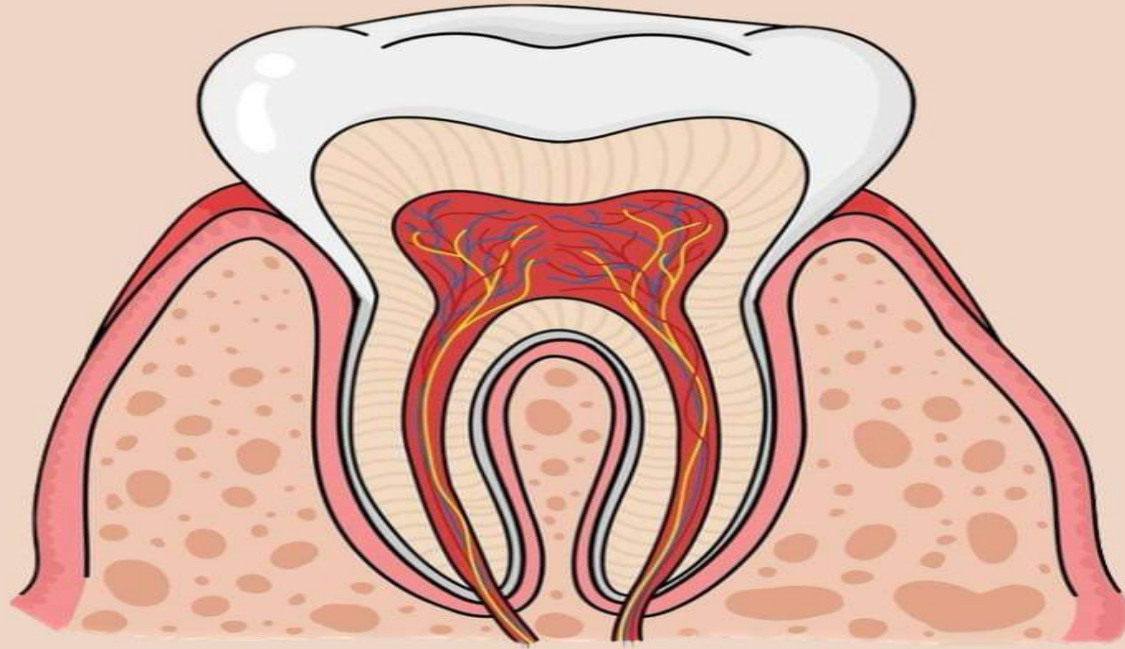




# ANATOMY



LEC NO. :

7

DONE BY :

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وَقُلْ رَبِّ زِدْنِي عِلْمًا



