

LECTURE 1

- Sympathetic** neurons:
 - Pre-sympathetic neurons (shorter) synapse at 2 different place
 - Sympathetic trunk (paravertebral ganglia): to head and thorax
 - Prevertebral/visceral ganglia: to abdomen
 - Run in splanchnic nerves to get to abdominal and pelvic viscera
- Parasympathetic** neurons:
 - Longer preganglionic fibres
 - Run in Vagus nerve for thorax and abdomen, or run in pelvic splanchnic nerves for pelvis
- Visceral afferent neurons follow sympathetic pathway go back to CNS at **same segment of spinal cord**, can also follow parasympathetic.
- Referred pain** is perception of pain in areas other than stimulation, usually due to common spinal segmental origin. Visceral afferent go back to T4, somatic afferent go back to T4, pain might refer to dermatome T4. This is due to convergence of two inputs to the same population of neurons at a given spinal segmental level.

LECTURE 2

- Role of thoracic wall:
 - Protects viscera underneath
 - Mechanical basis of breathing
 - Includes thoracic cage and covering
- Rib is flat bone, costal cartilage contributes to mobility of thoracic cage

True Ribs	False Ribs	Floating ribs
1-7, attach directly to sternum via costal cartilage	-8-10, attach to costal cartilage above	-11-12, have no anterior attachment

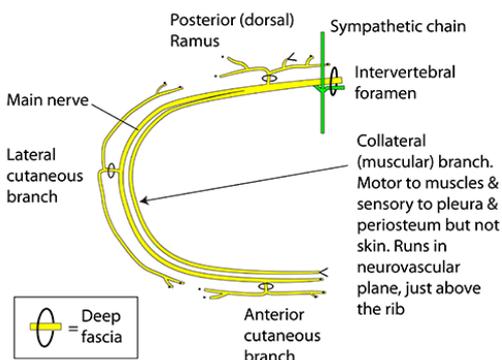
Typical ribs (3-9)	Atypical ribs (1,2,10-12)
<p>-2 facet on head</p> <p>Superior facet attach to demifacet of vertebra above</p> <p>Inferior facet</p> <p>Head (attach to vertebra posteriorly)</p> <p>Neck (transverse process)</p> <p>Articular facet</p> <p>Tubercle (~3cm on lateral & posterior aspect)</p> <p>Angle</p> <p>Costal groove -space for intercostal vessel, neurovascular bundles</p> <p>Shaft</p> <p>Curved and flat</p>	<p>-single facet</p> <p>Grooves for subclavian vessels</p> <p>Scalene tubercle attachment for neck muscle</p> <p>Superior view of rib 1</p> <p>very flat, have grooves and tubercle, and most curved</p> <p>-rib 11,12 shorter, do not have neck and tubercle</p> <p>T6</p> <p>T7</p> <p>7th RIB</p> <p>**not enough space on LHS, it is feature of articulation of typical ribs</p>

3. **Sternal angle/angle of Louis:** to identify **second** rib, at **T4**, known as manubriosternal joint (2nd cartilaginous)

External intercostal muscle (1 st)	Internal intercostal muscle (2 nd)	Innermost intercostal muscle (3 rd)
-fibre runs anteroinferior (front pocket)	-fibre runs posteroinferior	-fibre runs posteroinferior
-elevate thoracic cage	-medial part: elevation	-depress of thoracic cage
-work lateral to costochondral	other part: depression	
-deficient anteriorly to form external intercostal membrane	-deficient posteriorly to form internal intercostal membrane	-deficient posteriorly

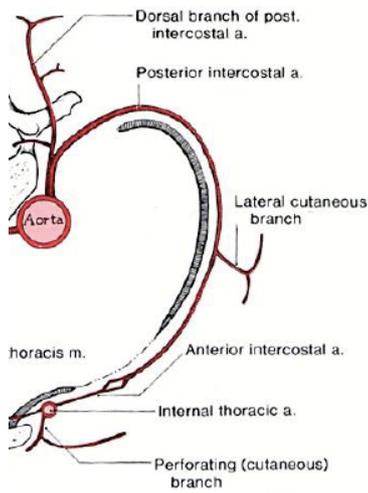
- Subcostal muscle (prominent posteriorly) and transversus thoracis assist with inspiration.
- Neurovascular bundles in **costal groove** high up in intercostal space, superior to inferior
 - vein, artery, nerve within internal and innermost intercostal muscle

TYPICAL INTERCOSTAL NERVE



Intercostal nerve (somatic nervous system) supply thoracic wall

- ventral rami of thoracic spinal nerve
- branch out to lateral cutaneous nerve to supply skin of lateral thoracic wall
- anterior cutaneous nerve to supply skin of anterior wall



