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# The Muscular System (2)

CHAPTER 11

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**Principles of  
Human Anatomy  
13th Edition**

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## Characteristics Used to Name Muscles

### NAME

### MEANING

**DIRECTION:** Orientation of muscle fascicles relative to the body's midline

**Rectus**

Parallel to midline

**Transverse**

Perpendicular to midline

**Oblique**

Diagonal to midline

**SIZE:** Relative size of the muscle

**Maximus**

Largest

**Minimus**

Smallest

**Longus**

Long

**Brevis**

Short

**Latissimus**

Widest

**Longissimus**

Longest

**Magnus**

Large

**Major**

Larger

**Minor**

Smaller

**Vastus**

Huge

**ACTION: Principal action of the muscle**

<b>Flexor</b>	Decreases a joint angle
<b>Extensor</b>	Increases a joint angle
<b>Abductor</b>	Moves a bone away from the midline
<b>Adductor</b>	Moves a bone closer to the midline
<b>Levator</b>	Raises or elevates a body part
<b>Depressor</b>	Lowers or depresses a body part
<b>Supinator</b>	Turns palm anteriorly
<b>Pronator</b>	Turns palm posteriorly
<b>Sphincter</b>	Decreases the size of an opening
<b>Tensor</b>	Makes a body part rigid
<b>Rotator</b>	Rotates a bone around its longitudinal axis

**NUMBER OF ORIGINS: Number of tendons of origin**

<b>Biceps</b>	Two origins
<b>Triceps</b>	Three origins
<b>Quadriceps</b>	Four origins

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**LOCATION:** Structure near which a muscle is found. Example: temporalis, a muscle near the temporal bone

**ORIGIN AND INSERTION:** Sites where muscle originates and inserts. Example: sternocleidomastoid, originating on the sternum and clavicle and inserting on mastoid process of temporal bone

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**TABLE 11.2****Characteristics Used to Name Muscles****NAME****MEANING****SHAPE: Relative shape of the muscle**

<b>Deltoid</b>	Triangular
<b>Trapezius</b>	Trapezoid
<b>Serratus</b>	Saw-toothed
<b>Rhomboid</b>	Diamond-shaped
<b>Orbicularis</b>	Circular
<b>Pectinate</b>	Comblike
<b>Piriformis</b>	Pear-shaped
<b>Platys</b>	Flat
<b>Quadratus</b>	Square, four-sided
<b>Gracilis</b>	Slender

# The Neck (The Cervical Region)

Divided into 2 portions:

**Anterolateral aspect:**

ant. & post.

**Post. aspect:**

covered by trapezius  
part of the back



# The Neck (The Cervical Region)

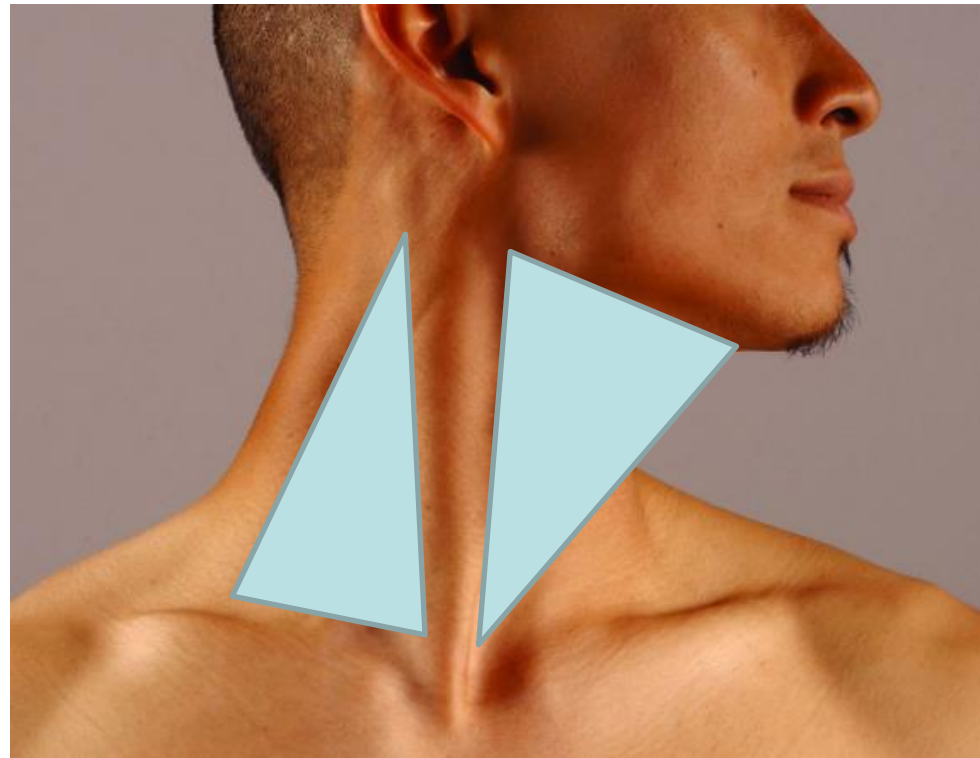
Divided into 2 portions:

**Anterolateral aspect:**

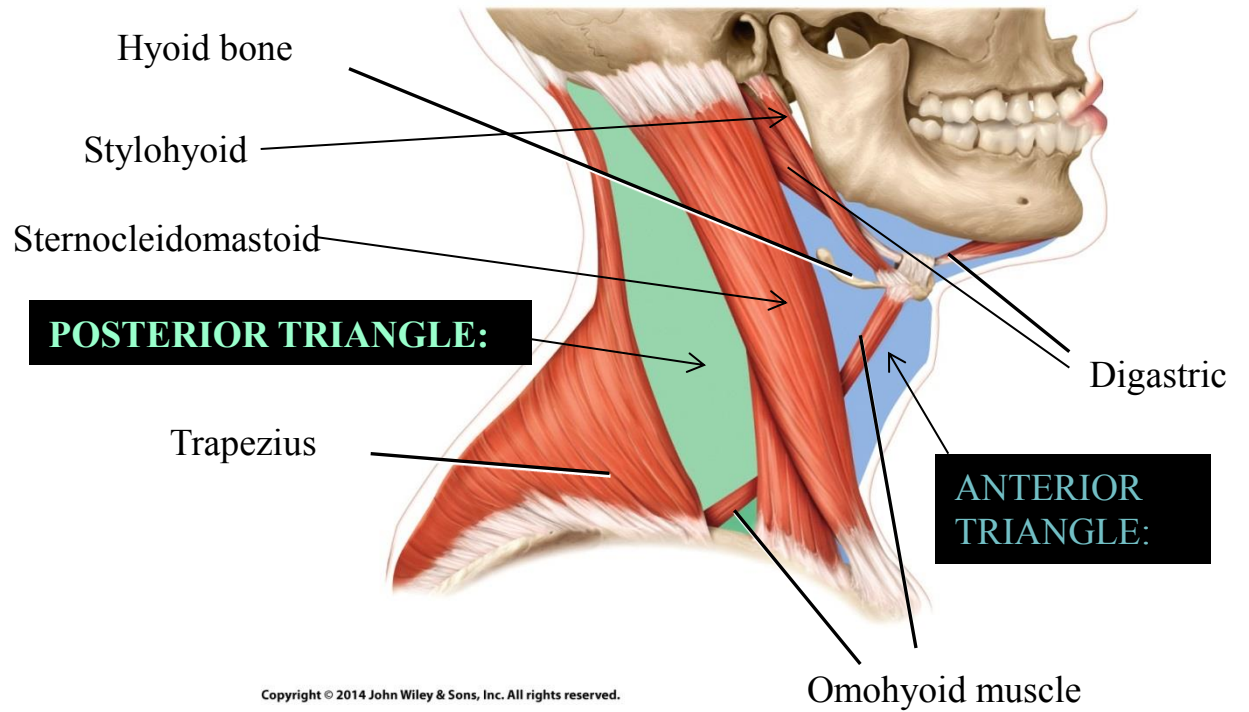
ant. & post.

