular facets and 2 laminal and 1 spinal process



Vertebral or spinal foramen
Vertebral column has the nerves, blood vessels and everything

Synovial joint formed by the superior articular facets and inferior facets

Laminal flat bony part join at the midline to form spinal process

Intervertebral foramen the space

Ventral body > anterior facets for articulation

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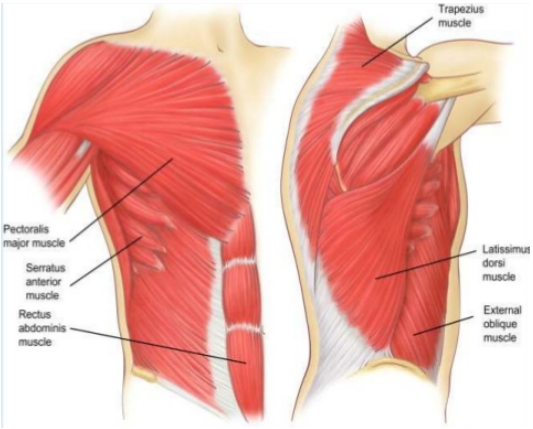
Anatomy Lecture 5

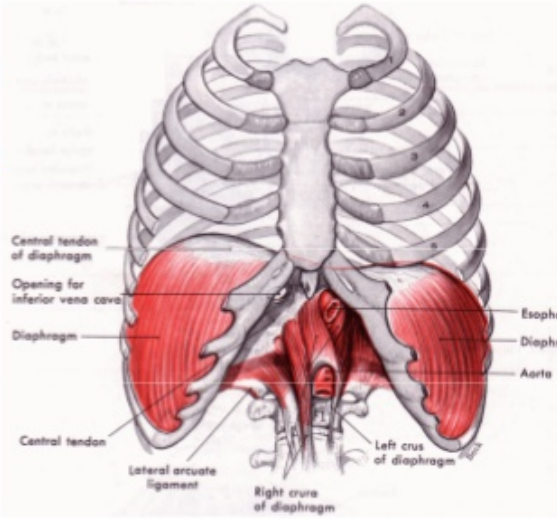
Muscles of thoracic walls:

Pectoral region: anterior of the chest: pectoralis major muscle and deep to it pectoralis minor
Attached to the ribs serratus anterior muscle.
Three muscles move the upper limb
Muscles of the back: Trapezius muscle and at the lower part of the back latissimus dorsi muscle > act on upper limb (moving)



Muscles between the ribs intercostal muscles: intercostal muscles are composed of three layer (external, internal and innermost)
Connect ribs together and help in respiration

Diaphragm: abdomen and thoracic cavities are separated by this layer
Central tendon white grey structure and peripheral part is the muscle
the most important muscle of respiration **Paralysis** of the diaphragm leads to respiratory failure



Right dome is higher than L dome because of the presence of the liver in the right side so it's pushed upward

Nerve for the diaphragm is **Phrenic nerve** that arises from the ventral rami of C3, C4, and C5

Neck injury might result in respiratory failure because of injury of Phrenic nerve

Another function is that when it contracts it becomes flat > depression inside the abdomen (increase the intra-abdominal pressure) * to help the digestive system to empty the intestines > defecation passage of stool from the digestive system and urinary bladder (urine)** micturition.

During labor, high pressure in the abdomen helps in ***parturition

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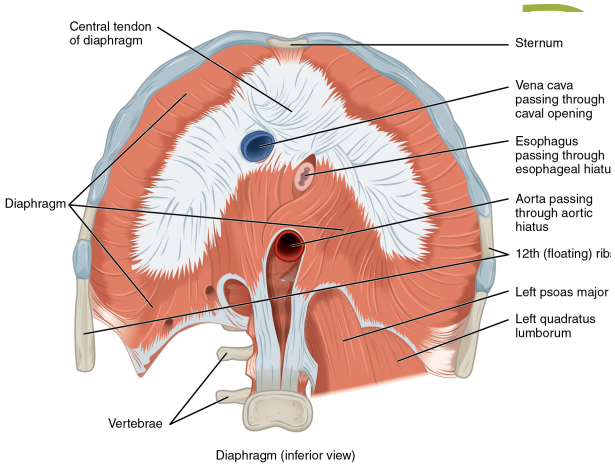
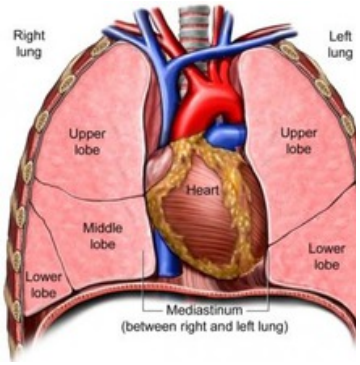


