



# **General Anatomy**

## **Lecture 8: Muscles of Thorax, Abdomen & Pelvis**

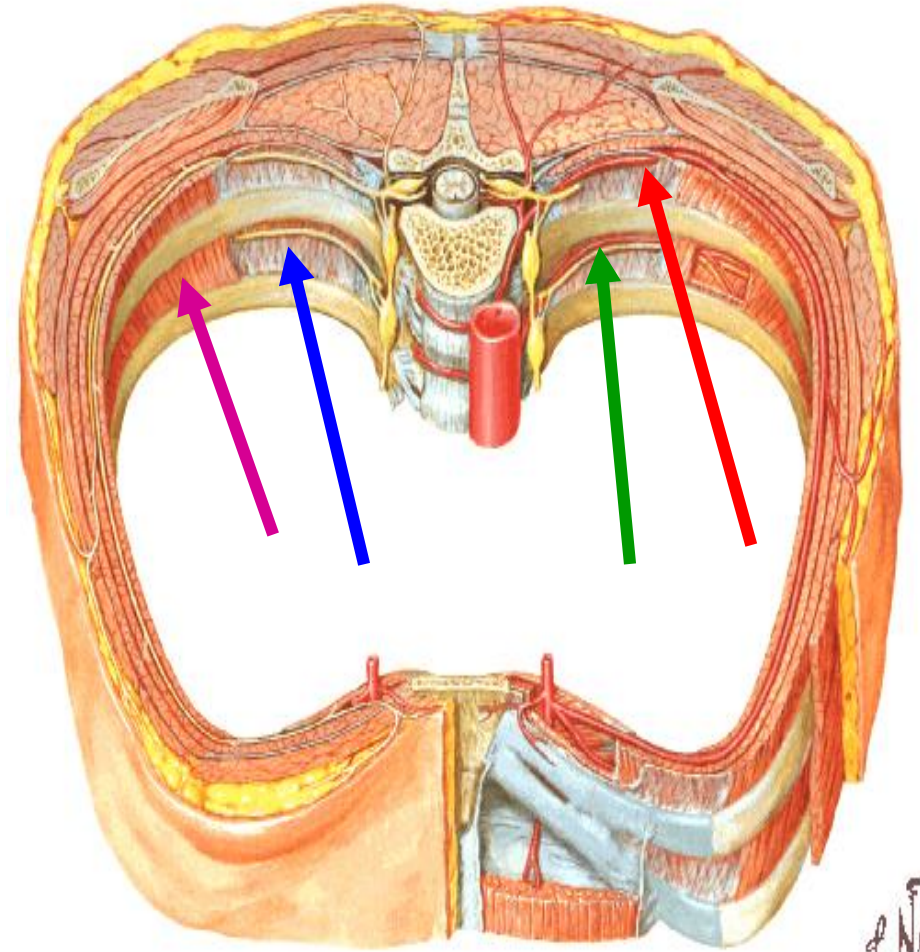
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# Thoracic Wall

\* Formed by the thoracic cage + the soft tissues which occupy the intercostal spaces.

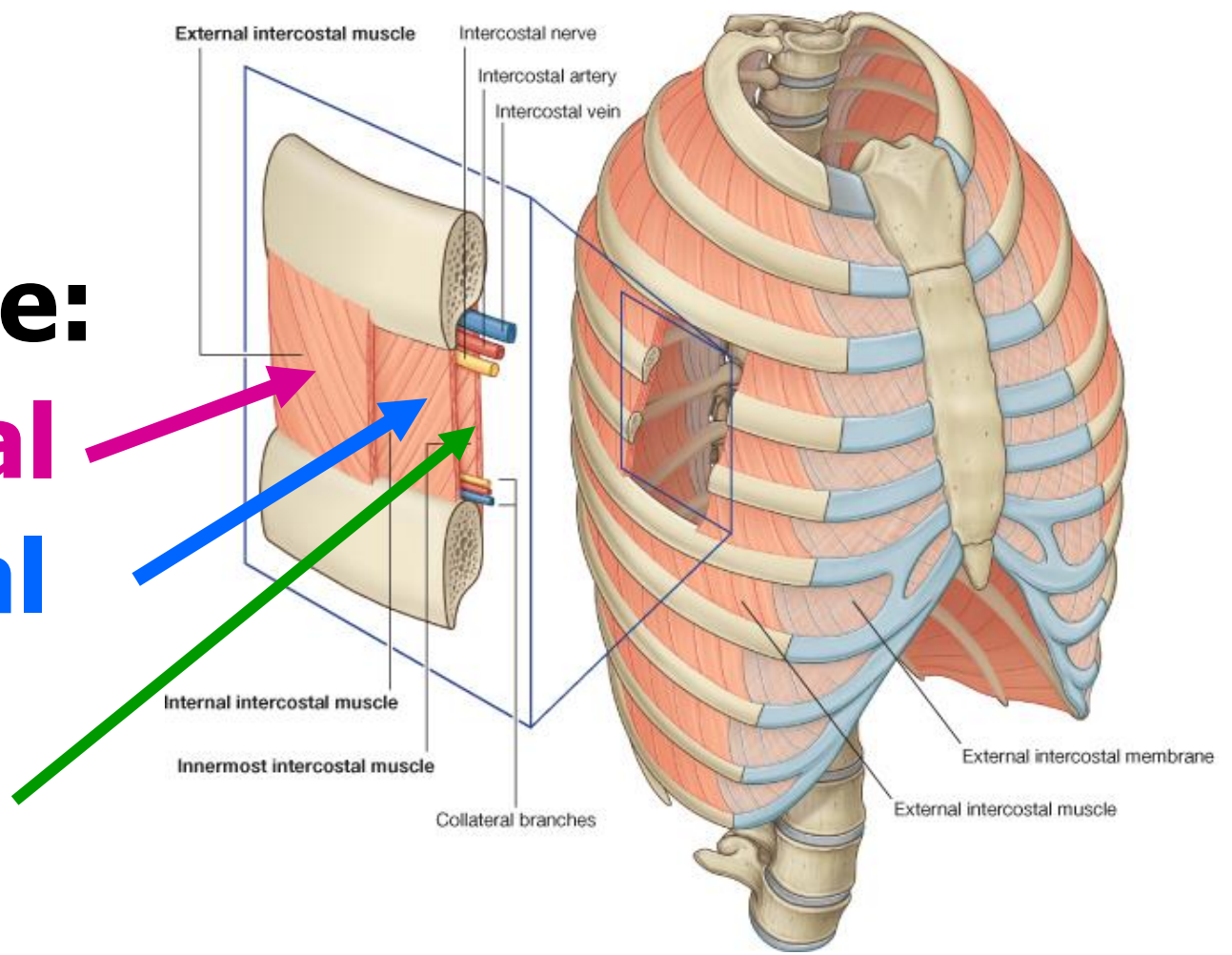
\* It includes Intercostal muscles, membranes, nerves & vessels.



# Intercostal muscles and membranes

**\*\* 3 layers of flat muscles from outside → inwards are:**

- 1. External intercostal**
- 2. Internal intercostal**
- 3. Innermost intercostal**

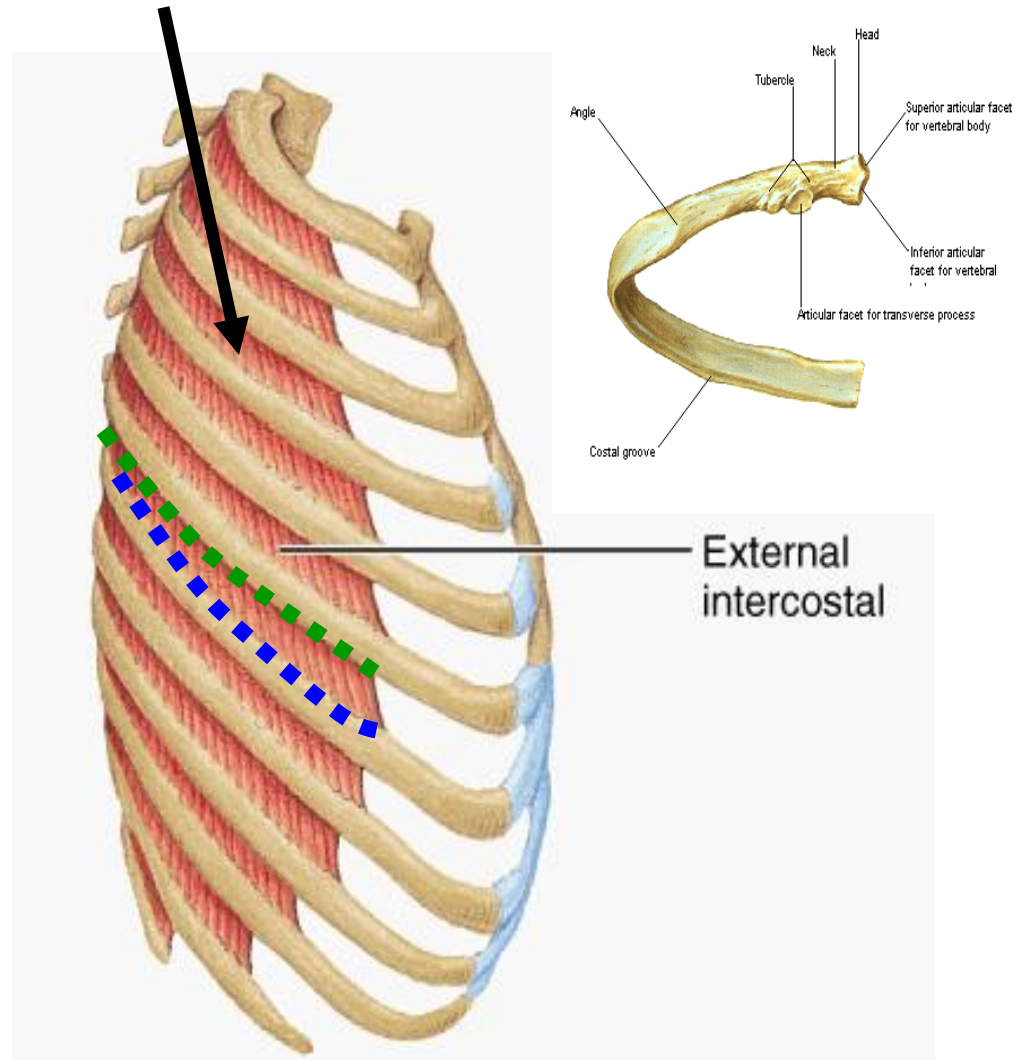


# 1. External intercostal Muscle

\* Direction of fibers  
→ obliquely downwards & forwards.