**Post. aspect:**

covered by trapezius  
part of the back



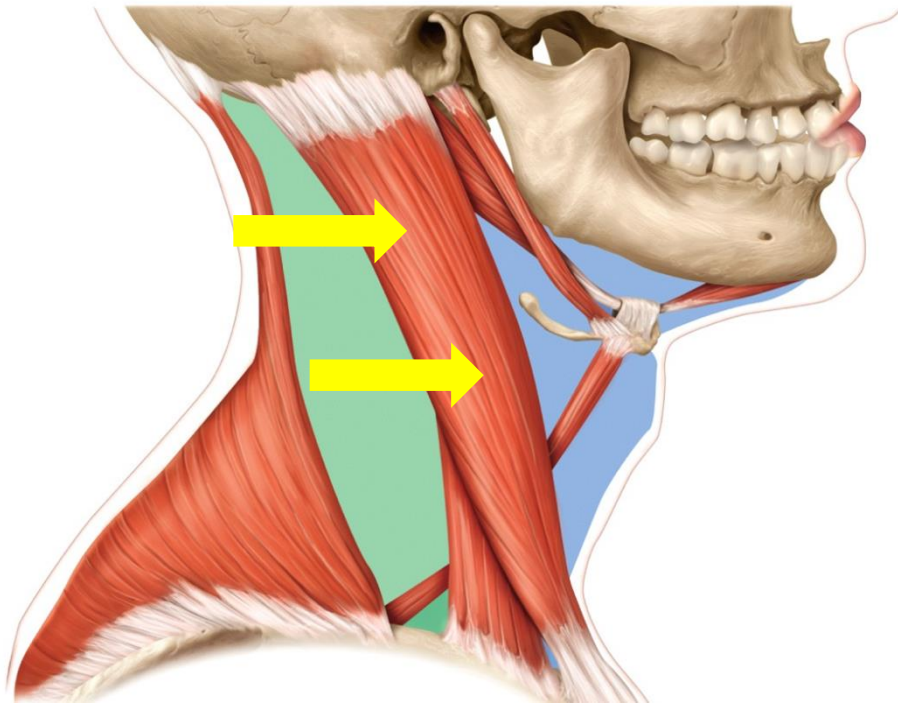




(d) Right lateral view of triangles of neck



# Muscles of the Neck: triangles



## sternocleidomastoid

### Origin:

Manubrium (sternal head) & clavicle

### Insertion:

Mastoid process of temporal

### Innervation:

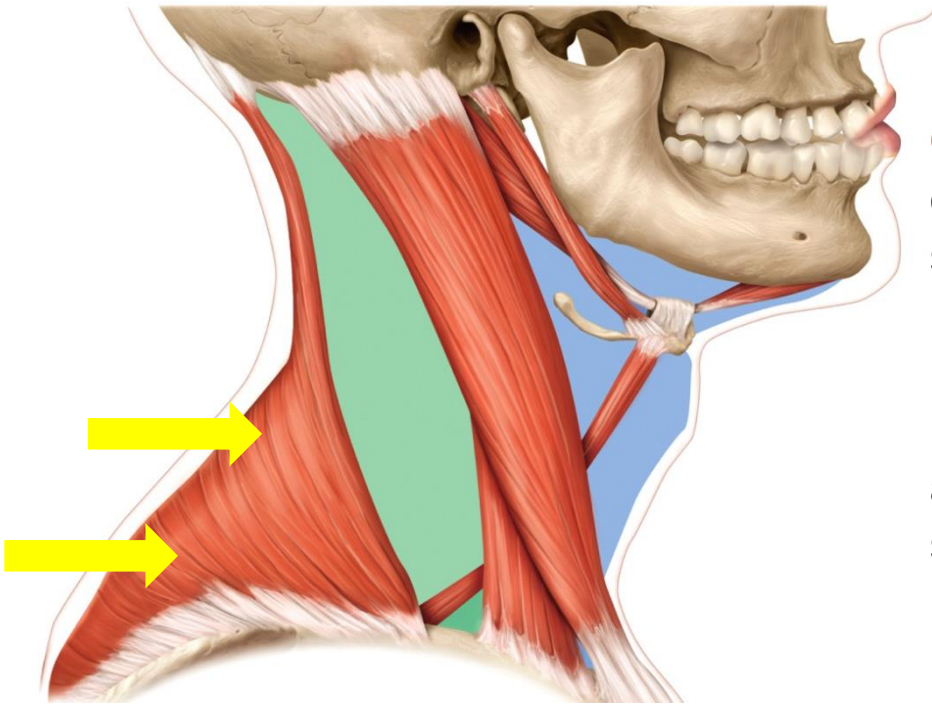
spinal part of XI

### Action:

single: tilts head to opposite side

Both: flex the neck

# Muscles of the Neck: triangles



## Trapezius Muscle

**Origin:**  
occipital bone  
spinous processes (C7-T12)

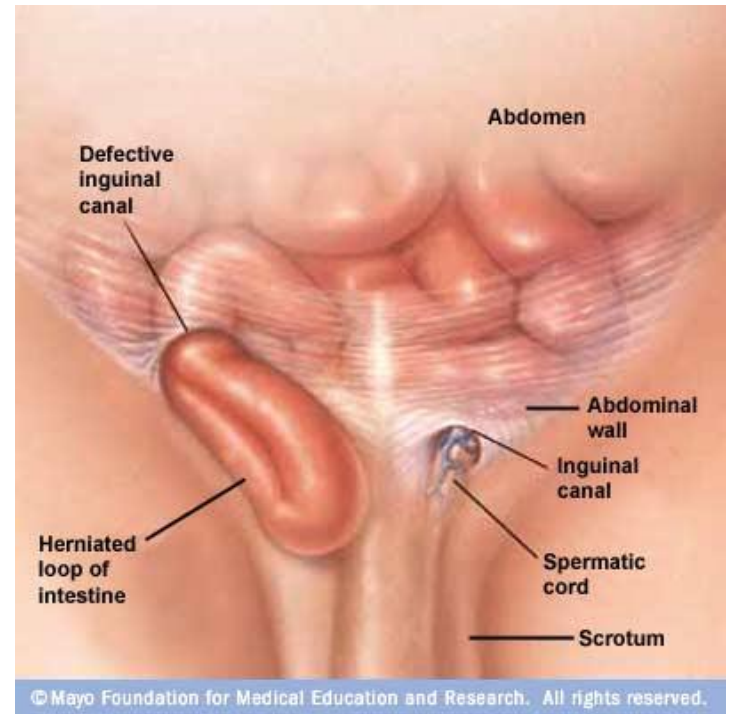
**Insertion:**  
Lat. 1/3 of clavicle  
acromion/ scapula  
spine of scapula

**Innervation:**  
spinal part of XI

**Actions:**  
3 actions?

# Inguinal Hernia

❑ It is protrusion of part of small intestine due to rupture or separation in the inguinal area



❑ Common in males as they have larger inguinal canal & it's a weak area in the abdominal wall

❑ Treatment: surgical repair

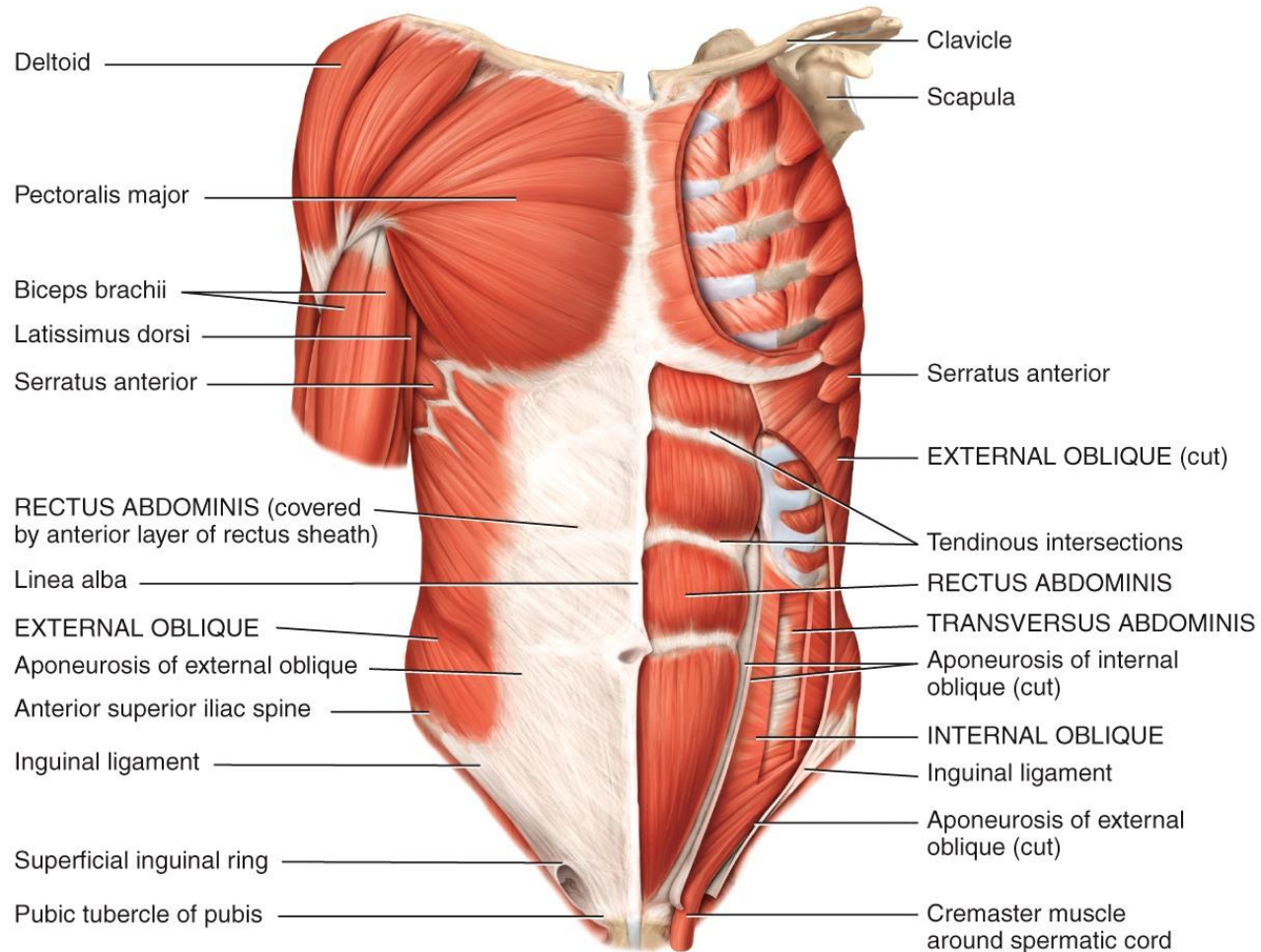
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## Muscles of the Abdomen That Protect Abdominal Viscera and Move the Vertebral Column

- ❑ Abdominal wall is composed of:
    - Skin
    - fascia
    - 4 pairs of muscles
  
  - ❑ Function: protection of viscera in the abdomen
-

# Muscles of the Abdomen That Protect Abdominal Viscera and Move the Vertebral Column



(b) Anterior superficial view

(c) Anterior deep view

# Muscles of the Abdomen That Protect Abdominal Viscera and Move the Vertebral Column

## **Anterior**

- 1. Rectus Abdominis:**
- 2. External Oblique**
- 3. Internal Oblique**
- 4. Transversus abdominis**