Blood supply in thoracic (intercostal vessels-from 2 location):

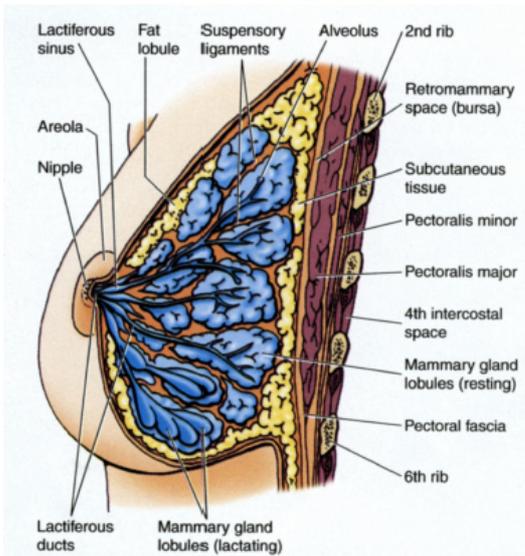
- posterior intercostal artery direct branch of thoracic aorta
- anterior intercostal artery from internal thoracic artery (arise from subclavian artery downwards, run postero-lateral aspect of the sternum)
- both anastomoses at anterior in intercostal space

VEIN:

- posterior intercostal vein drain into Azygous vein
- anterior intercostal vein drain into internal thoracic vein

Blood supply to breast:

- subclavian artery, internal thoracic artery, axillary artery, lateral thoracic artery, lateral mammary branches, lateral mammary branches of posterior intercostal arteries



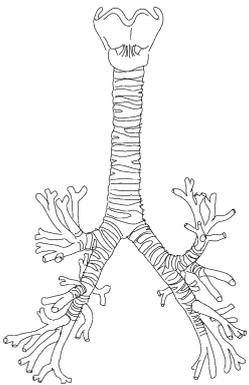
6. Mammary gland sit on fascia superficial to pectoralis major

- retromammary space is space between pectoralis major and mammary gland
- 15-20 lobules, each lobules contain alveoli which secrete milk
- lobules drained into lactiferous duct opened independently to nipple, so have 15-20 openings
- lactiferous sinus is dilated portion, store milk
- attached to skin and fascia by suspensory ligaments
- 2/3 lies on pectoralis major, 1/3 lies on serratus anterior
- nipple** is at **4th intercostal space** (between 4th and 5th rib), in **mid-clavicular line**, consist of smooth muscle that contract to erect during feeding, no fat, hair and sweat glands
- areola** is pigmented area around nipple, have sebaceous gland for lubrication
- in younger women, more connective tissue and gland so is denser while in older women, is fatty (low density)
- 75% of lymph from breast go to axillary nodes, some to parasternal nodes
- breast cancer usually derived from glandular epithelium in lobules.

LECTURE 3

1. Trachea and bronchi

- have cartilaginous ring around, but posteriorly deficient so allow it to expand if needed
- trachea arise beneath the cricoid cartilage (lower border of larynx)
- bifurcation occur at level T4/5



Right trachea/ lung	Left trachea/ lung
-R main bronchus shorter, wider, more vertical, so into R lung first	-L hilum: just one trachea opening
-R hilum, divide into 2 tubes (2 openings) earlier	-2 lobar bronchi (superior, inferior)
-3 lobar bronchi (superior, intermediate, inferior)	-oblique fissure separate to superior and inferior lobe)
- horizontal fissure separate superior and middle lobe, oblique fissure separate middle and inferior	-have cardiac notch due to heart project towards left
-have shallow cardiac impression on medial	-have deep cardiac impression in medial

- segmental bronchi (9-10 each side) run into each of the pulmonary segment and functionally

isolated (p.vein, p.artery)

- cartilage lost when going to lower airways, change name to bronchiole (no cartilage)
- apex of lung just above first ribs, vulnerable to damage
- posterior border of lung is more rounded compared to anterior border

2. Asthma involve in spasm (constriction) of smooth muscle around the lower airways (bronchiole)

3. Blood supply to lung (2 SYSTEMS)

- **Pulmonary blood supply:** gas exchanges at alveoli
 - 1 pulmonary artery carry deoxygenated blood from RV to lung, 2 pulmonary vein to LA from lung
 - pulmonary artery superior and posterior, pulmonary vein inferior and anterior
- **bronchial supply** for lung parenchyma (non-respiratory)
 - in between or within those connective tissue in alveoli
 - direct branches of descending aorta → bronchial arteries
 - supply wall of those airway, and connective tissue in lung
 - seen as small vessel in cross section of hilum
 - bronchial veins drain into Azygous vein (R)

Bronchopulmonary segments are the pyramid shaped with apex projecting to hilum and base on surface