# Anatomy & Embryology

## Lecture 1: Upper Limb Muscles

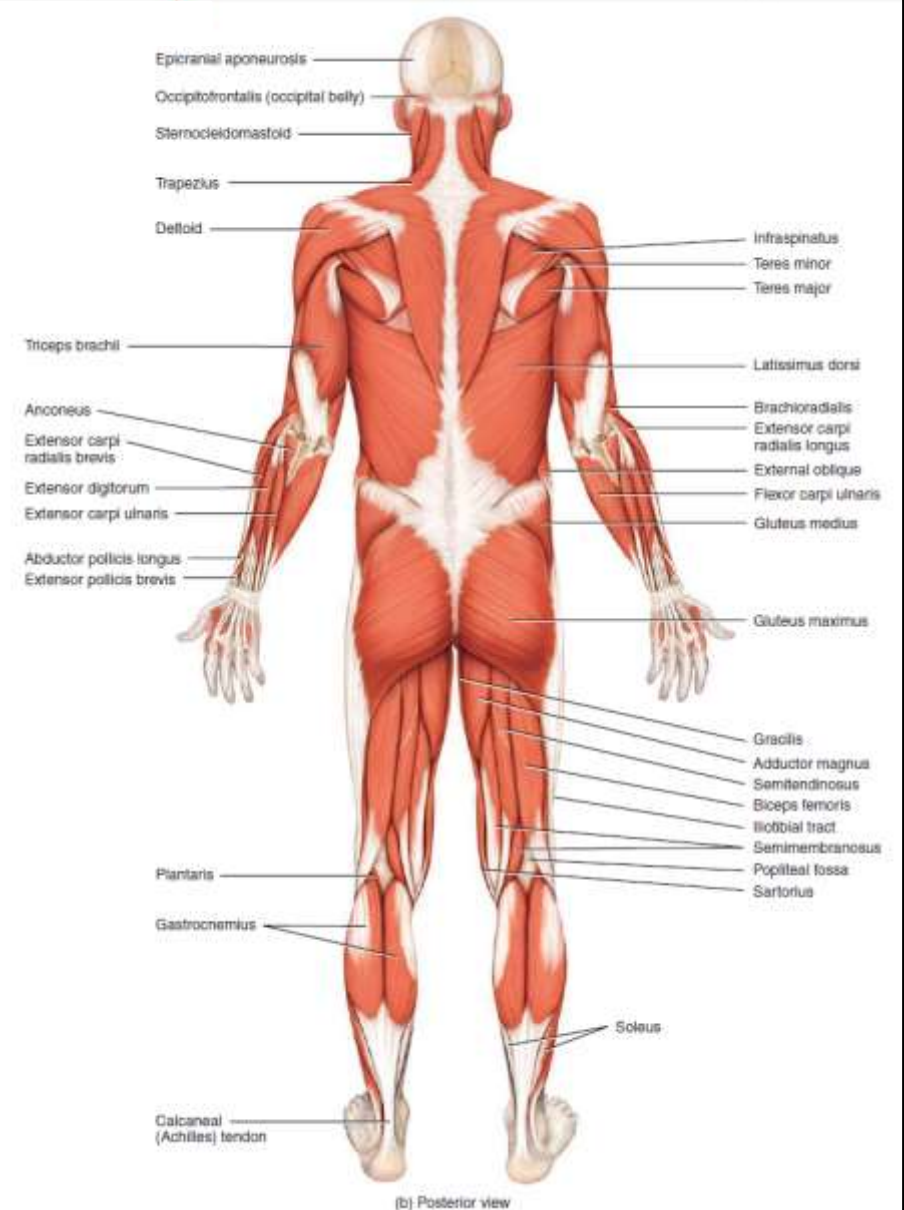
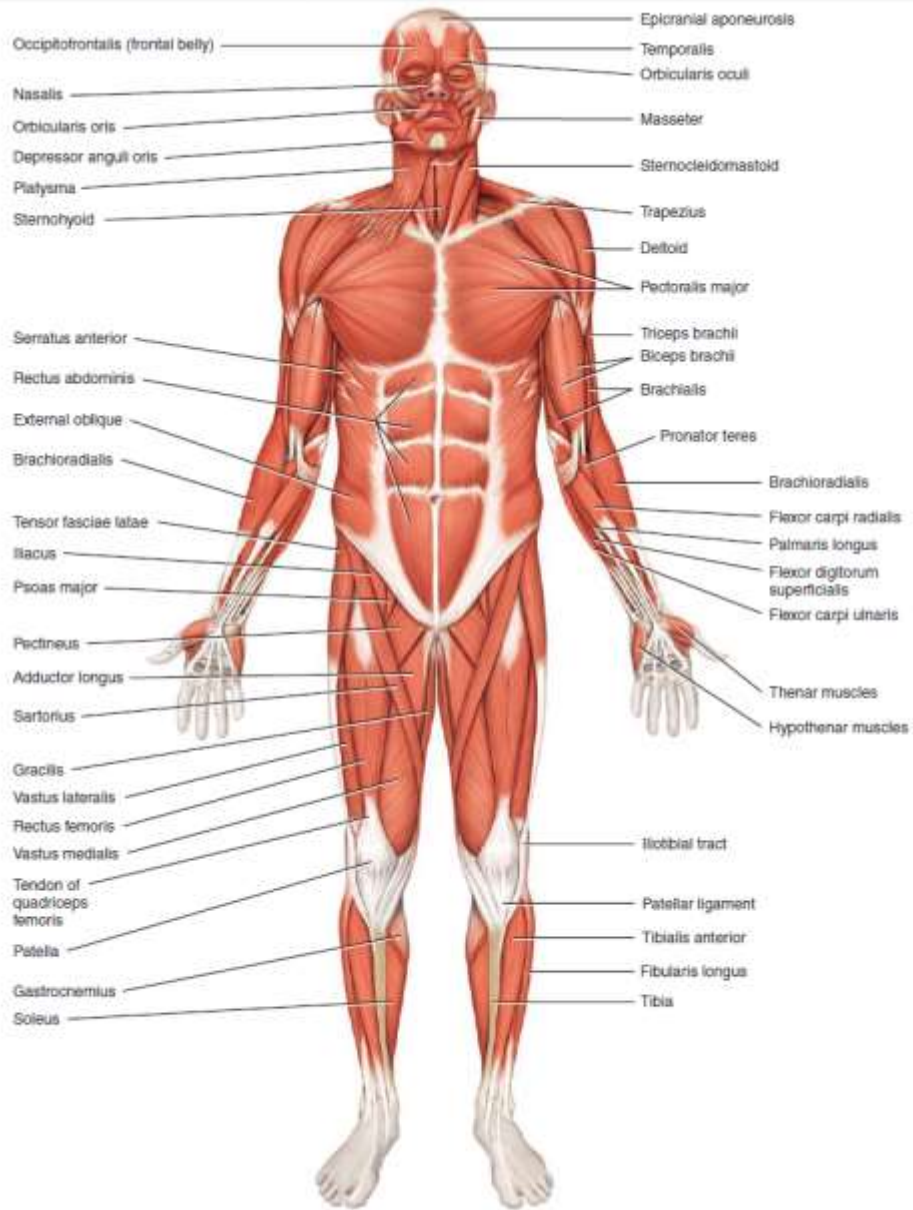
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# The Muscular System