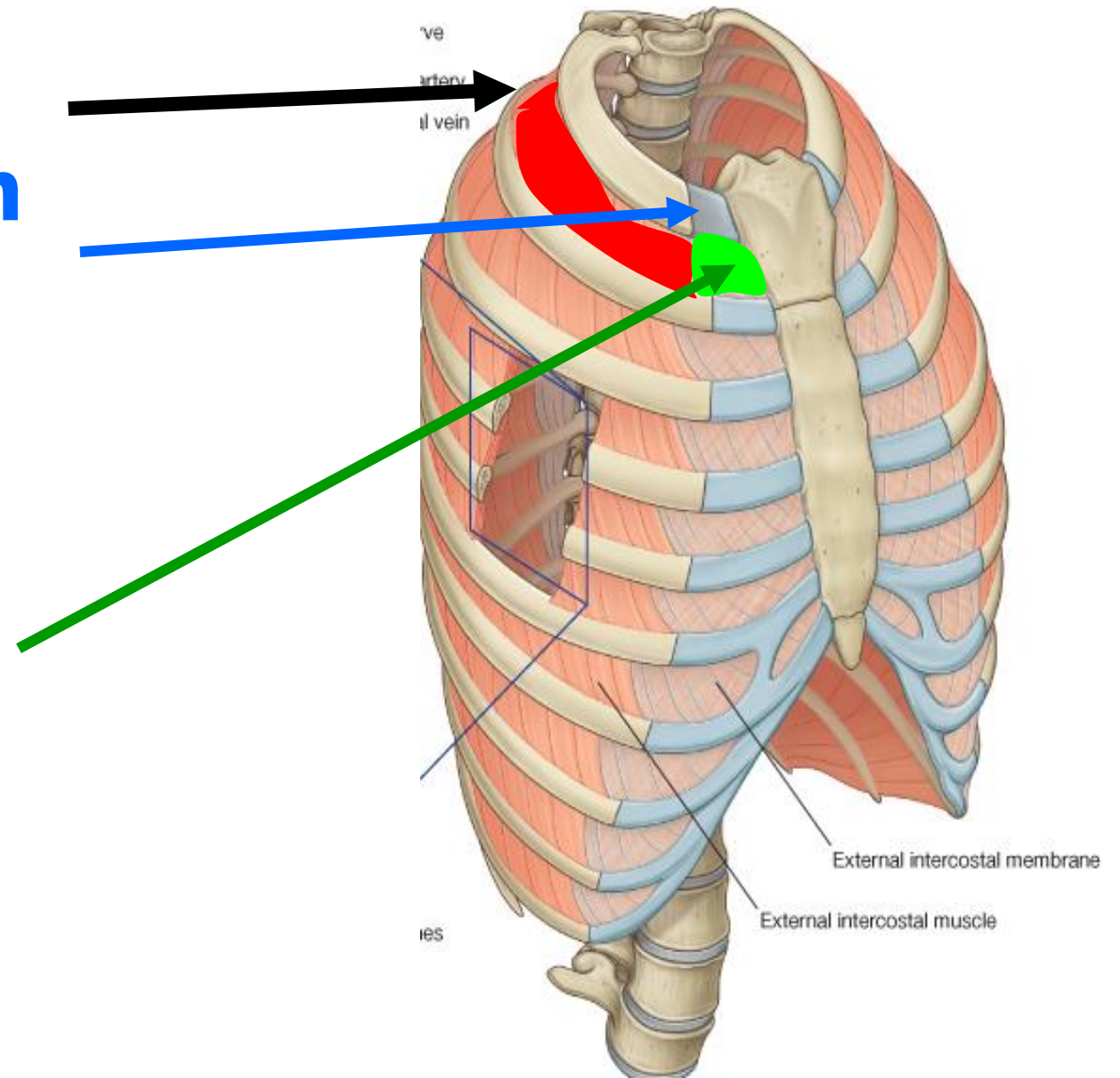
\* Origin → lower border of rib above.

\* Insertion → upper border of rib below.



# 1. External intercostal Muscle (contd.)

\* **Extent** → from from tubercle of rib posteriorly to **junction of rib with its costal cartilage (costo-chondral junction) anteriorly** where it is **replaced by external (anterior) intercostal membrane** which extends to lateral margin of sternum.

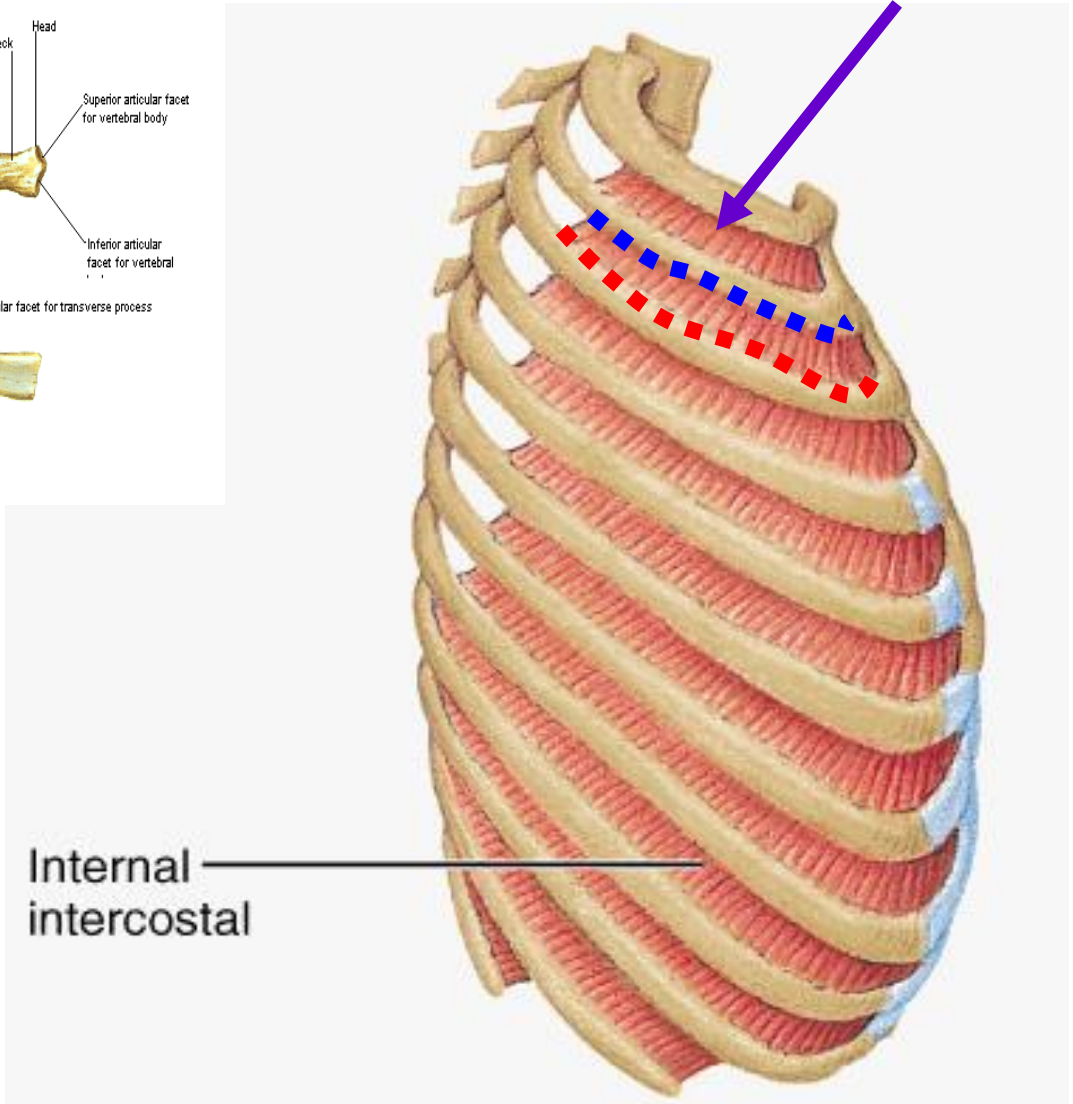
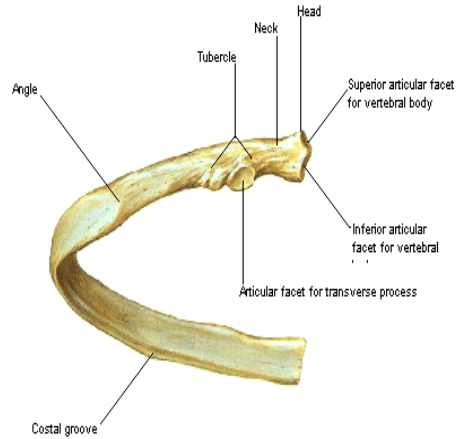


## 2. Internal intercostal muscle

\* **Direction of fibers** → downwards & backwards.

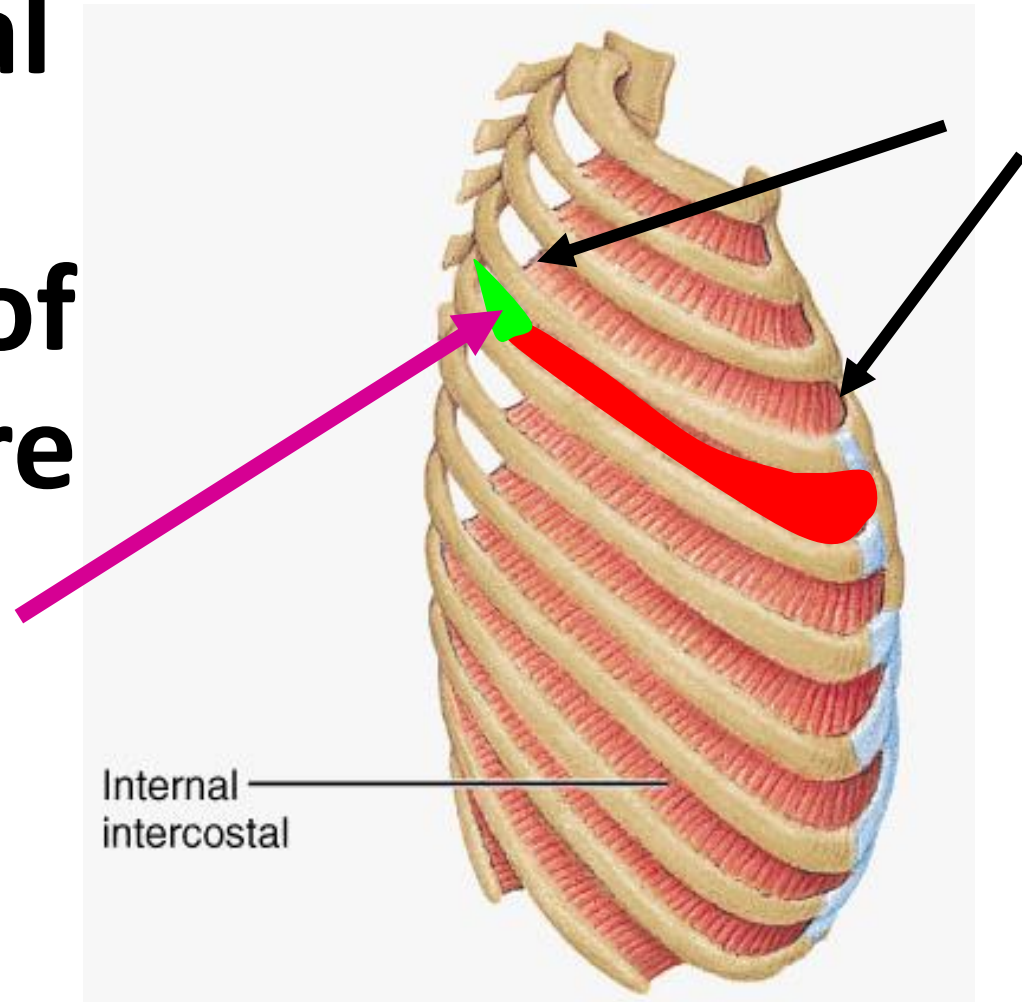
\* **Origin** → costal groove of rib above.