## **Posterior**

**Quadratus lumborum**

# Muscles of the Abdomen That Protect Abdominal Viscera and Move the Vertebral Column

## **Anterior**

### **1. Rectus Abdominis:**

**Origin:** pubic crest & pubic symphysis

**Insertion:** lower costal cartilages & xiphoid process

Innervation



# Muscles of the Abdomen That Protect Abdominal Viscera and Move the Vertebral Column

## **Anterior**

### **2. External Oblique**

**Origin:** lower ribs

**Insertion:** iliac crest & linea alba

**Innervation:**

# Muscles of the Abdomen That Protect Abdominal Viscera and Move the Vertebral Column

## **Anterior**

### **3. Internal Oblique:**

**Origin:** iliac crest & inguinal ligament

**Insertion:** cartilage of lower ribs & linea alba

**Innervation:**

# Muscles of the Abdomen That Protect Abdominal Viscera and Move the Vertebral Column

## Anterior

### 4. Transversus abdominis:

**Origin:** iliac crest & inguinal ligament & cartilage of lower ribs

**Insertion:** xiphoid & linea alba

### **Innervation**

**Action for anterior:** compress abdomen in defecation, urination, forced exhalation, child birth

All flex vertebral column except transversus abdominis

# Muscles of the Abdomen That Protect Abdominal Viscera and Move the Vertebral Column

## Posterior

### **Quadratus lumborum**

**Origin:** iliac crest

**Insertion:** inferior border of 12<sup>th</sup> rib & L1- L4

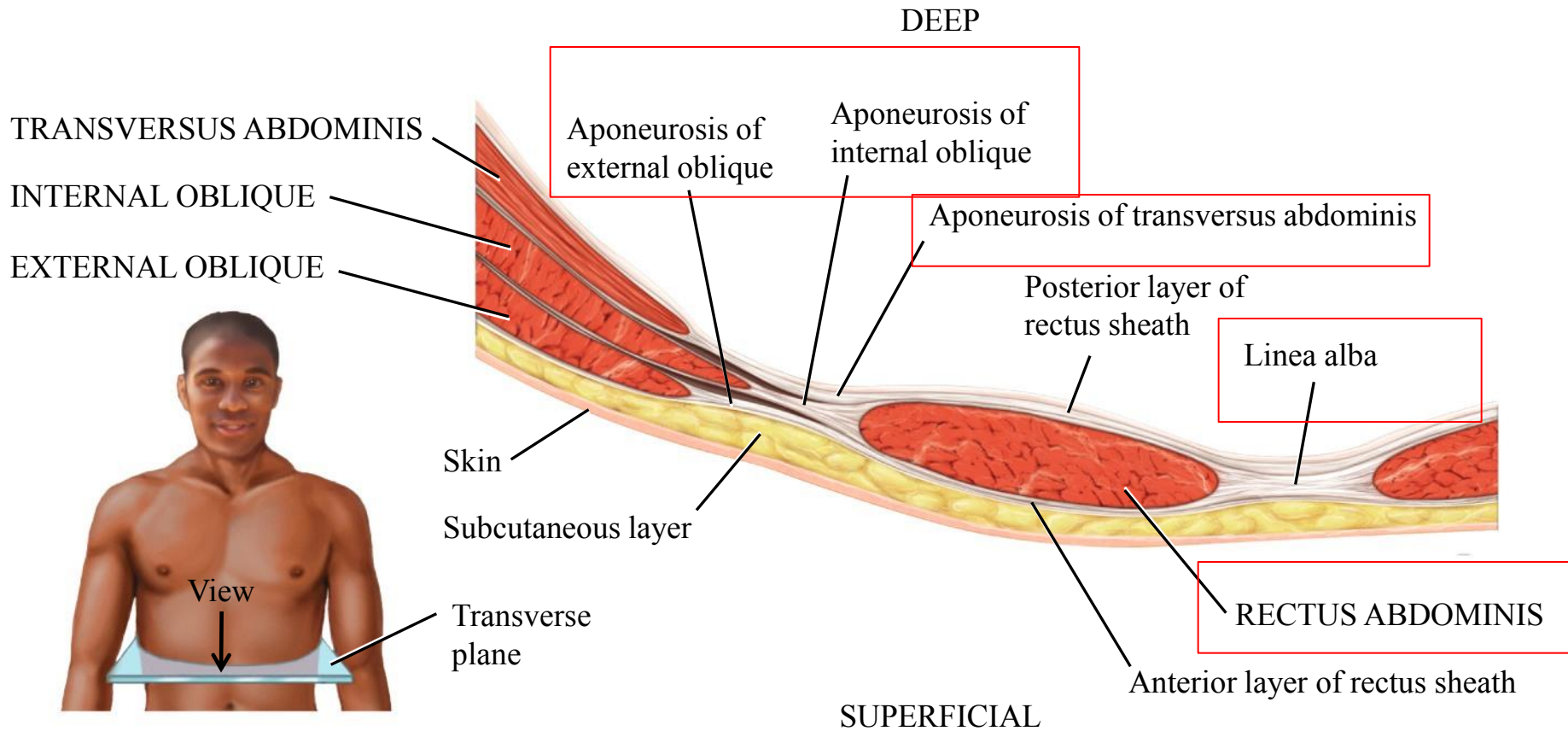
**Innervation:**

**Action:** on 12<sup>th</sup> rib: fix & pull inferiorly

on Lumbar vertebrae: extend & lateral flexion

MUSCLE	ORIGIN	INSERTION	ACTION
<b>Rectus abdominis</b> (REK-tus ab-DOM-in-is; <i>rectus</i> =fascicles parallel to midline; <i>abdomin</i> =abdomen)	Pubic crest and pubic symphysis	Cartilage of ribs 5–7 and xiphoid process	Flexes vertebral column (especially lumbar portion), and compresses abdomen to aid in defecation, urination, forced exhalation, and childbirth  RMA: Flexes pelvis on the vertebral column
<b>External oblique</b> (ō-BLĒK; <i>external</i> =closer to surface; <i>oblique</i> =fascicles diagonal to midline)	Ribs 5–12	Iliac crest and linea alba	Acting together (bilaterally), compress abdomen and flex vertebral column; acting singly (unilaterally), laterally flex vertebral column, especially lumbar portion, and rotate vertebral column
<b>Internal oblique</b> ( <i>internal</i> =farther from surface)	Iliac crest, inguinal ligament, and thoracolumbar fascia	Cartilage of ribs 7–10 and linea alba	Acting together, compress abdomen and flex vertebral column; acting singly, laterally flex vertebral column, especially lumbar portion, and rotate vertebral column
<b>Transversus abdominis</b> (tranz-VER-sus; <i>transverse</i> =fascicles perpendicular to midline)	Iliac crest, inguinal ligament, lumbar fascia, and cartilages of ribs 5–10	Xiphoid process, linea alba, and pubis	Compresses abdomen
<b>Quadratus lumborum</b> (kwod-RĀ-tus lum-BOR-um; <i>quad</i> =four; <i>lumbo</i> =lumbar region) (see <a href="#">Figure 11.14</a> )	Iliac crest and iliolumbar ligament	Inferior border of rib 12 and L1–L4	Acting together, pull twelfth ribs inferiorly during forced exhalation, fix twelfth ribs to prevent their elevation during deep inhalation, and help extend lumbar portion of vertebral column; acting singly, laterally flex vertebral column, especially lumbar portion  RMA: Elevates hip bone, commonly on one side

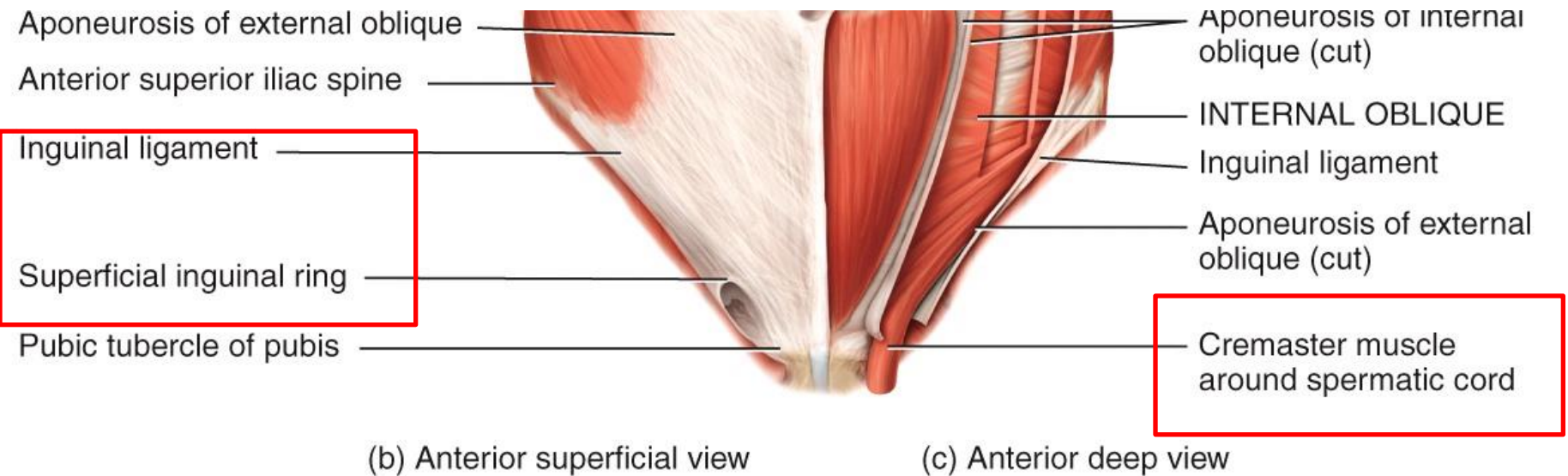
# Rectus Sheath



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(a) Superior view of transverse section of anterior abdominal wall superior to umbilicus (navel)