Three major openings in the diaphragm: esophagus (esophageal opening) **T10,** inferior vena cava (caval opening) **T8** and aorta (Aortic opening) **T12**

When the aorta passes from thoracic to the abdomen it changes its name to abdominal aorta instead of thoracic aorta

Thoracic cavity:

- Lungs and its coverings
- Mediastinum



Lungs:

Conical in shape base and an apex, spongy, and compressible because of elastic tissue.
Three surfaces: facing the ribs > **costal surface**
Inferior surface facing the diaphragm > **diaphramatic surface**
Medially > **mediastinal surface**
Loops: right lung > three lobes and two fissures (horizontal, oblique fissure) upper, middle and lower
Left lung > two lobes, upper and lower > oblique fissure (one fissure only)
Right lung is heavier
Left lung gives space to the heart so a part of it is missing

Each lung is covered by a serous membrane > **Pleurae**
Two layers: **visceral pleura** close to the lungs and **parietal pleura** close to the ribs
Hilum of the lungs area where things enter and leave the lung and it's not covered with pleura

Between the two layers we have potential closed space > pleural cavity and it's filled with fluid > **pleural fluid** for lubrication

The fluid will create a negative pressure to keep the lungs inflated
If it's ruptured or damage> air will enter and layers will separate so the lungs get smaller > **pneumothorax** > problems breathing
Or it's can ruptured or damage by increase in fluid or blood inside > **hydrothorax**

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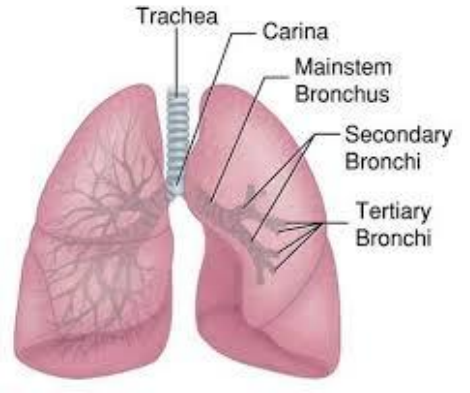
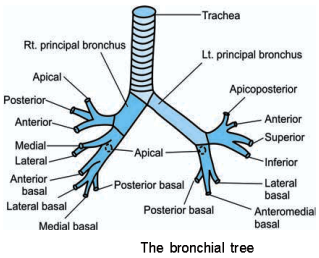
Respiratory system:

Conduction zone: starts from the trachea > main airway > divides to two primary bronchi depending on the # of lungs> right primary bronchus and left PB and the bifurcation is Carina

Depending on the lobes:
RPB > three secondary bronchi
LPB > two secondary bronchus

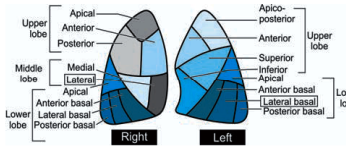


Each lobe subdivides into smaller segments:
Bronchopulmonary segment > functional unit of the lung > wedge shaped + a tertiary bronchus + BVs