\* **Insertion** → upper border of rib below.



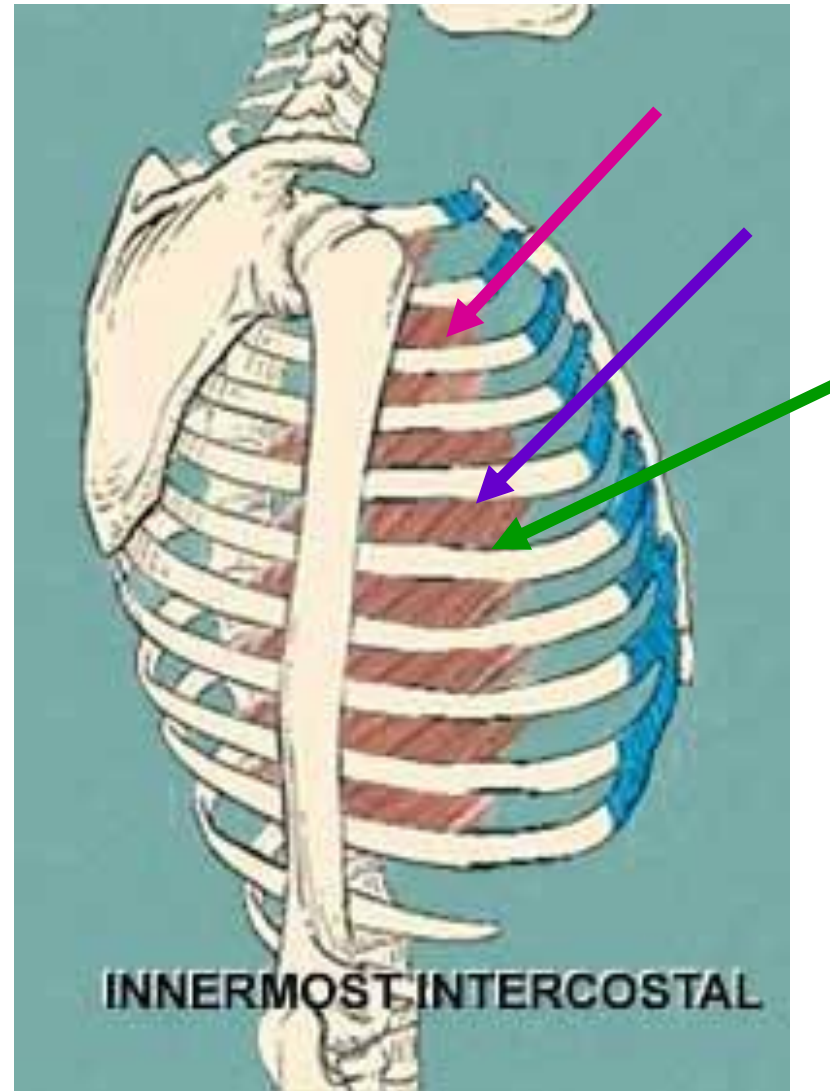
## 2. Internal intercostal muscle (contd.)

\* Begins from lateral margin of sternum anteriorly to angle of rib posteriorly where it is replaced by **internal (posterior) intercostal membrane.**



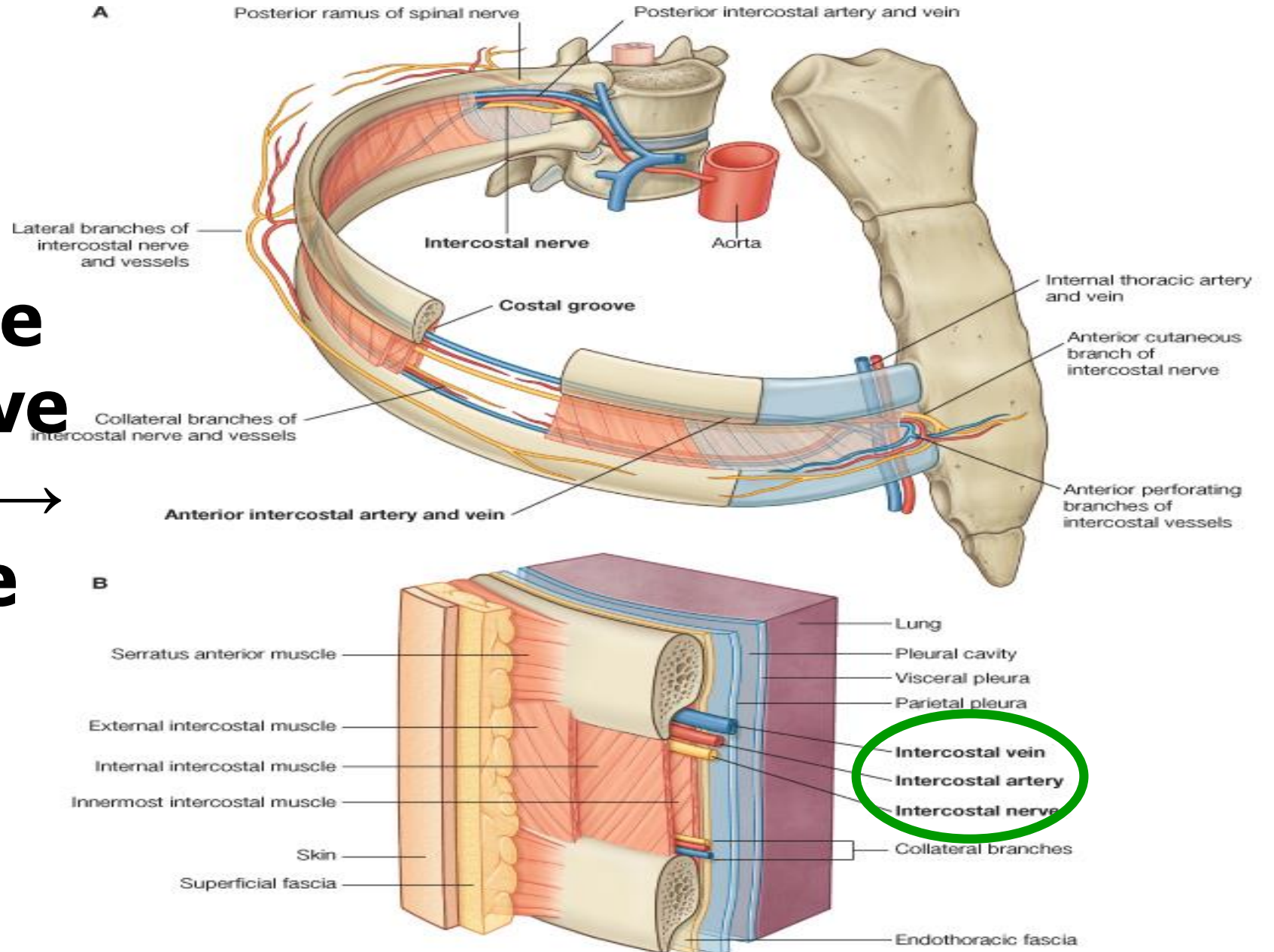
### 3. Innermost intercostal muscle

- \* It is the deepest part of internal intercostal which is split off by the intercostal nerve & vessels.
- \* **Direction of fibers** → downwards & backwards.
- \* **Origin** → costal groove of rib above.
- \* **Insertion** → upper border of rib below.
- \* Occupies the middle 2/4 of intercostal space.





**\* The neurovascular plane (i.e. the plane where the intercostal nerve & vessels run) → lie between the intercostal & innermost intercostal muscles.**



## **\*\* Action of Intercostals:**

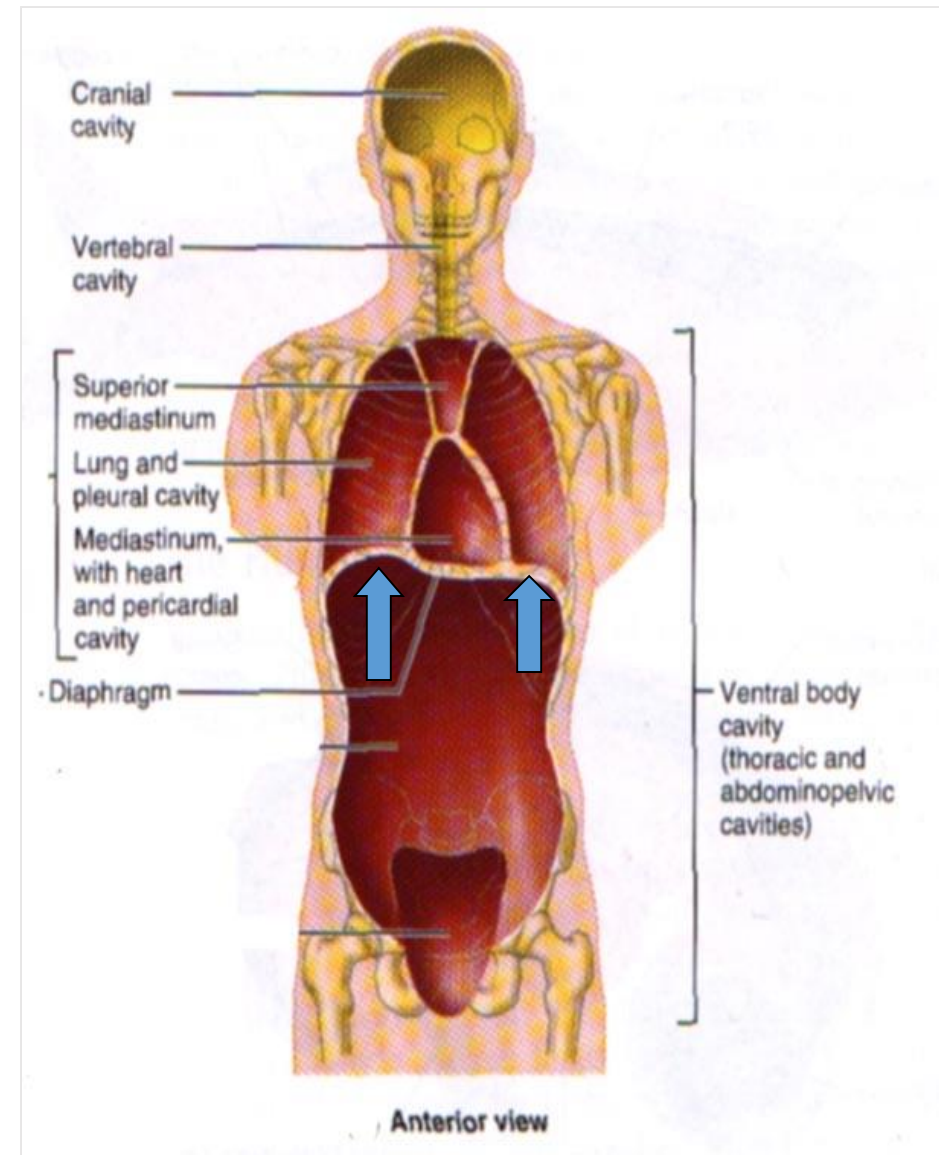
- **External intercostals → elevate the ribs (inspiration).**
- **Internal & innermost intercostals → depress the ribs (expiration).**