# Inguinal ligament & Inguinal canal



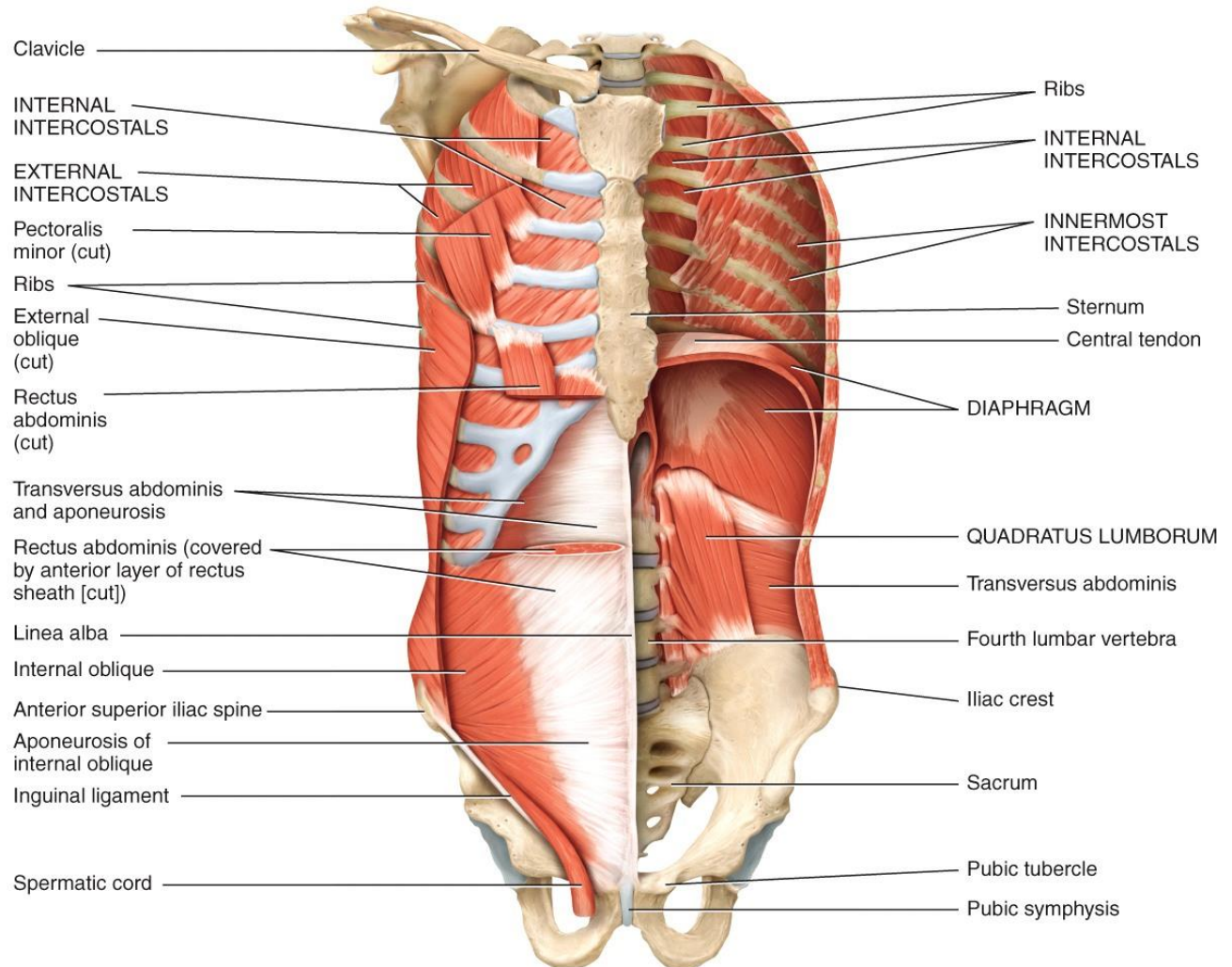


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# Inguinal ligament & Inguinal canal



# Muscles of the Thorax That Assist in Breathing ( Respiration)



(a) Anterior superficial view

(b) Anterior deep view

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# Muscles of the Thorax That Assist in Breathing ( Respiration)

**Action: change the size of the thorax & help in ventilation**

Inspiration = inhalation

Expiration = exhalation

- 1. Diaphragm**
- 2. Intercostal muscles**

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# Muscles of the Thorax That Assist in Breathing ( Respiration)

## **Diaphragm:**

- ❖ Most important muscle of respiration
  - ❖ Dome- shaped
  - ❖ Musculotendinous
  - ❖ Separate thorax from abdomen
  
  - ❖ Consists of 2 parts: peripheral muscular part & a central tendinous part
    - Central tendon: strong aponeurosis, serves as tendon of insertion for the muscular part.
    - Peripheral muscular fibers
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# Muscles of the Thorax That Assist in Breathing ( Respiration)

## **Diaphragm:**

It fuses with inferior surface of pericardium (external covering of the heart) and parietal pleura ( external covering of lungs)

Origin: xiphoid process, costal cartilages of inferior ribs, lumbar vertebrae

Insertion:?????

Innervation: phrenic nerve

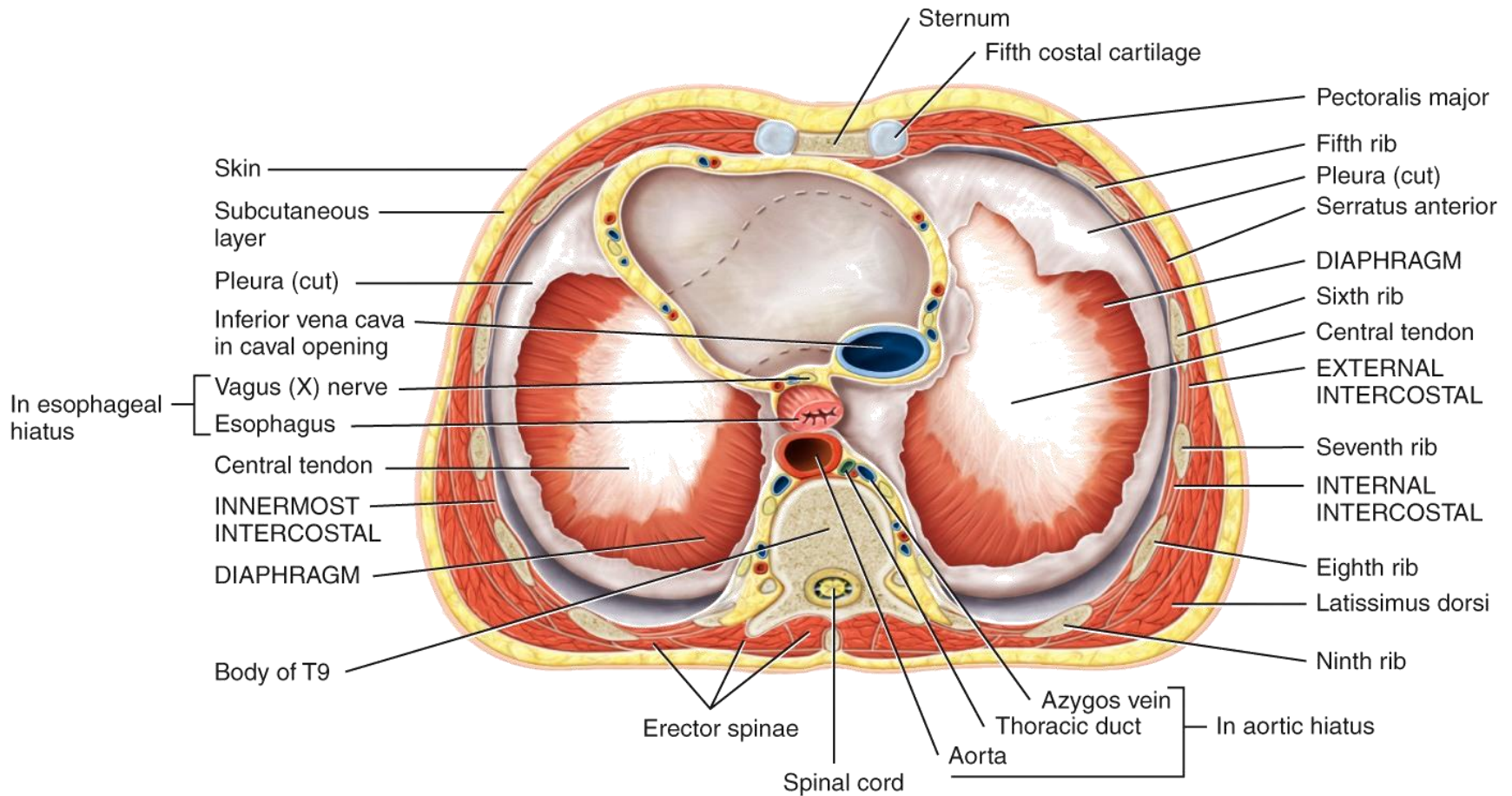
Action: makes the floor of the thorax

pull central tendon inferiorly and increases vertical length of thorax

## **3 openings in diaphragm:**

1. Aortic hiatus
  2. Esophageal hiatus
  3. Foramen for vena cava
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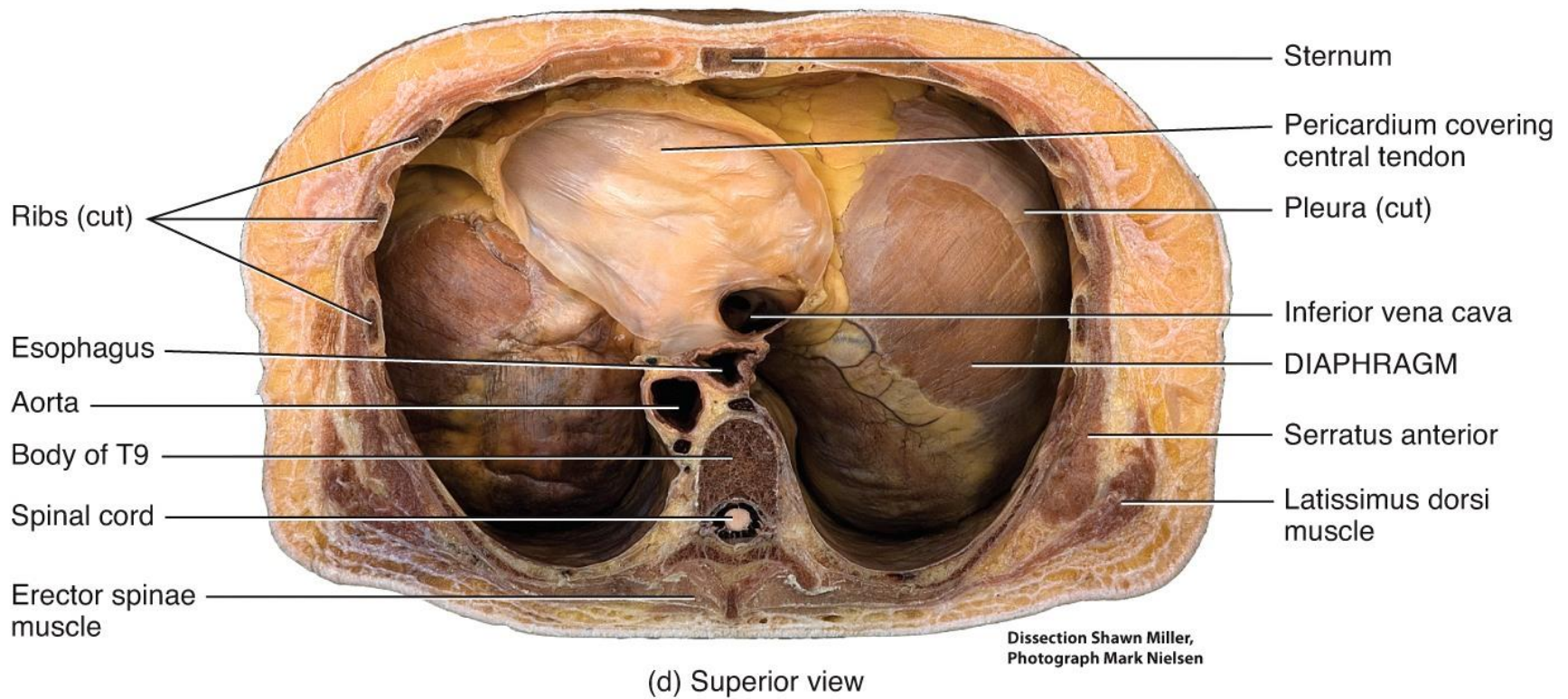
# Muscles of the Thorax That Assist in Breathing