The bronchial tree

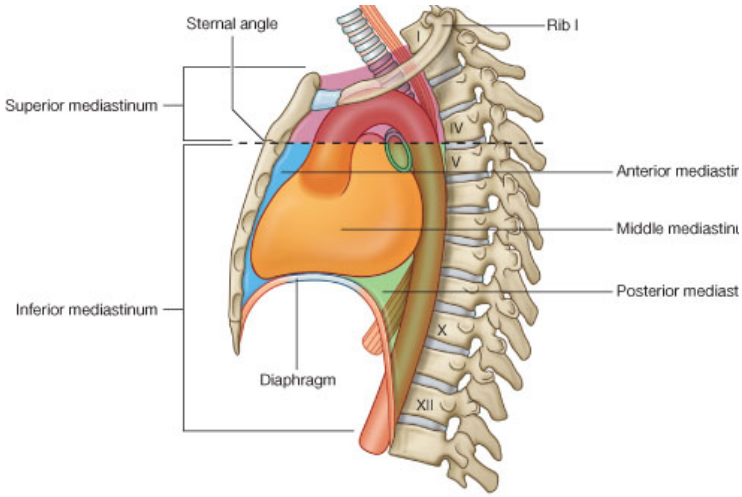
LPB > narrower
RPB > straight and wider > foreign body more likely enters the right PB because it's wider and straighter



The bronchopulmonary segments (lateral aspect)

Mediastinum: thoracic cavity minus lungs and pleura
Divide it by imaginary line from level of sternal angle between T4, T5

Superior, inferior and inferior is divided to middle, posterior (heart and vertebral column) and anterior



Superior:

- Superior Vena Cava
- Brachiocephalic vein
- Arch of Aorta
- Trachea
- Vagus nerve
- Phrenic nerve
- Thoracic duct
- Esophagus
- Thymus
- Left recurrent laryngeal nerve

-the vein in the head and neck > **internal jugular vein** right and left
-From the upper limbs **> left subclavian vein** and **right subclavian vein**
Both join to form **brachiocephalic vein** > right and left
Both of which join and form **superior vena cava** > enters the RA of the heart
Bring the blood from **the upper half of the body**

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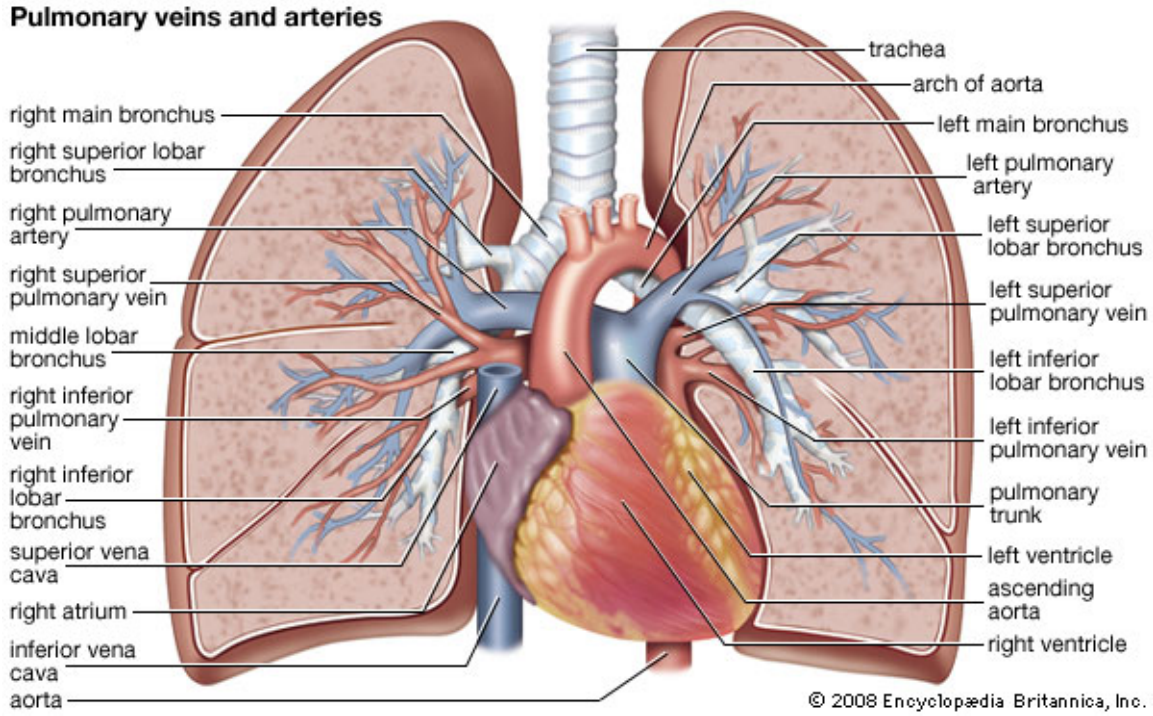
Arch of the aorta