## **\*\* Innervation of Intercostal Muscles:**

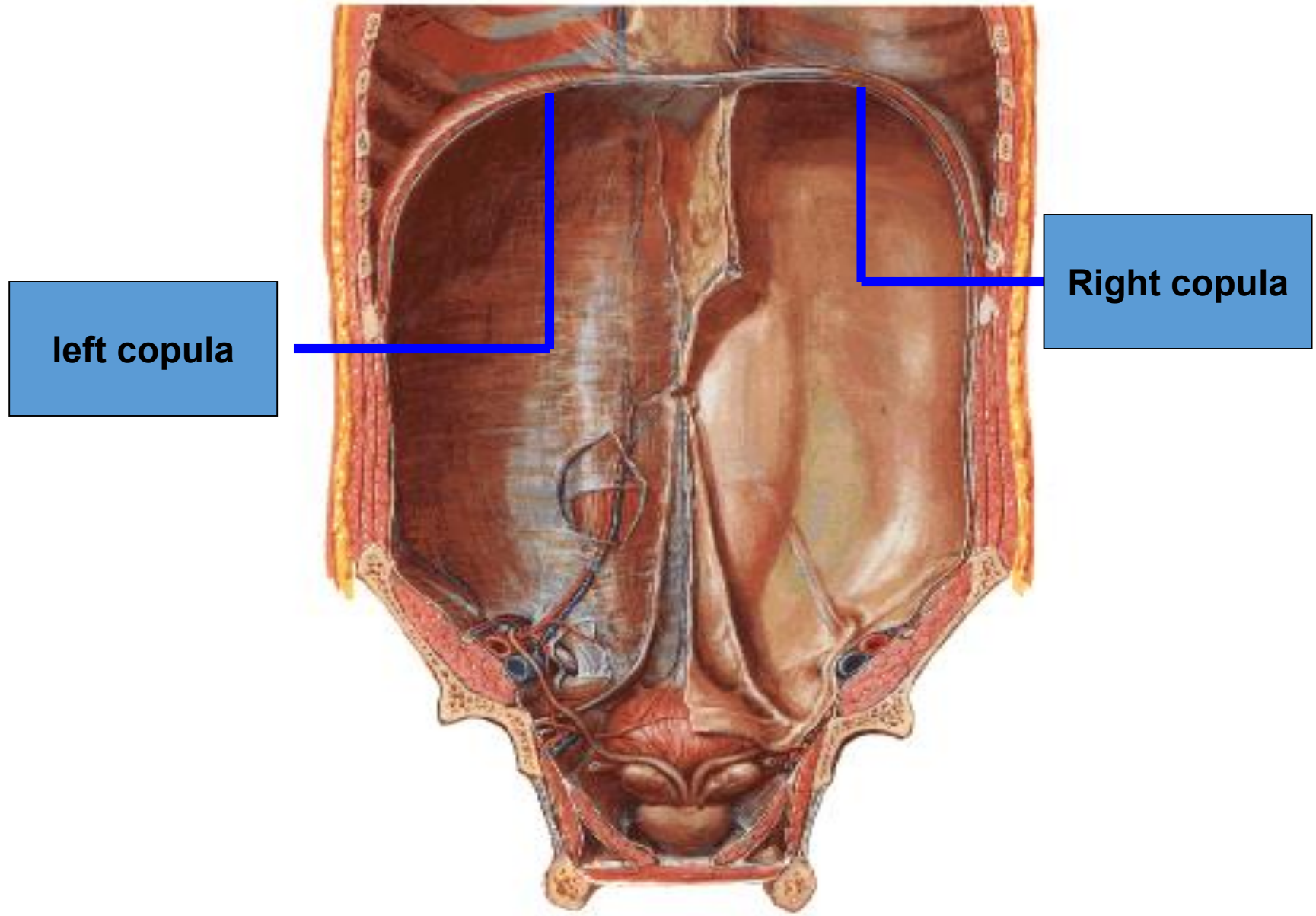
**All are supplied by the corresponding intercostal nerves.**

# SHAPE OF DIAPHRAGM

- \* **Dome shaped.**
- \* **A musculo-tendinous partition which separates the thoracic cavity from the abdominal cavity.**
- \* **Upper surface is convex towards the thoracic cavity.**
- \* **Lower surface is concave towards the abdominal cavity.**
- \* **Right side is called Right copula & bulges higher up than the left copula.**



# Internal View



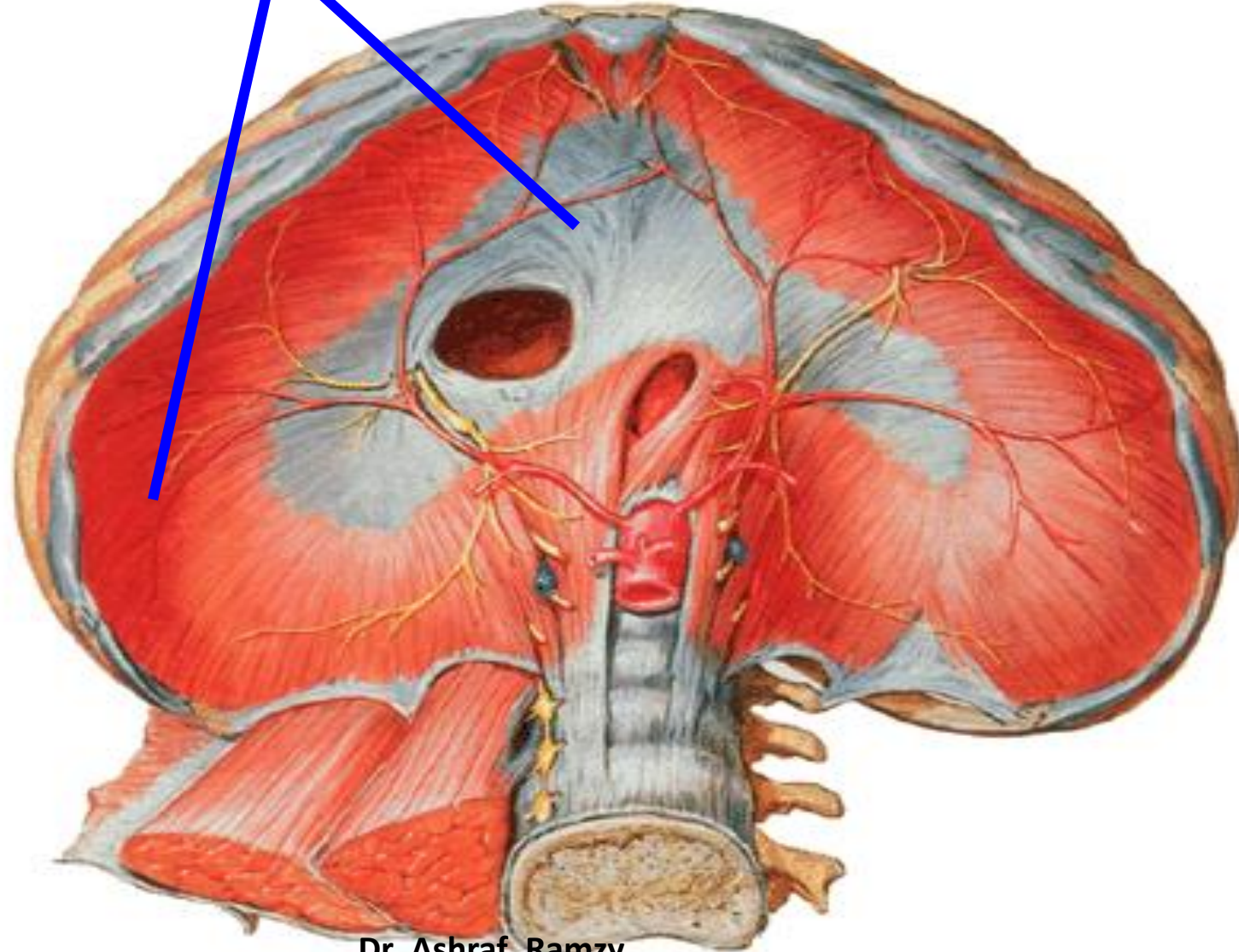
left copula

Right copula

# Diaphragm

## Abdominal Surface

musculotendinous

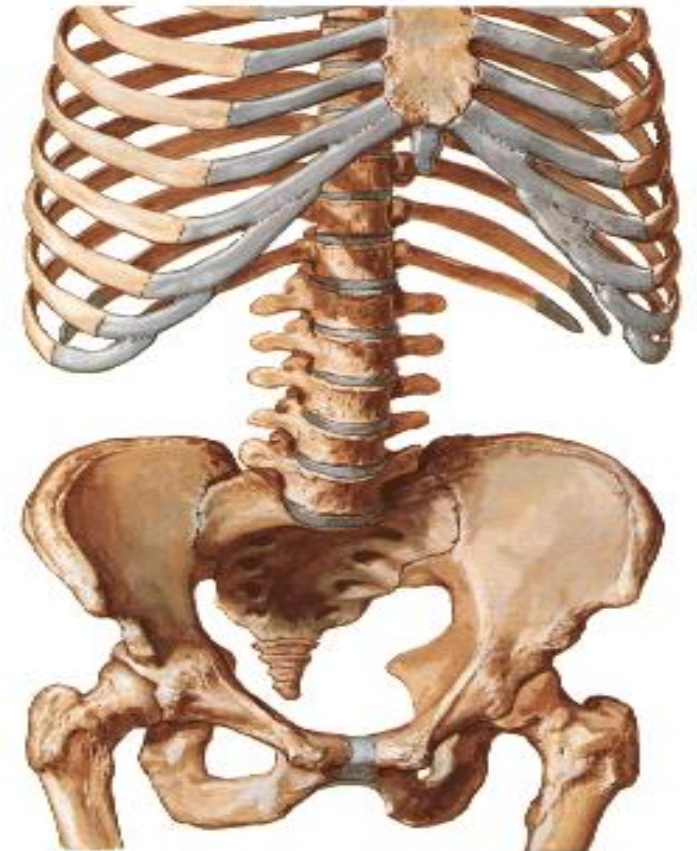
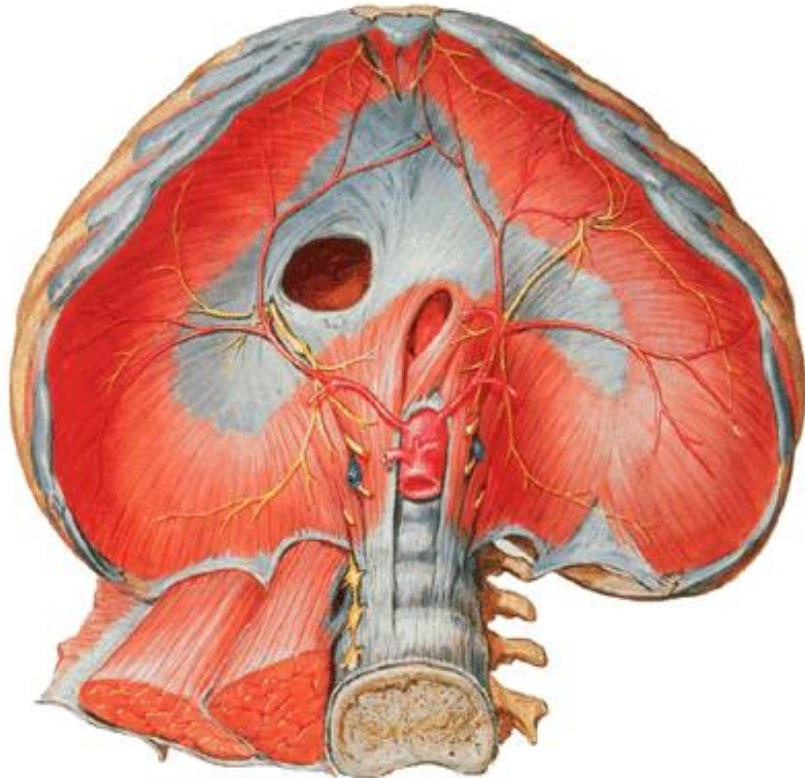