(c) Superior view of diaphragm

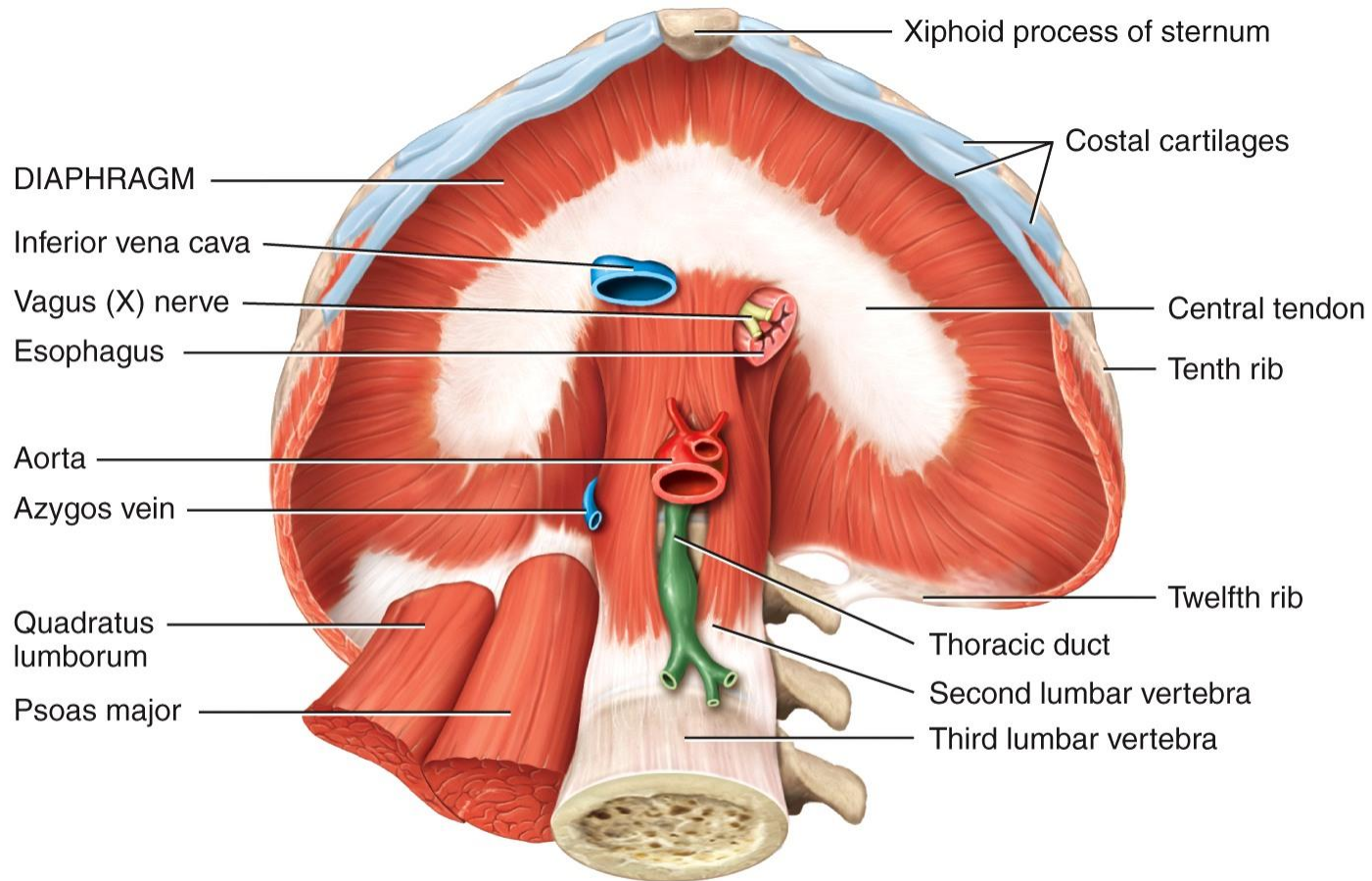


# Muscles of the Thorax That Assist in Breathing





# Muscles of the Thorax That Assist in Breathing

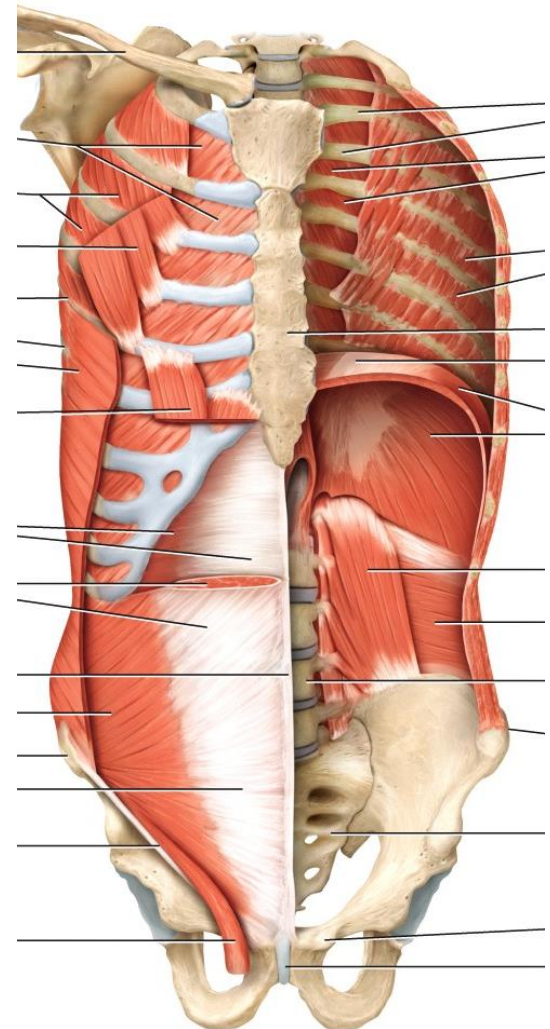


(e) Inferior view of diaphragm

# Muscles of the Thorax That Assist in Breathing ( Respiration)

## Intercostal muscles:

- 3 layers:
  1. External intercostal
  2. Internal intercostal
  3. Transversus thoracis
- Nerve: intercostal nerves



anterior superficial view

(b) Anterior deep view

# Muscles of the Thorax That Assist in Breathing ( Respiration)

## **Intercostal muscles:**

### 1. External intercostal

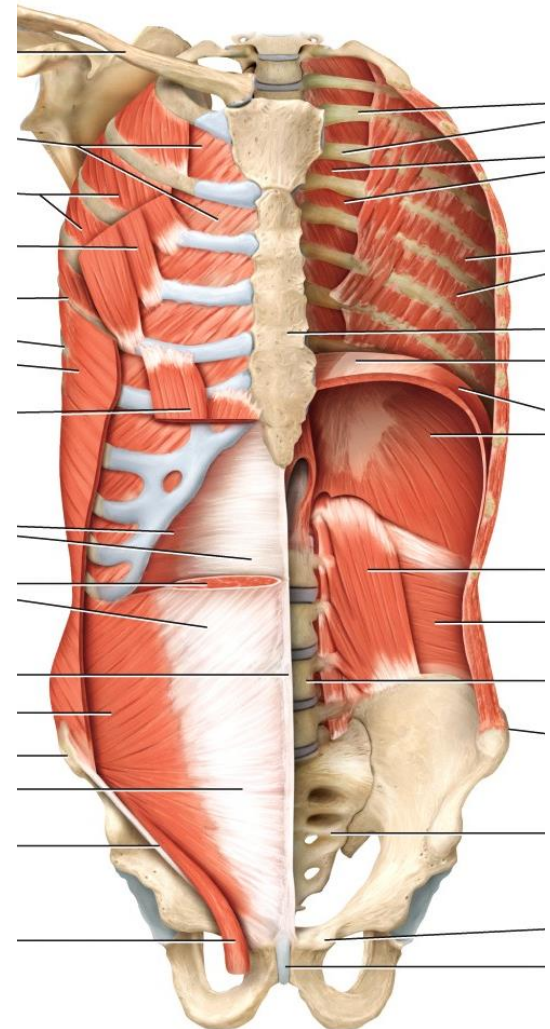
Superficial muscle

Runs obliquely inferiorly & anteriorly

Origin: inf border of rib above

Insertion: sup. Border of rib below

Action : elevate ribs



anterior superficial view

(b) Anterior deep vi

# Muscles of the Thorax That Assist in Breathing ( Respiration)

## **Intercostal muscles:**

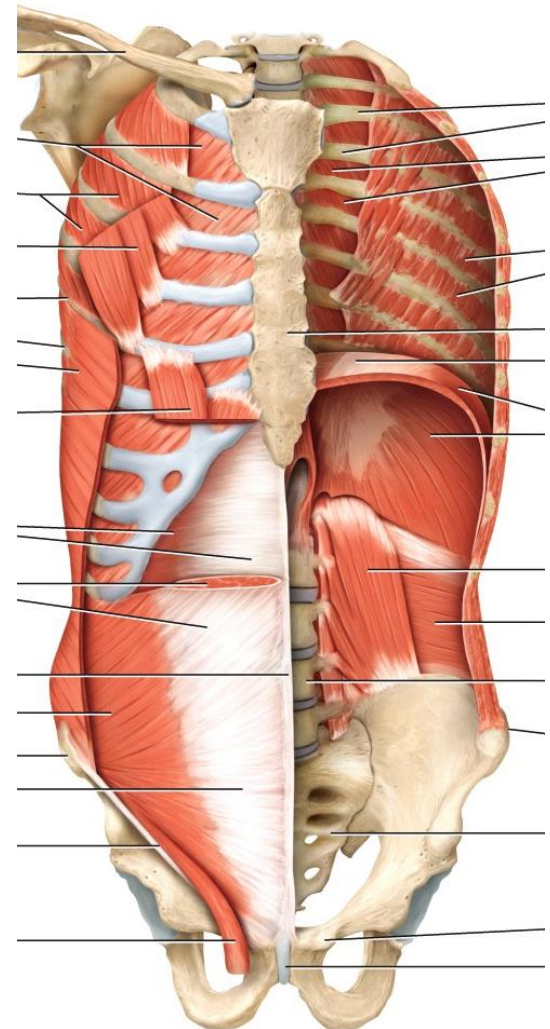
### 2. Internal intercostal:

Deep to ext. intercostal

Muscle fibers run obliquely inf. & post.