العضلات الهيكلية



(b) Posterior view

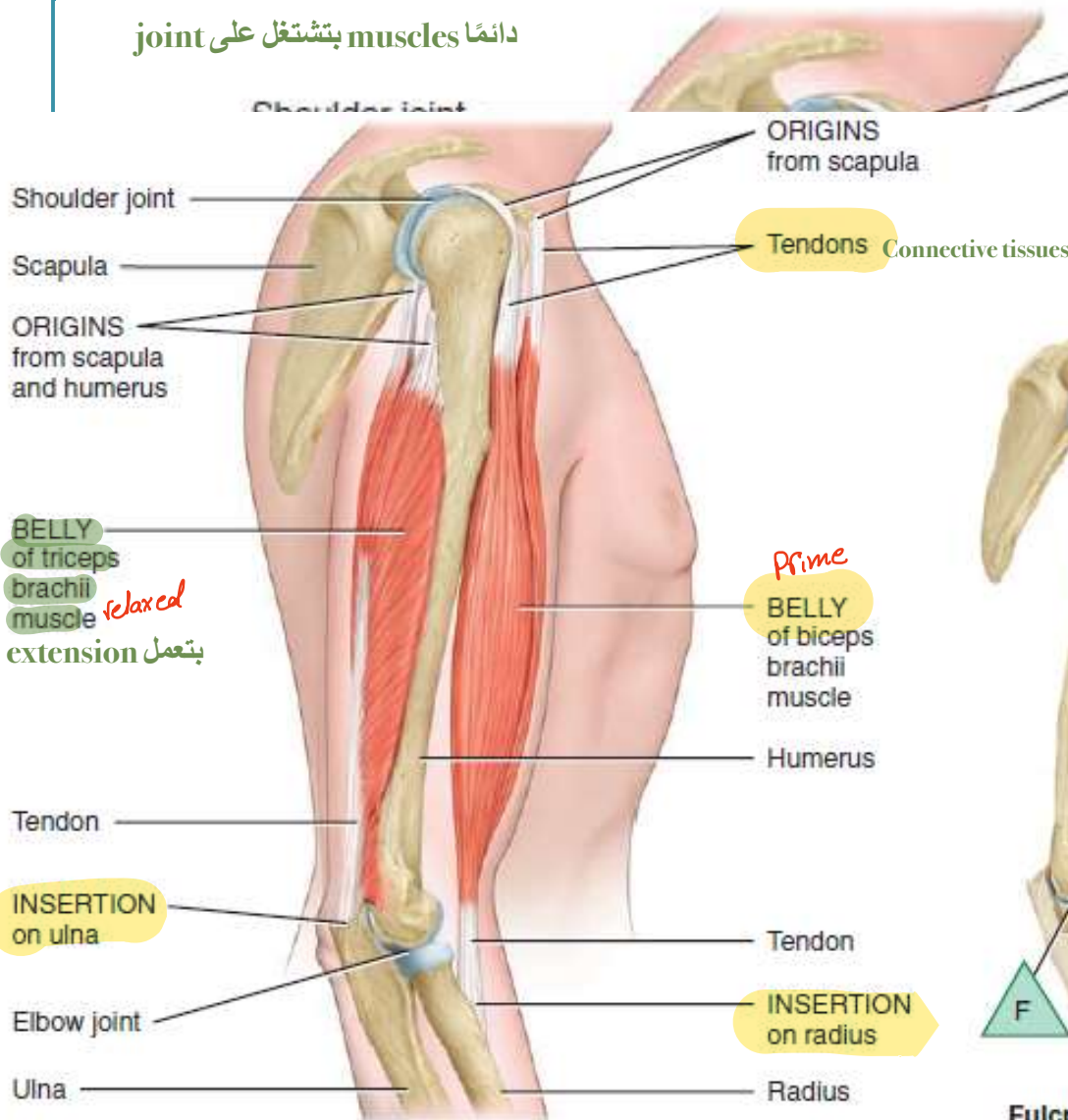
skeletal system.