Dr Ashraf Ramzy

# Origin of the Diaphragm:

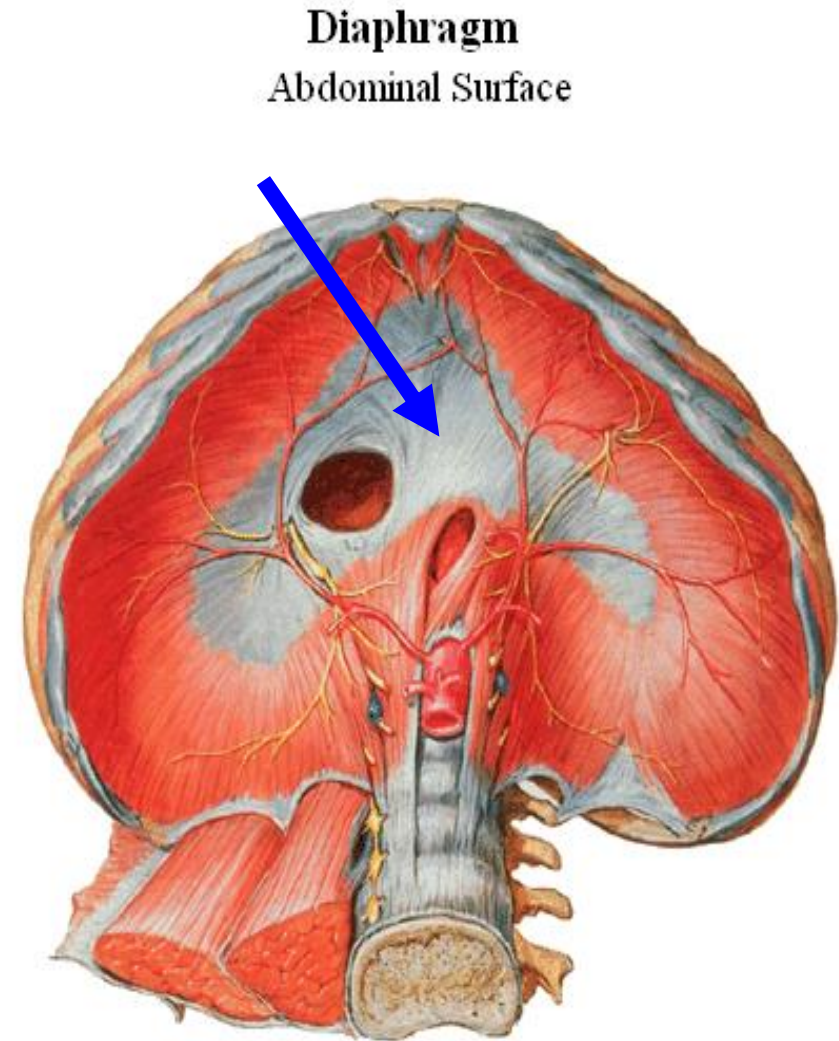
\* From circumference of the thoracic outlet:

1. Sternal origin → from back of xiphoid process.
2. Costal origin → from the inner surfaces of the lower 6 costal cartilages.
3. Vertebral origin → from upper 3 lumbar vertebrae.



# Insertion of Diaphragm:

- \* **Fibers from sternal, costal & vertebral parts converge to be inserted into a crescentic shaped **central tendon**.**
- \* **Central tendon is fibrous in structure, semilunar in shape & have one median & 2 lateral leaflets.**

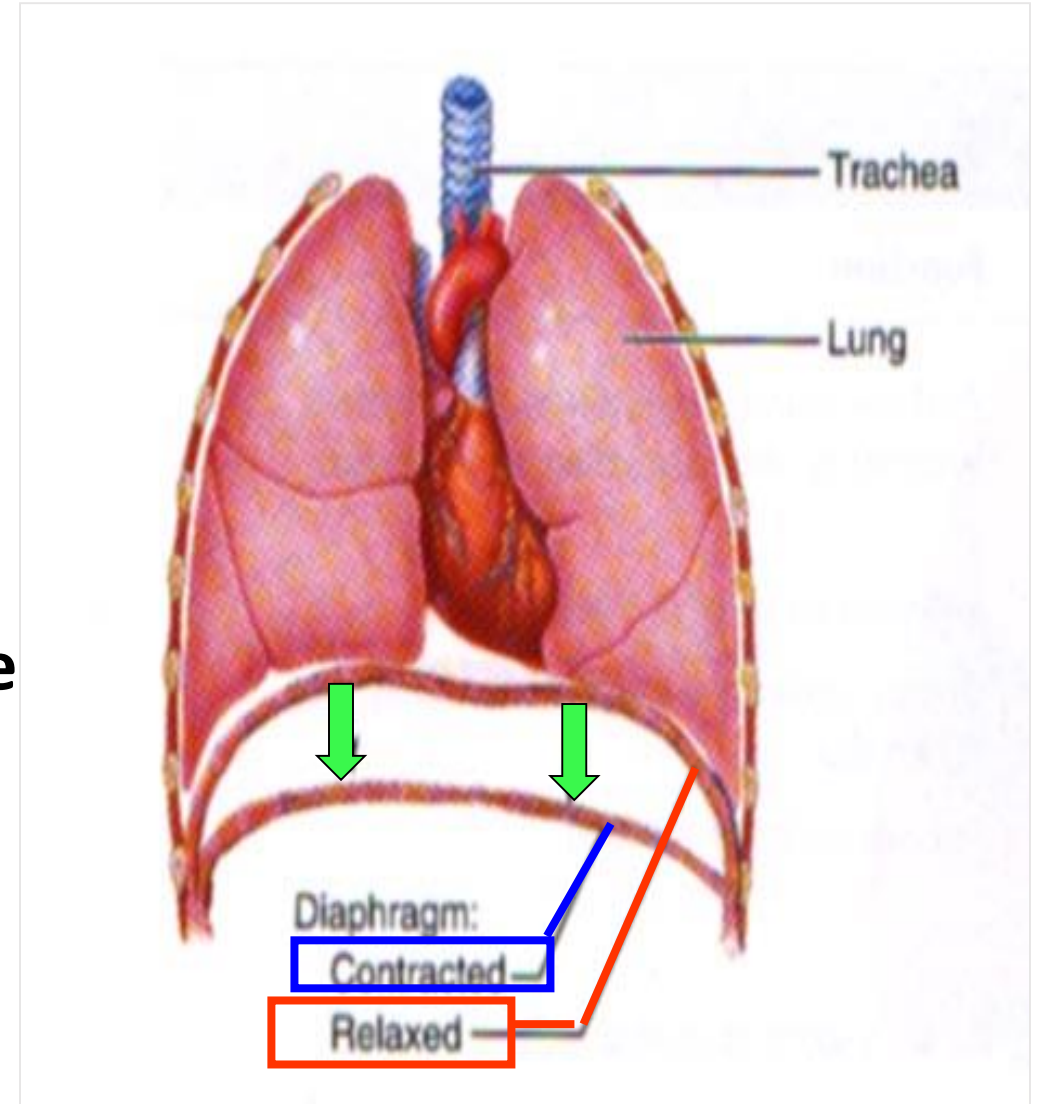


# Nerve supply of Diaphragm:

\* **Motor supply**: right & left phrenic nerves

# Action of Diaphragm:

- \* Diaphragm is the main muscle of inspiration.
- \* When it contracts → it descends to increase the vertical diameter of the thoracic cavity.
- \* It is active during forced expulsive acts, e.g. coughing, vomiting, defecation, urination and parturition.





# Major foramina of the diaphragm

## 1. Inferior Vena caval opening

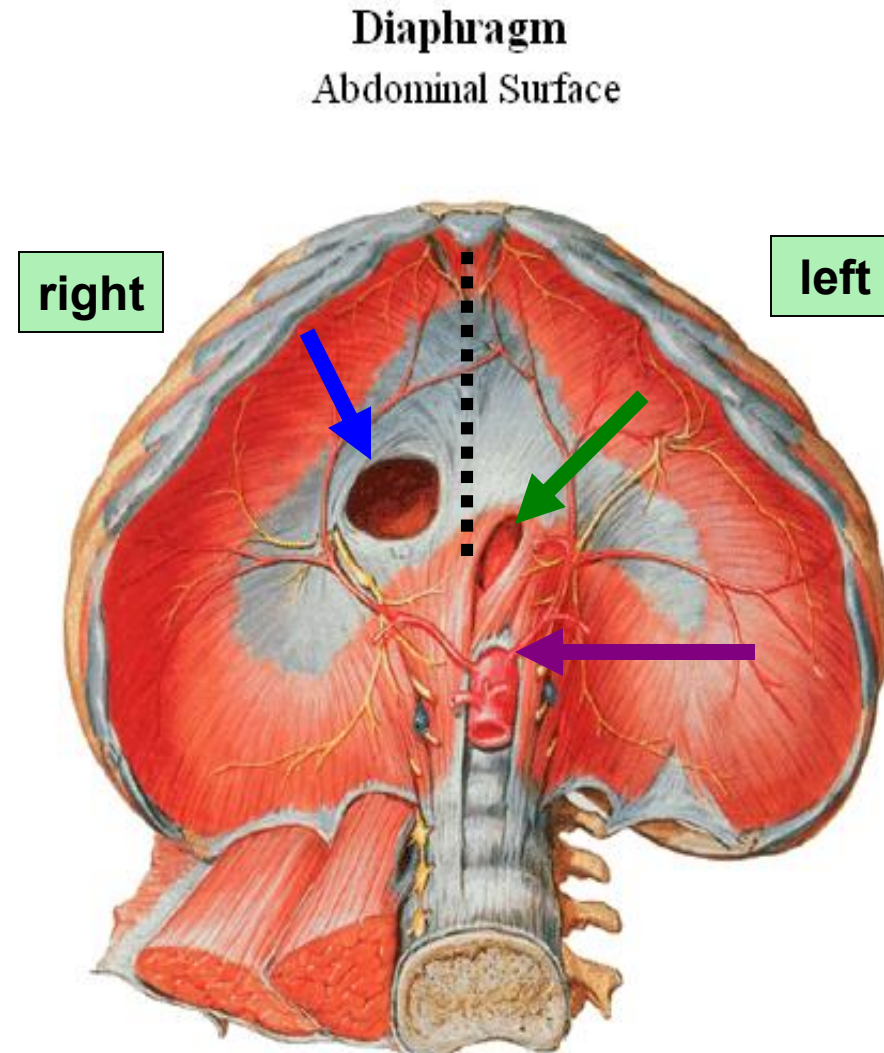
→ 1 inch to the right of median plane piercing central tendon.