From sup border of rib below to inferior border of rib above

Act to draw adjacent ribs together



anterior superficial view

(b) Anterior deep vi



# Muscles of the Thorax That Assist in Breathing ( Respiration)

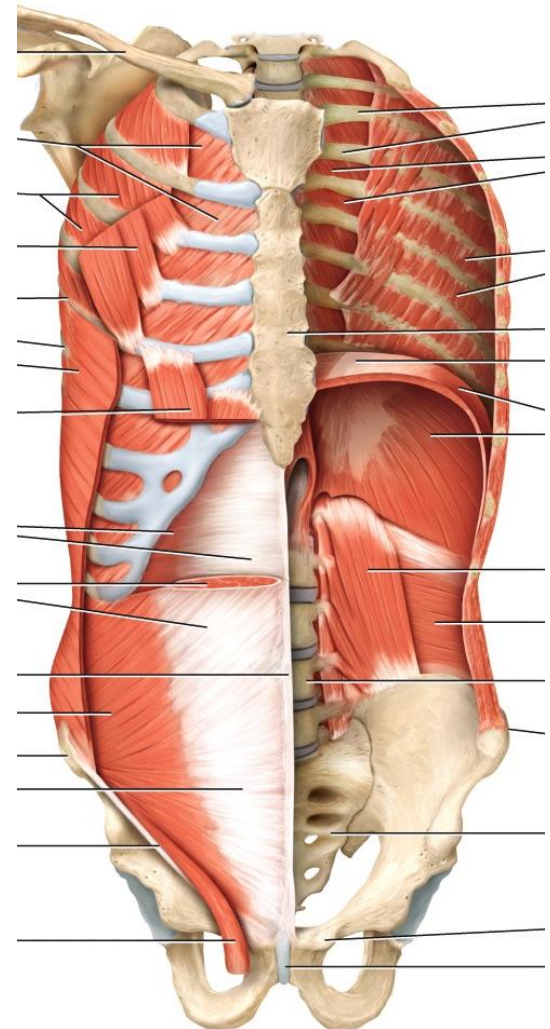
## Intercostal muscles:

3 . Transversus thoracis

Deep

Run as internal intercostal

Same action



anterior superficial view

(b) Anterior deep view

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# Muscles of the Pelvic Floor That Support the Pelvic Viscera and Function as Sphincters

- Levator ani muscle
  - With surrounding connective tissue it makes pelvic diaphragm
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# Muscles of the Perineum

Perineum is inferior to pelvic diaphragm

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# Muscles of the Thorax That Move the Pectoral( shoulder) Girdle

Ant. & post. Thoracic muscles

**Action: stabilize scapula**

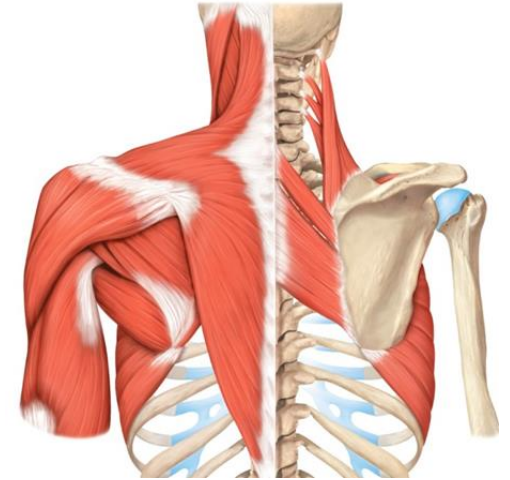
( so scapula can act as a stable point of origin for most muscles that move humerous)



# Muscles of the Thorax That Move the Pectoral( shoulder) Girdle

## **Anterior Thoracic muscles:**

1. Subclavius( 1<sup>st</sup> rib- clavicle)
2. Pectoralis minor( ribs- scapula)
3. Serratus anterior(ribs- scapula)



## **Posterior Thoracic muscles:**

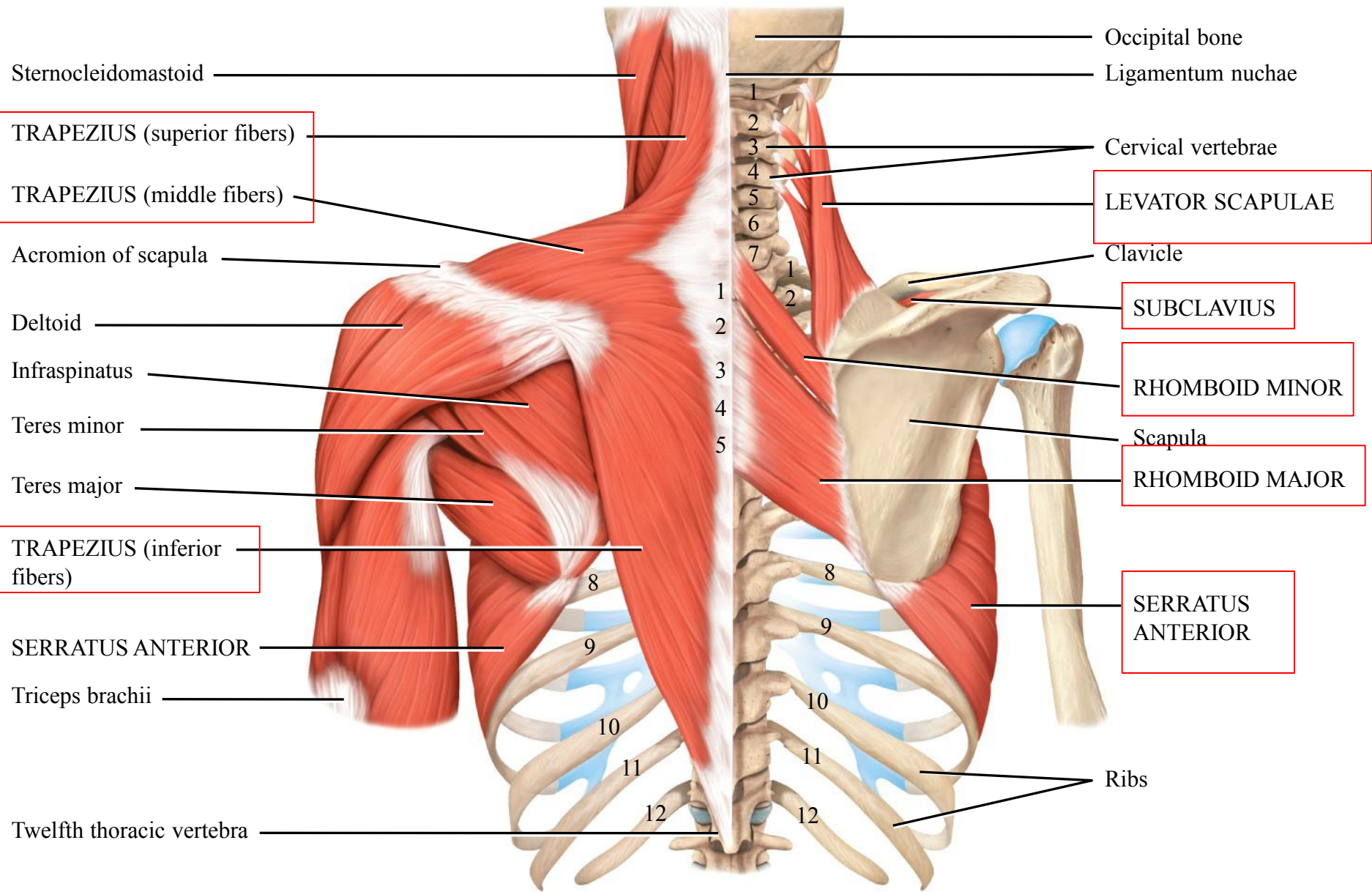
1. Trapezius( skull & vertbrae- clavicle & scapula)
2. Levator scapula( vertbrae- scapula)
3. Rhomboide major( vertbrae- acpula)
4. Rhomboide minor( vertbrae- acpula)

# Muscles of the Thorax That Move the Pectoral( shoulder) Girdle

MUSCLE	ORIGIN	INSERTION	ACTION	INNERVATION
<b>ANTERIOR THORACIC MUSCLES</b>				
<b>Subclavius</b> (sub-KLĀ-vē-us, <i>sub</i> =under; <i>clavius</i> =clavicle)	Rib 1	Clavicle	Depresses and moves clavicle anteriorly and helps stabilize pectoral girdle	Subclavian nerve
<b>Pectoralis minor</b> (pek'-tō-RĀ-lis; <i>pector</i> =breast, chest, thorax; <i>minor</i> =lesser)	Ribs 2–5, 3–5, or 2–4	Coracoid process of scapula	Abducts scapula and rotates it downward  RMA: Elevates third through fifth ribs during forced inhalation when scapula is fixed	Medial pectoral nerve
<b>Serratus anterior</b> (ser-Ā-tus; <i>serratus</i> =saw-toothed; <i>anterior</i> =front)	Ribs 1–8, or 1–9	Vertebral border and inferior angle of scapula	Abducts scapula and rotates it upward  RMA: Elevates ribs when scapula is stabilized; known as “boxer’s muscle” because it is important in horizontal arm movements such as punching and pushing	Long thoracic nerve