**Skeletal muscles** are formed of several bundles (fascicles) of skeletal muscle cells. They are attached by tendons to bones

- When the skeletal muscle contracts, the tendon will be pulled and this will pull the bone resulting in **Movement**
- The **belly** of the muscle is the fleshy (wide) part between the tendons
- Muscles have more than one bony attachment:
  - the attachment of a tendon to the stationary bone is called the **origin**.
  - the attachment of the muscle's other tendon to the movable bone is called the **insertion**.
- the **action/s** of a muscle are the main (movements) that occur during contraction (e.g., flexion or extension).



دائمًا muscles بتشتغل على joint



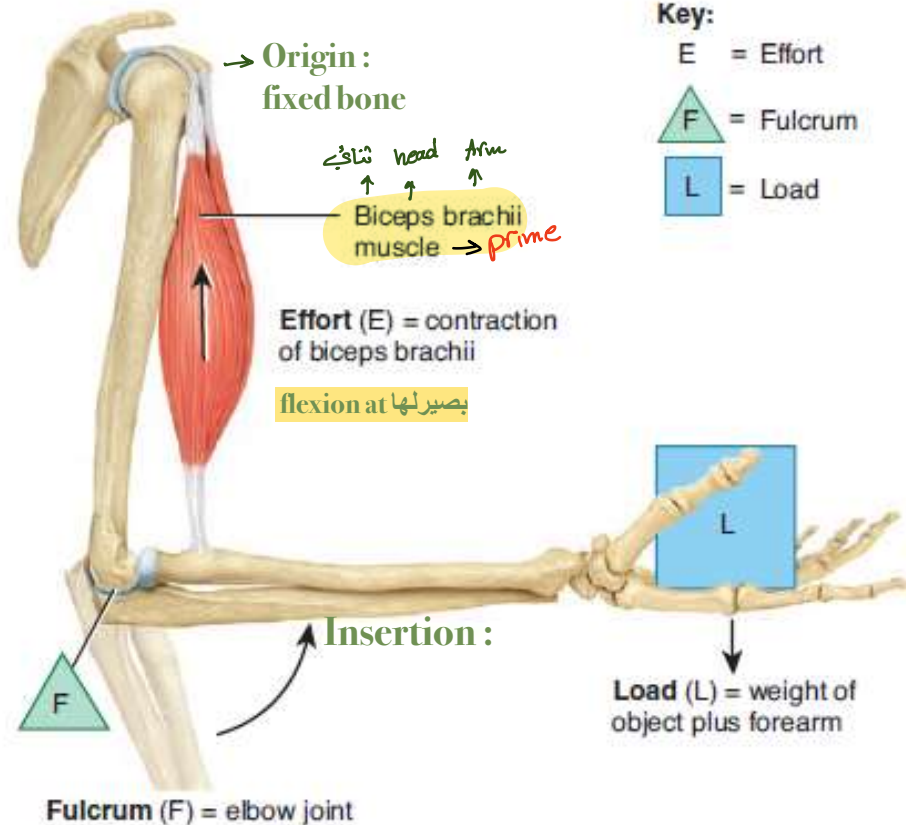
(a) Origin and insertion of a skeletal muscle