## 2. Oesophageal opening → 1

inch to left of median plane piercing right crus.

## 3. Aortic opening → in mid line

behind median arcuate ligament.

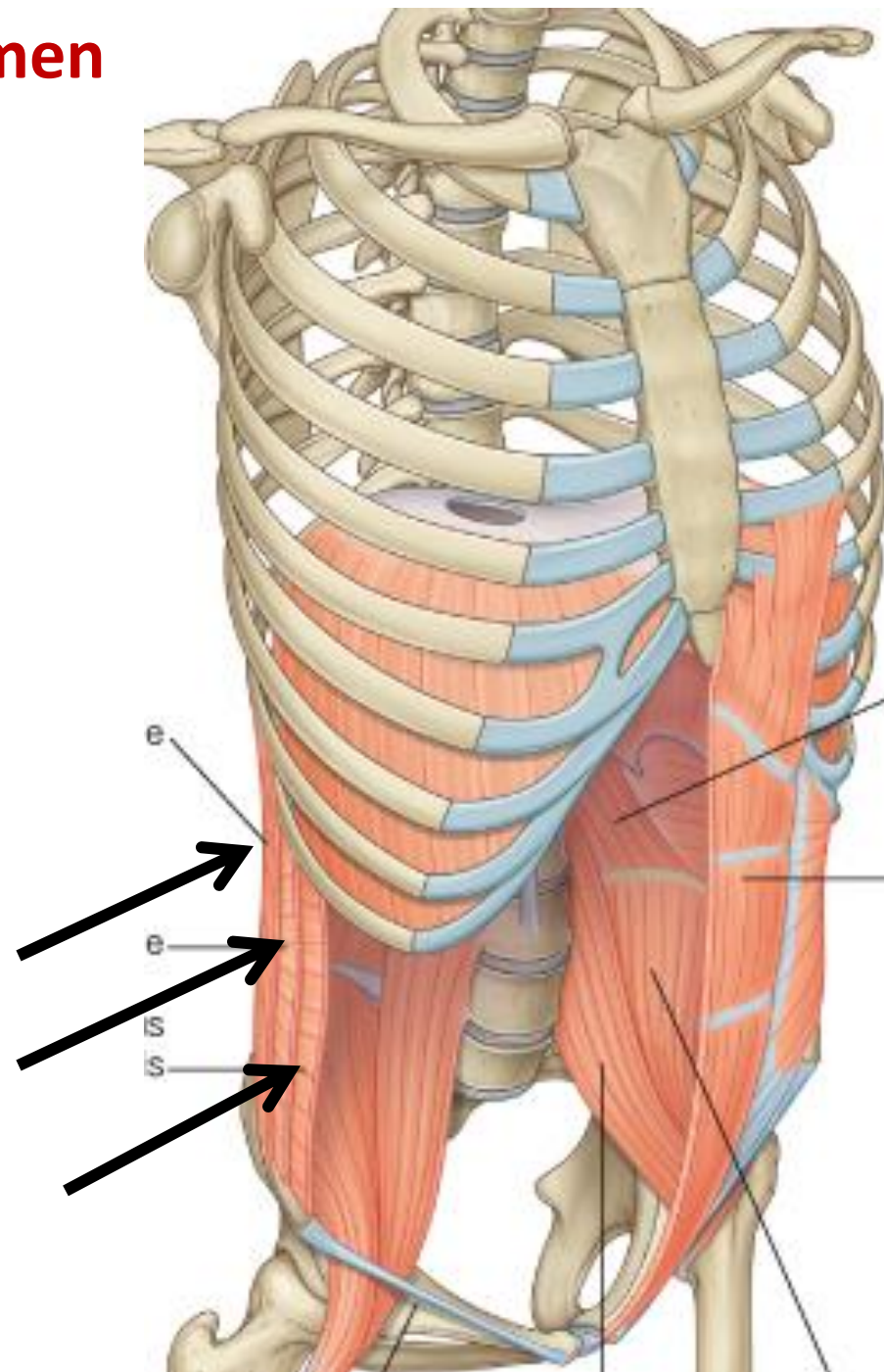


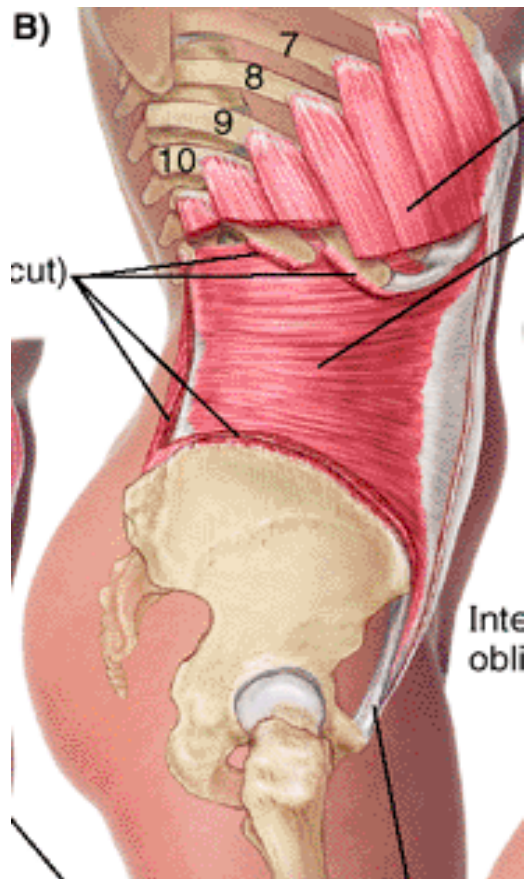
## Ms of the Abdomen

### Muscles of Anterior Abdominal Wall

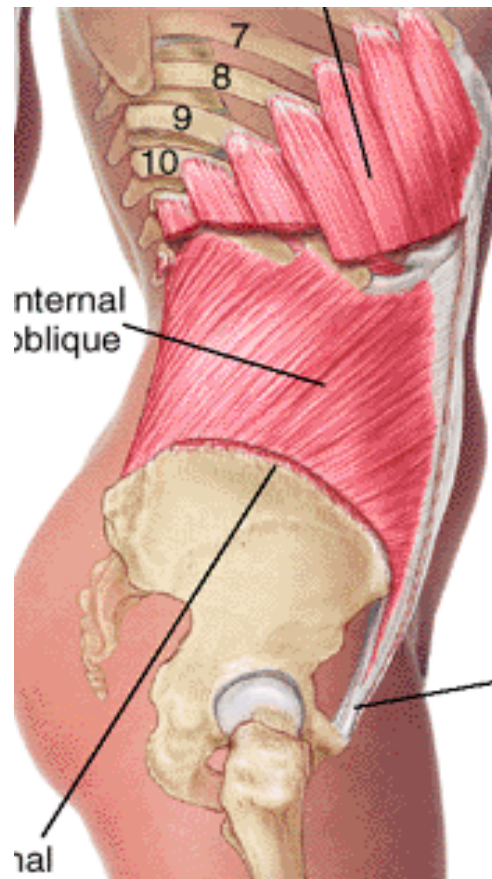
\* Three flat muscles whose fibers begin posterolaterally, pass anteriorly, and are replaced by an aponeurosis as the muscle continues towards the midline:

1. External oblique ms.
2. Internal oblique ms.
3. Transversus abdominis ms.

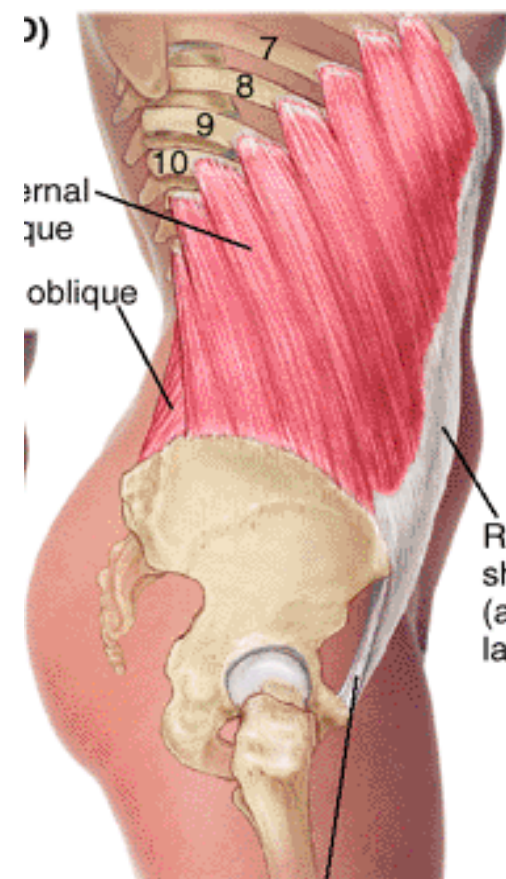




**Transversus abdominis**  
 (Its fibers run  
 transeversely)



**Internal oblique**  
 (Its fibers run obliquely  
 downwards,  
 backwards & laterally)



**External oblique**  
 (Its fibers run obliquely  
 downwards, forwards  
 & medially)

**They have different direction of muscle fibers to strengthen the abd. wall.**

\* The muscles have wide **fleshy origin** & **aponeurosis towards insertion** forming:

1. Rectus Sheath.

2. Linea alba

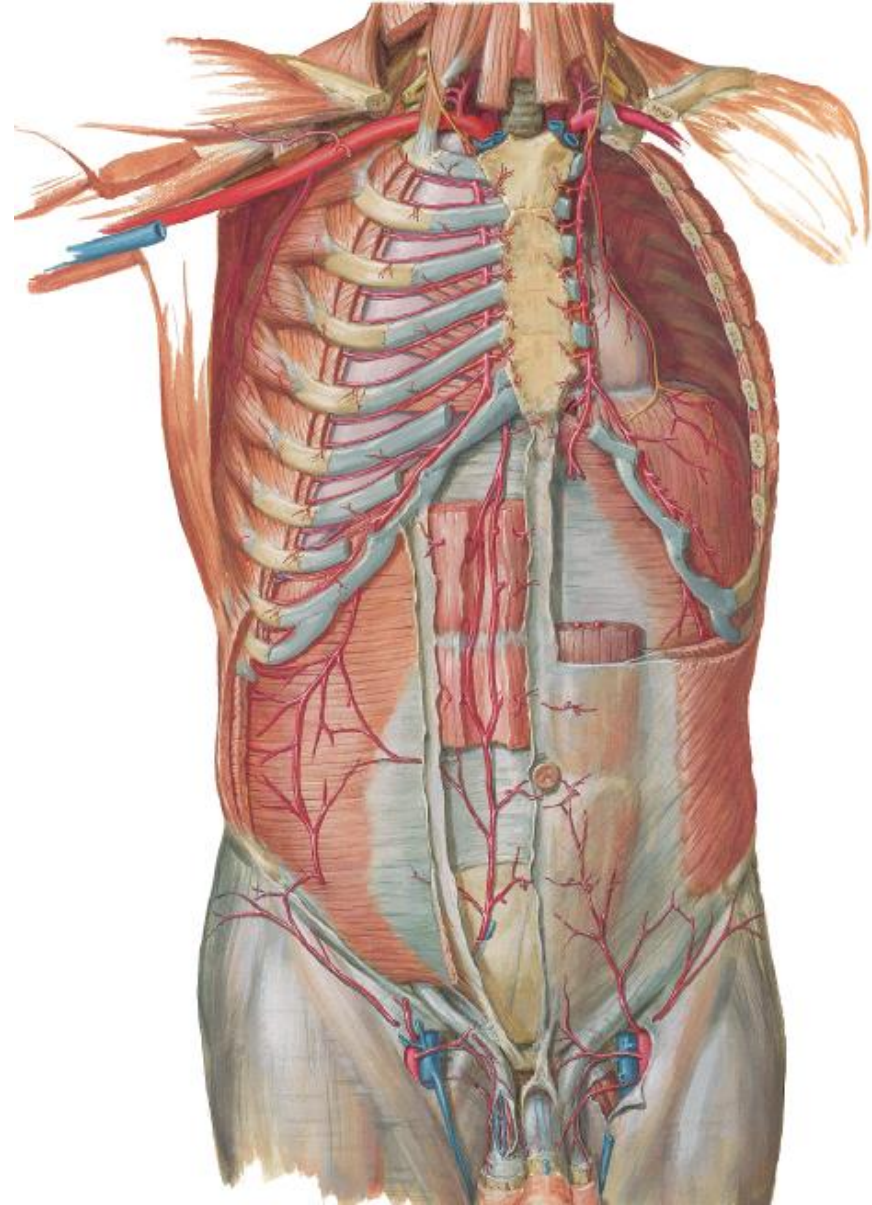
\* The **rectus abdominis** is a vertical muscle, near the midline, which is enclosed within a tendinous sheath (Rectus sheath) formed by the aponeuroses of the flat muscles



**\* Neurovascular  
plane:**

**\* Lies between  
internal oblique &  
transversus  
abdominis.**

**\* Vessels & nerves  
run in this plane.**



## **\*\* Innervation of muscles of Anterior Abdominal Wall:**

**The 3 anterolateral muscles & the rectus are supplied by lower six thoracic spinal nerves (T7 to T12).**

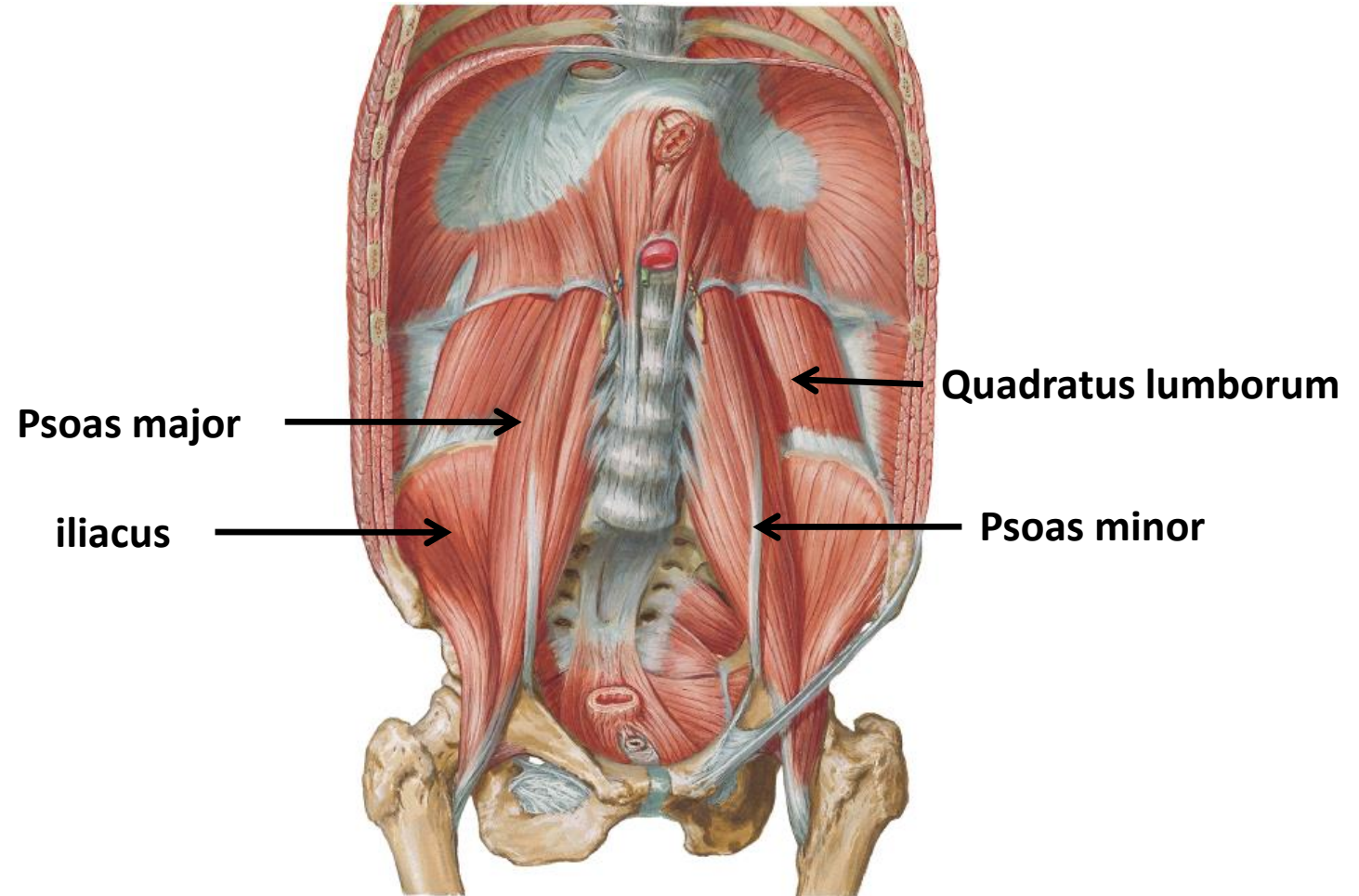
## **\*\* Action of muscles:**

- 1. Support & protect abdominal contents.**
- 2. Expiration.**
- 3. Expulsive acts as vomiting, micturition, defecation, labour.**
- 4. Movements of the trunk:**
  - \* Flexion of the trunk.**
  - \* Lat. Flexion of the trunk.**

# MUSCLES OF POSTERIOR ABDOMINAL WALL

They are 4 muscles:

1. Psoas major.
2. Psoas minor (may be absent).
3. Quadratus lumborum.
4. Iliacus.



# 1. Psoas Major

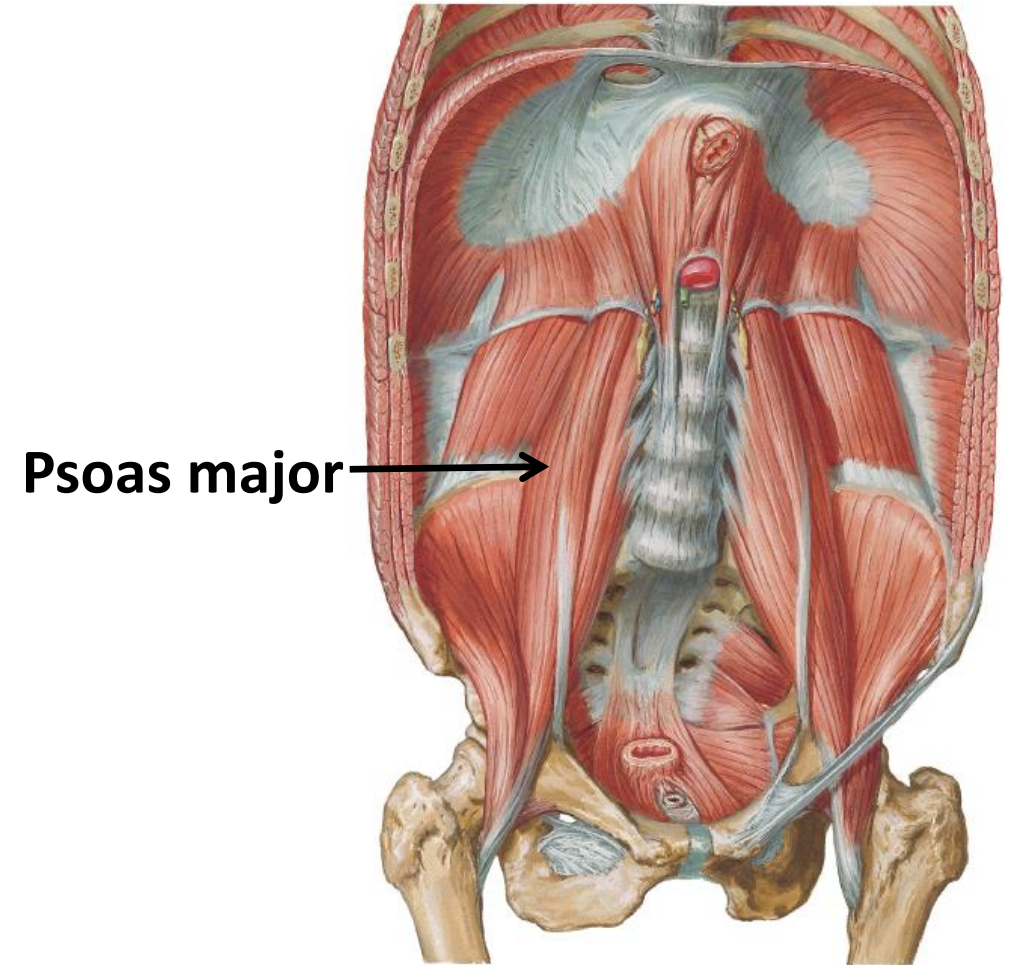
\* **Origin:** from lumbar vertebrae.

\* **Insertion:** into lesser trochanter of femur.