# Muscles of the Thorax That Move the Pectoral( shoulder) Girdle

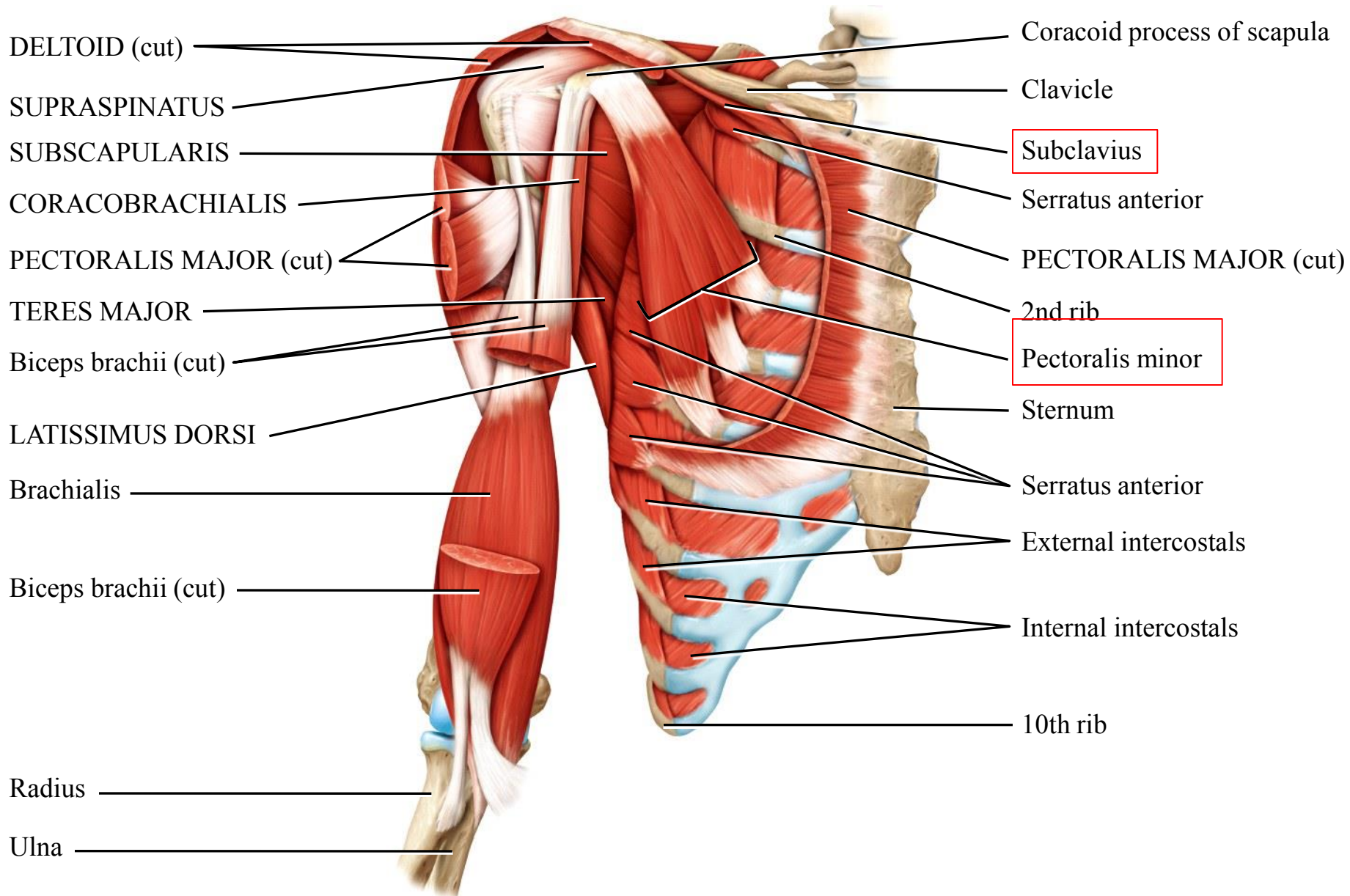
MUSCLE	ORIGIN	INSERTION	ACTION	INNERVATION
<b>POSTERIOR THORACIC MUSCLES</b>				
<b>Trapezius</b> (tra-PĒ-zē-us; <i>trapezi</i> =trapezoid- shaped)	Superior nuchal line of occipital bone, ligamentum nuchae, and spines of C7–T12	Clavicle and acromion and spine of scapula	Superior fibers upward rotate scapula; middle fibers adduct scapula; inferior fibers depress and upward rotate scapula; superior and inferior fibers together rotate scapula upward; stabilizes scapula  RMA: Superior fibers can help extend head	Accessory (XI) nerve and cervical spinal nerves C3–C5
<b>Levator scapulae</b> (le-VĀ-tor SKA-pu-lē; <i>levator</i> =raises; <i>scapulae</i> =of the scapula)	Transverse processes of C1–C4	Superior vertebral border of scapula	Elevates scapula and rotates it downward	Dorsal scapular nerve and cervical spinal nerves C3–C5
<b>Rhomboid major</b> (ROM-boyd; <i>rhomboid</i> =rhomboid- or diamond-shaped)	Spines of T2–T5	Vertebral border of scapula inferior to spine	Elevates and adducts scapula and rotates it downward; stabilizes scapula	Dorsal scapular nerve
<b>Rhomboid minor</b>	Spines of C7–T1	Vertebral border of scapula superior to spine	Elevates and adducts scapula and rotates it downward; stabilizes scapula	Dorsal scapular nerve