Thoracic duct > lymphatic channel which end in the venous circulation
Thymus is a gland located behind the sternum > retrosternal gland
Larger during early childhood and it's smaller as we grow up

T Lymphocytes mature by thymus > thymosin help in maturing T lymphocytes

Vagus (10th cranial nerve)

Left Recurrent Laryngeal nerve > branches from vagus and arises in the chest and goes back to the neck



Inferior:

- Anterior mediastinum: Lies anterior to the pericardium. Contains the thymus, lymph nodes, and fats.
- Middle mediastinum: Heart, pericardium, phrenic nerve, and main bronchi
- Posterior mediastinum: Esophagus, azygus vein, thoracic aorta, thoracic duct,

Intercostal veins on the right side they end > **azygus vein**
On the left side > smaller vein hemiazygus

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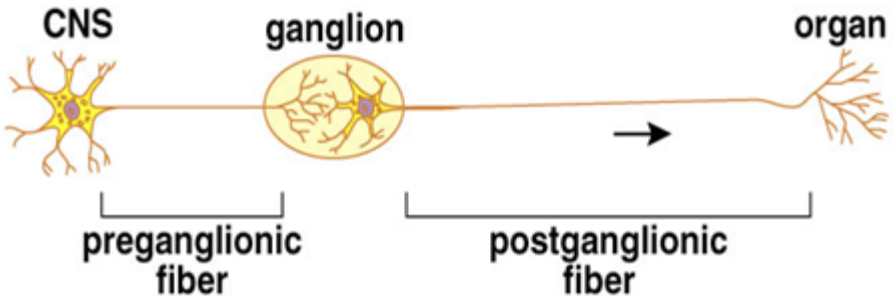
Functional Classification of Nerve:

- **Somatic** origin in CNS > (directly) effecter skeletal muscles
- **Visceral** (sympathetic and parasympathetic) : CNS > ganglion > effector

Nerve in CNS pass through ganglion then effector > the fibers are called preganglionic fibers between CNS and ganglion Between ganglion and effector > postganglionic fibers

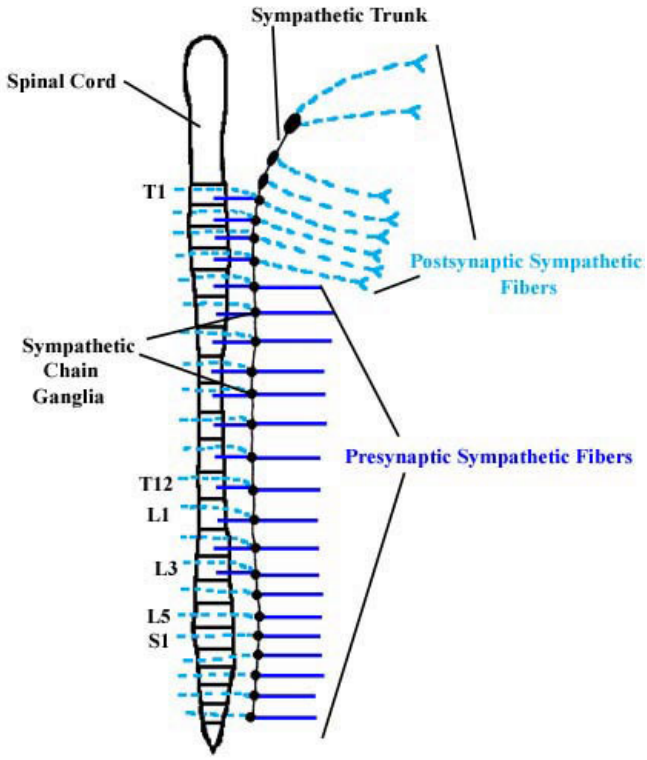


Parasympathetic: originate from brain and craniosacral outflow

Sympathetic: arises from the thorax and lumbar region of spinal cord > thoracolumbar outflow

- Preganglionic fiber of sympathetic is short because it's close to the ganglion
- Preganglionic fiber of Parasympathetic is long (to the effector)

Sympathetic chain (trunk): veins of sympathetic ganglion are connected to each other



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