\* **Action:**

1. The main flexor of thigh (hip joint).

2. It can flex the trunk on the thigh

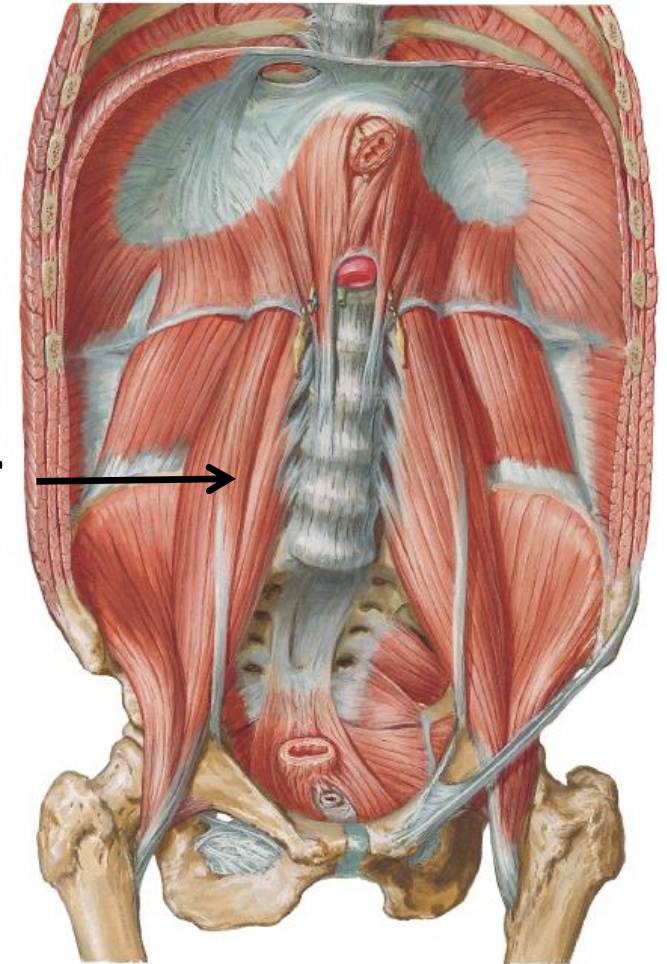




## 2. Psoas Minor

- \* **May be absent.**
- \* **Origin:** from 1<sup>st</sup> lumbar vertebra.
- \* **Insertion:** into hip bone.
- \* **Action:**  
Helps in flexion of thigh (hip joint).

Psoas minor



# 3. Quadratus Lumborum

\* **Origin:** from iliac crest of hip bone.

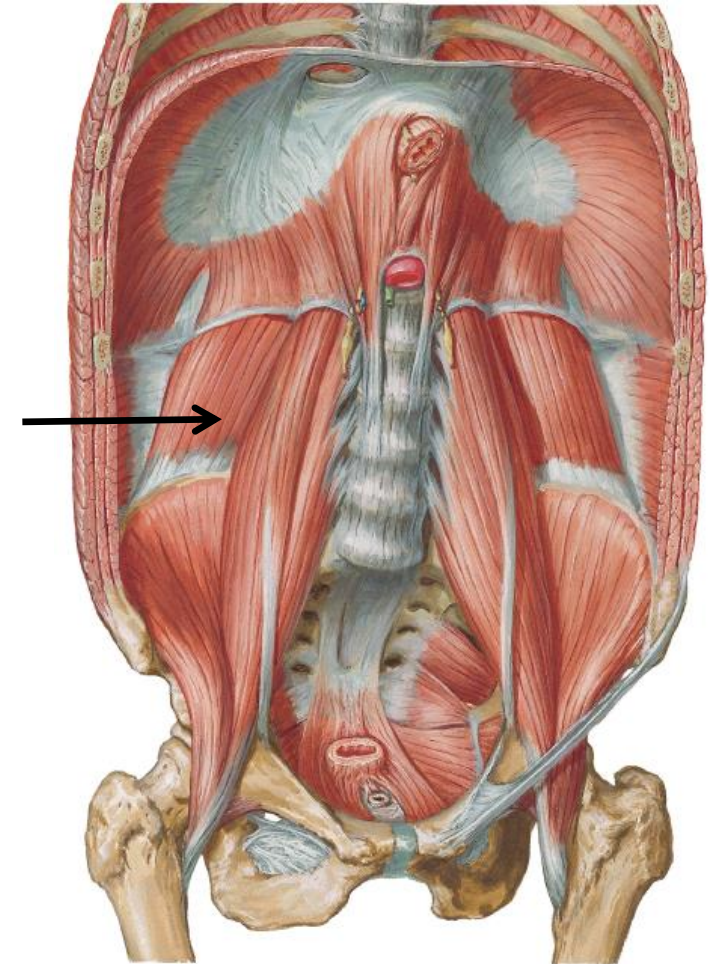
\* **Insertion:** into last rib.

\* **Action:**

1. Lateral flexion of the trunk.

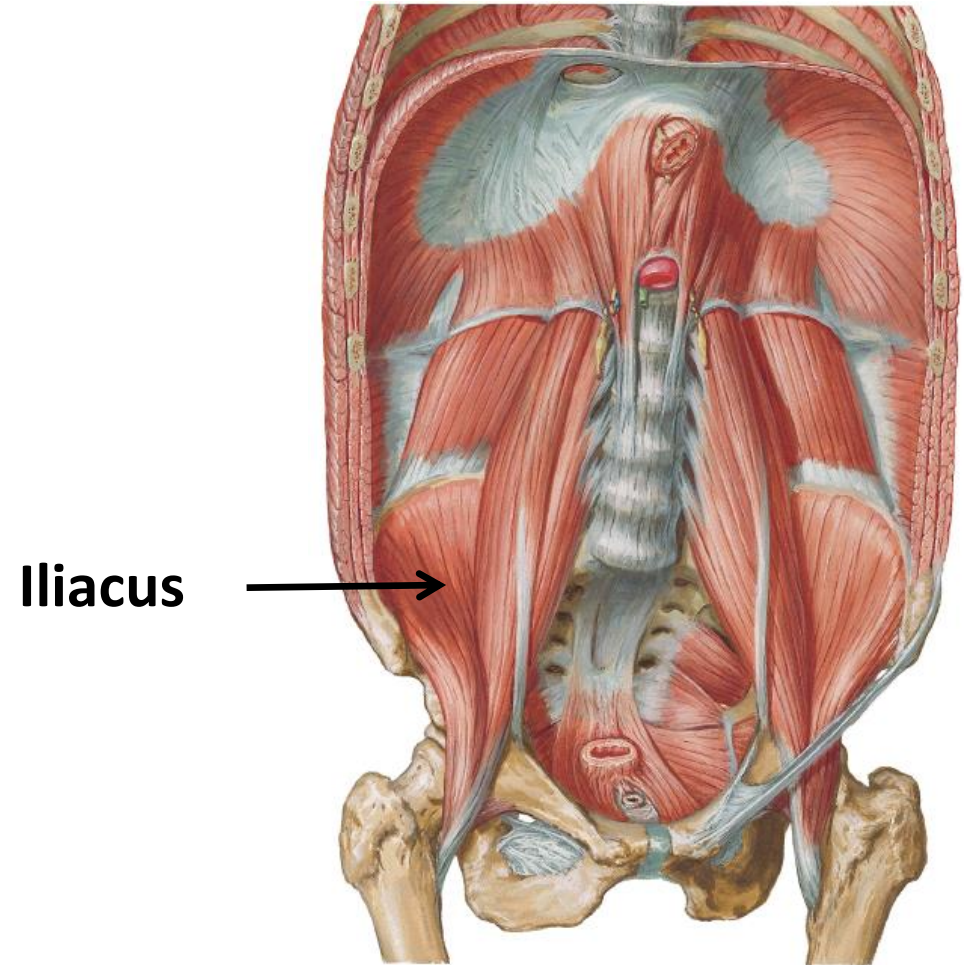
2- Extension of trunk.

Quadratus Lumborum



## 4. Iliacus

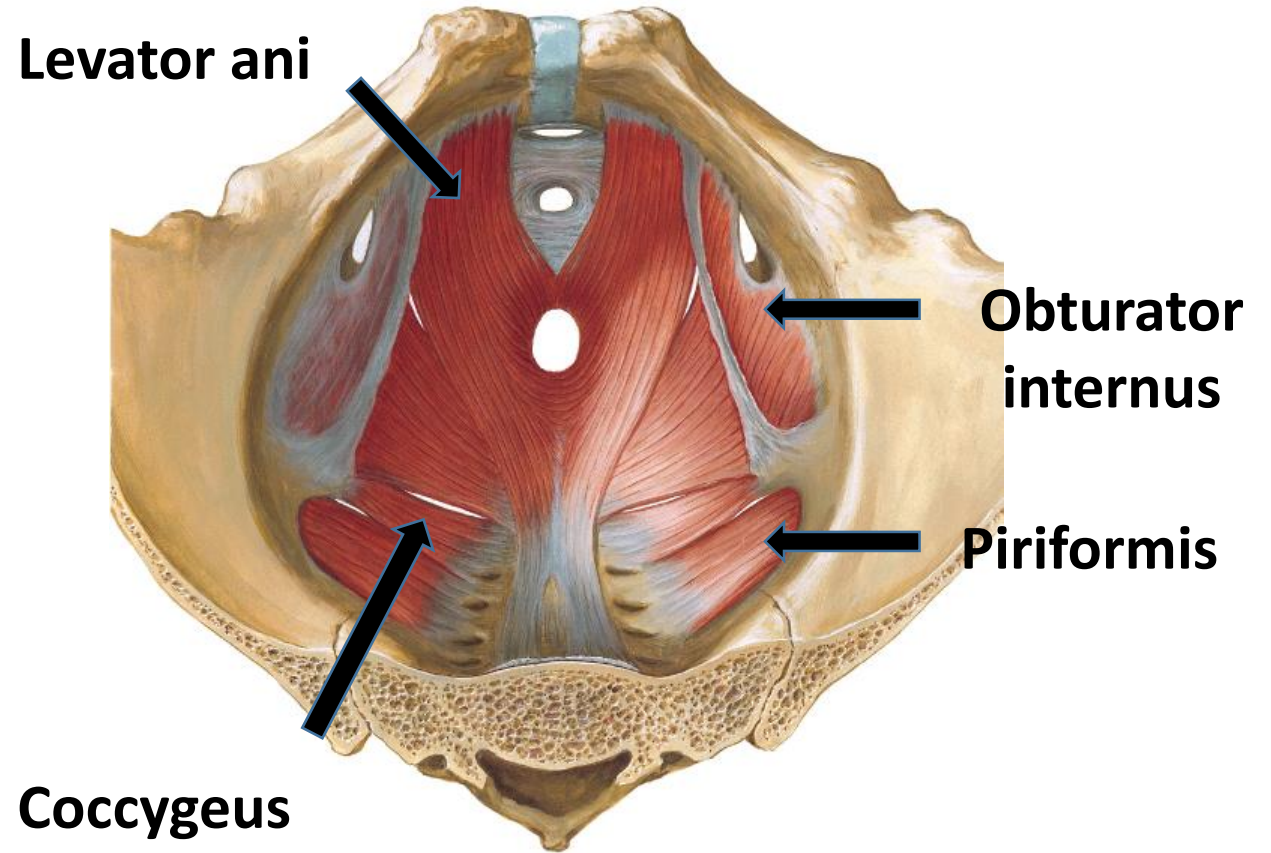
- \* **Origin:** from hip bone.
- \* **Insertion:** lesser trochanter of femur.
- \* **Action:**  
Helps in flexion of thigh (hip joint).



# MUSCLES OF PELVIS

**\*\* Muscles of the pelvic wall: piriformis and obturator internus.**

**\*\* Muscles of the pelvic floor (pelvic diaphragm): levator ani and coccygeus.**





Thank You  
Thank You  
Thank You!!!!