(d) Posterior superficial view

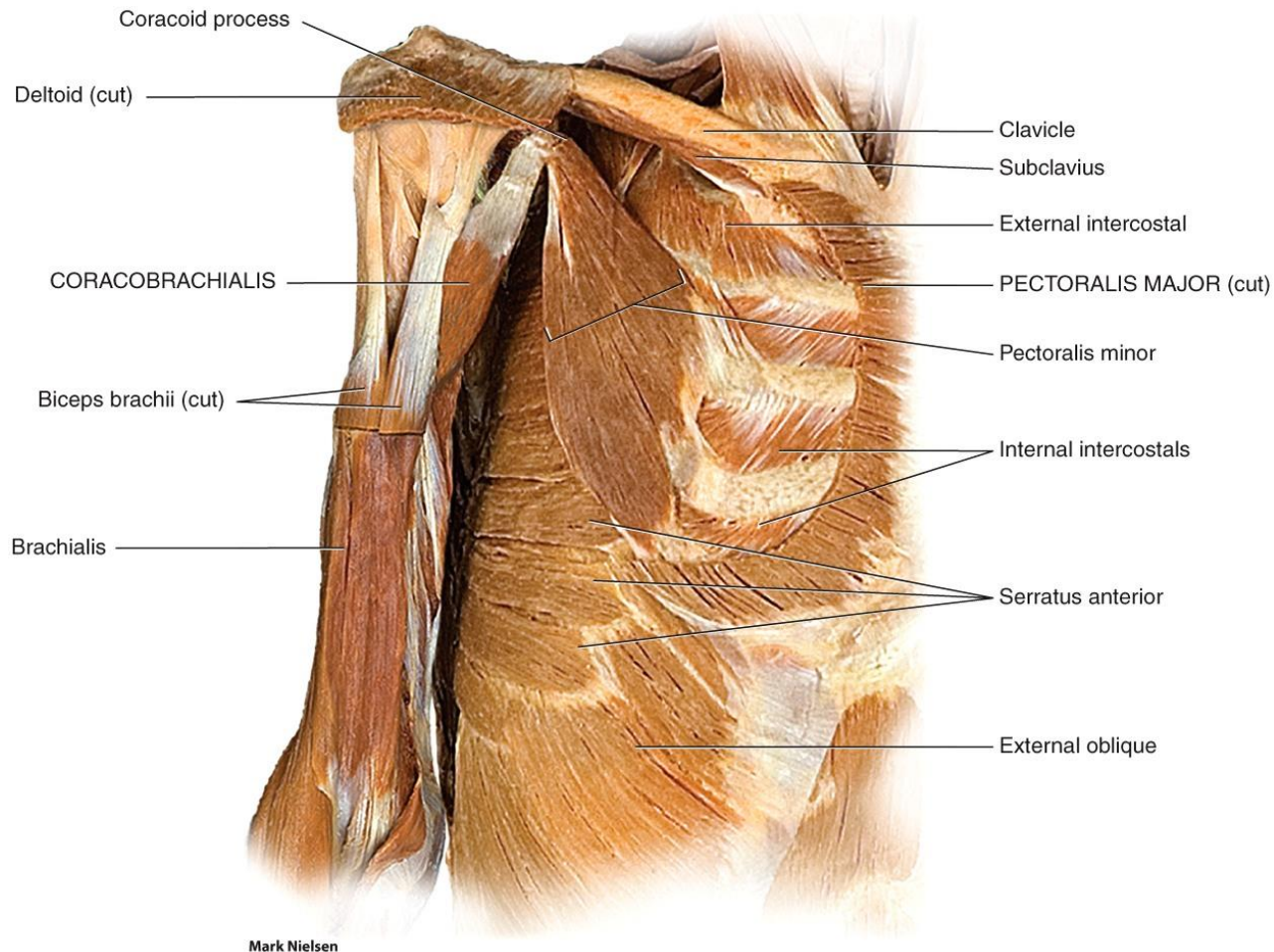
(e) Posterior deep view





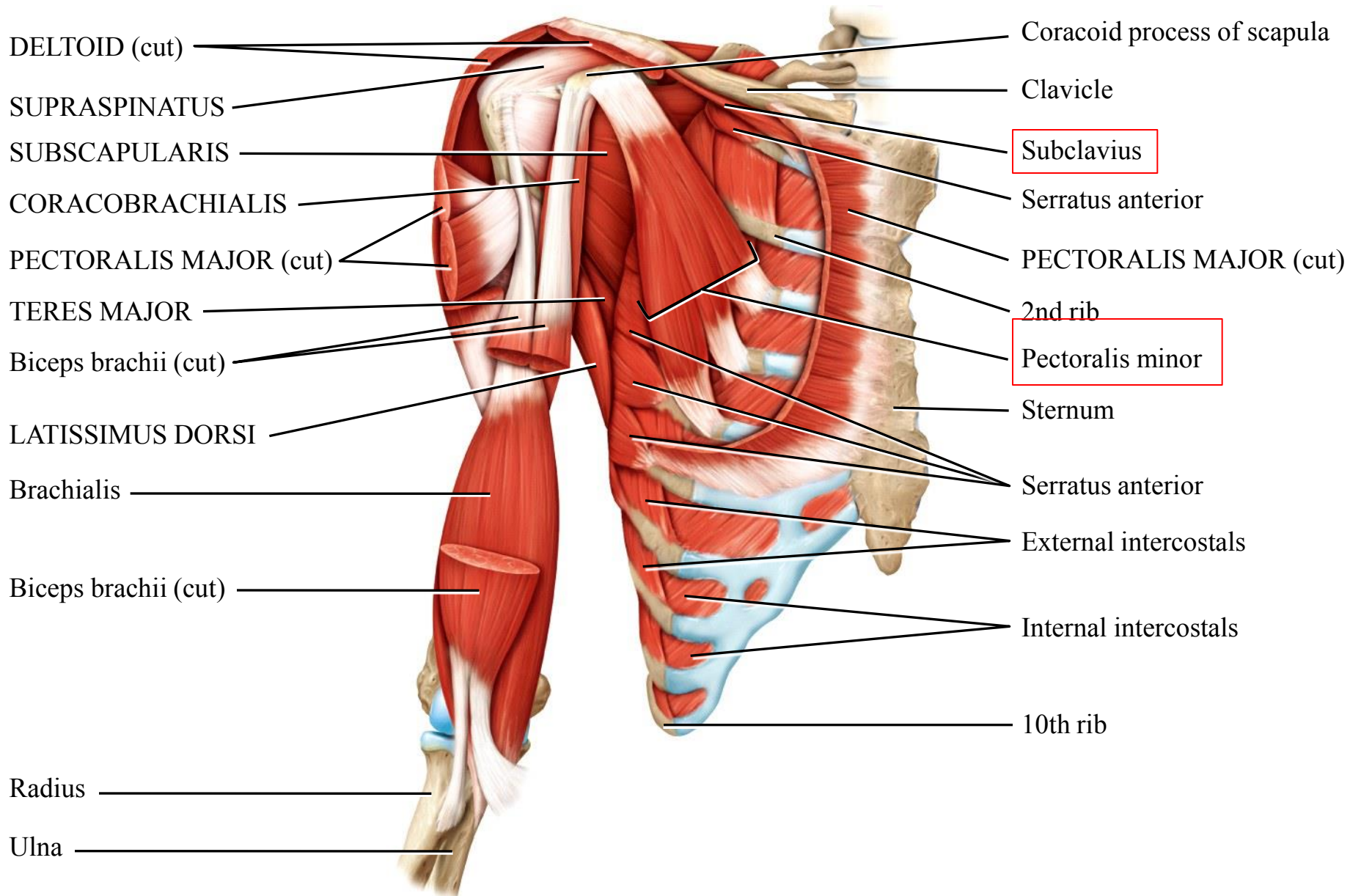
(a) Anterior deep view (the intact pectoralis major muscle is shown in [Figure 11.3a](#))

# Muscles of the Thorax and Shoulder That Move the Humerus



Mark Nielsen

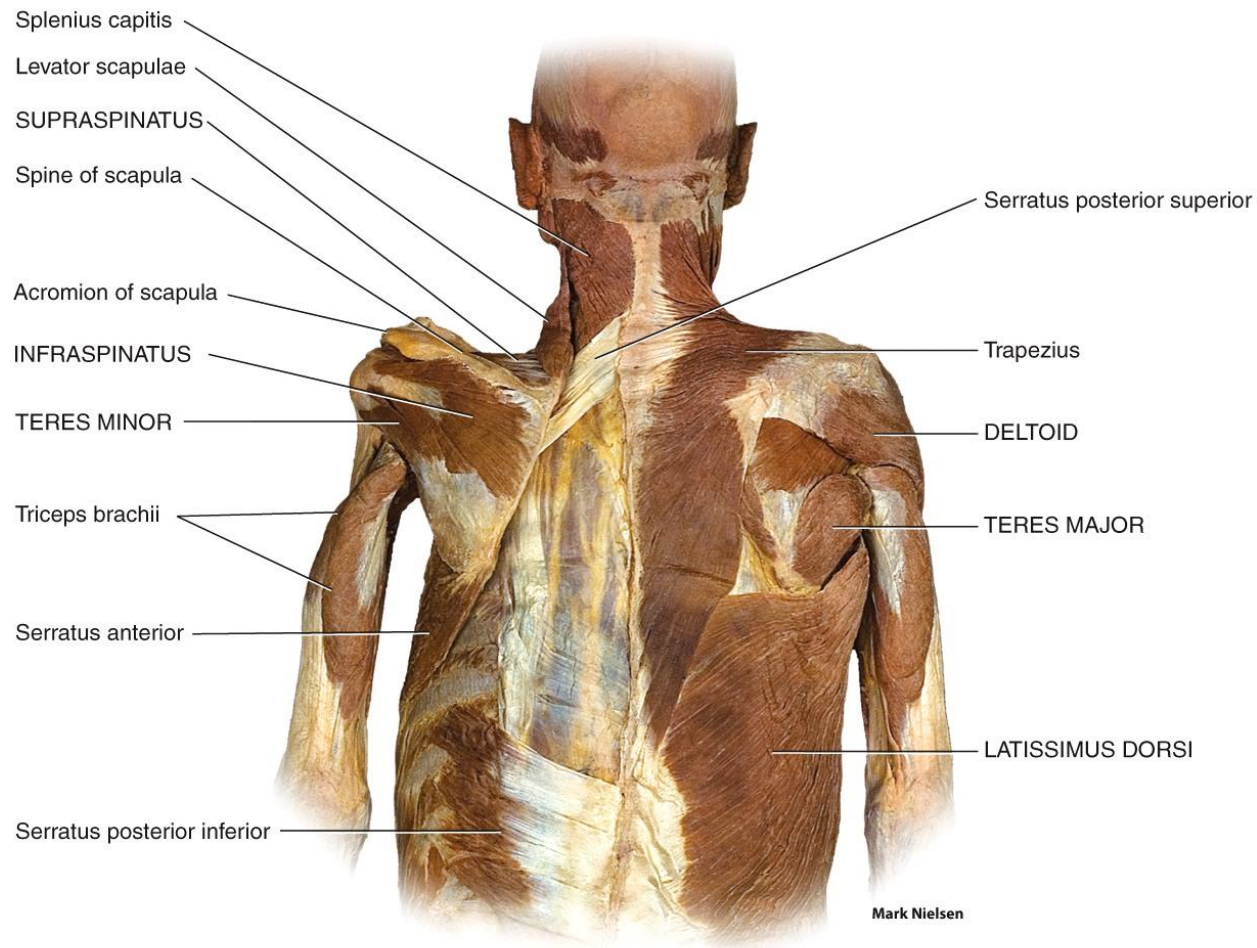
(b) Anterior deep view



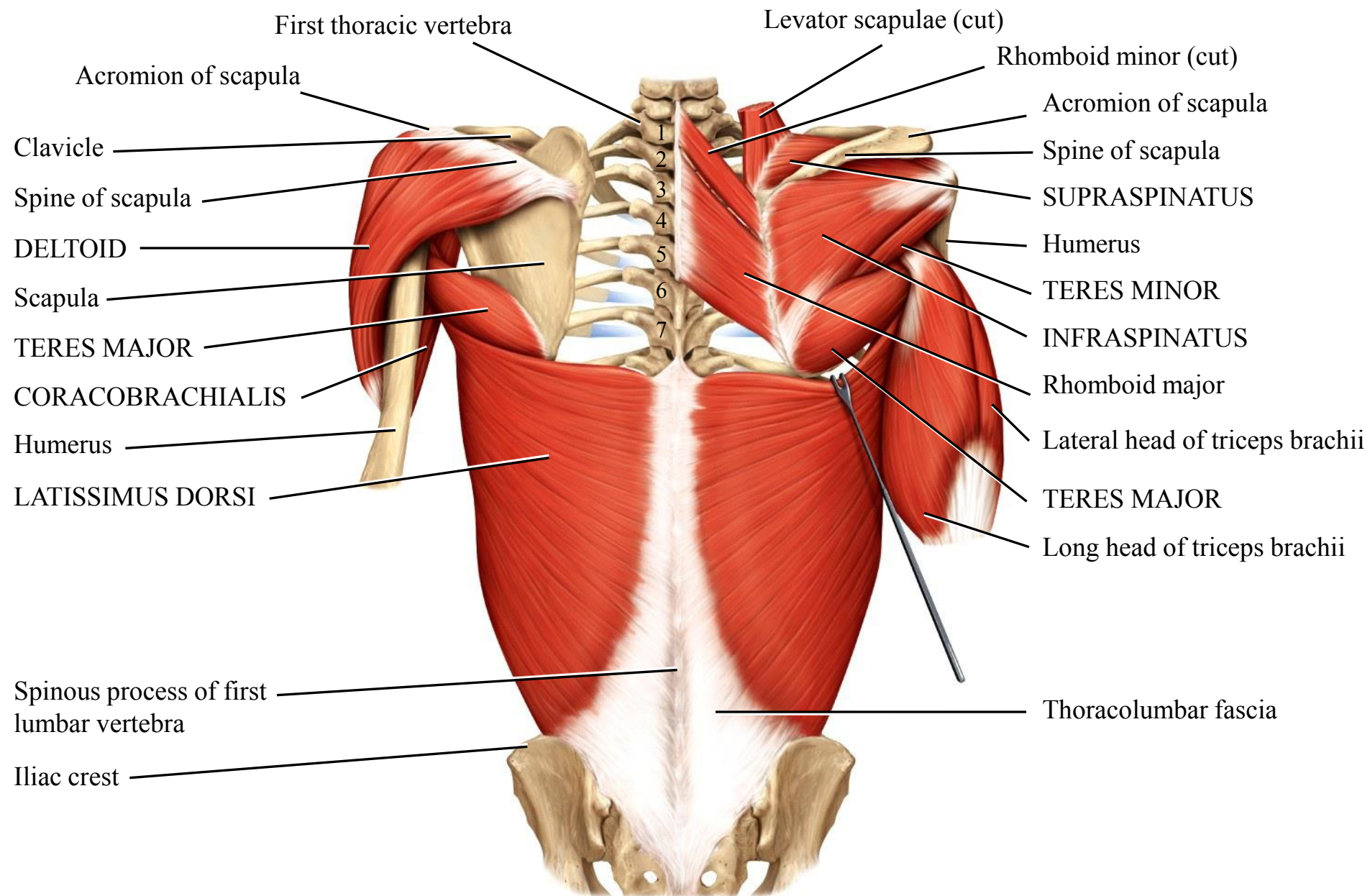
(a) Anterior deep view (the intact pectoralis major muscle is shown in [Figure 11.3a](#))



# Muscles of the Thorax and Shoulder That Move the Humerus



(e) Posterior view



(c) Posterior view

(d) Posterior view