Elbow joint

Ulna

ORIGINS from scapula

مستحيل bi و tri يشتغلوا مع بعض  
لما اعمل flexion الbi بتعمل  
contraction و الtri بصير لها  
relaxation



(b) Movement of the forearm lifting a weight on radius

Radius

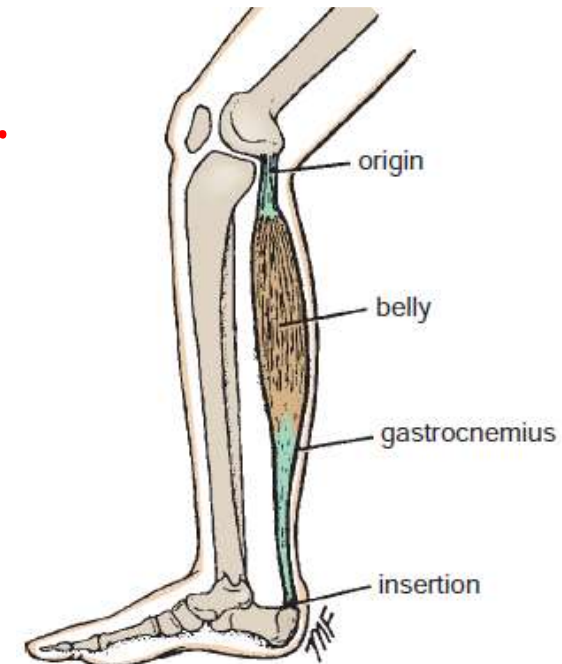
## Arrangement of the fascicles:

العضلة عبارة عن skeletal muscle cells بتعمل حزم كل حزمة من خلايا عضلية، مجموعة الحزم كلها تشكل العضلة الحزم تعطي شكل معين للعضلة

لأنها طويلة جدًا

- Skeletal muscle fibres (cells) within a muscle are arranged in bundles known as fascicles.
- Within a fascicle, all muscle fibres are parallel to one another.
- The fascicles, however, may form one of five patterns with respect to the tendons:-

- ① Parallel – Fusiform – Circular – Triangular
- ②
- ③
- ④
- ⑤ Pennate



### PARALLEL

Fascicles parallel to longitudinal axis of muscle; terminate at either end in flat tendons.  $\rightarrow$  يشبه السبر .

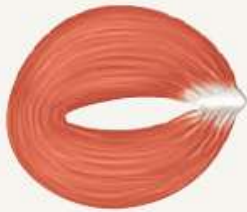


Example: Sternohyoid muscle (see Figure 11.8a)

### CIRCULAR

حائرية

Fascicles in concentric circular arrangements form sphincter muscles that enclose an orifice (opening).



موجودة في العين

Example: Orbicularis oculi muscle (see Figure 11.4a)

من المدار orbital .  
بتشبهه يلي بالمعرونة

زي الريشة، الها tendon/spine بالوسط

### FUSIFORM

مدببة من الطرفين و بالوسط ال diameter الها عالي

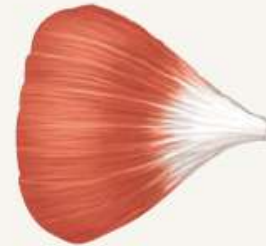
Fascicles nearly parallel to longitudinal axis of muscle; terminate in flat tendons; muscle tapers toward tendons, where diameter is less than at belly.



Example: Digastric muscle (see Figure 11.8a)

### TRIANGULAR

Fascicles spread over broad area converge at thick central tendon; gives muscle a triangular appearance.



Example: Pectoralis major muscle (see Figure 11.3a)

### PENNATE

Short fascicles in relation to total muscle length; tendon extends nearly entire length of muscle.

#### Unipennate

Fascicles are arranged on only one side of tendon. جاي على جهة واحد



Example: Extensor digitorum longus

#### Bipennate

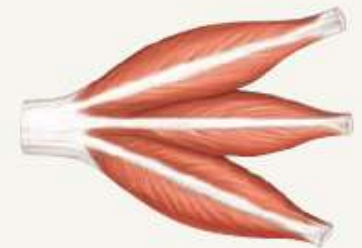
Fascicles are arranged on both sides of centrally positioned tendons.



Example: Rectus femoris muscle

#### Multipennate

Fascicles attach obliquely from many directions to several tendons. على اكثر من جهة

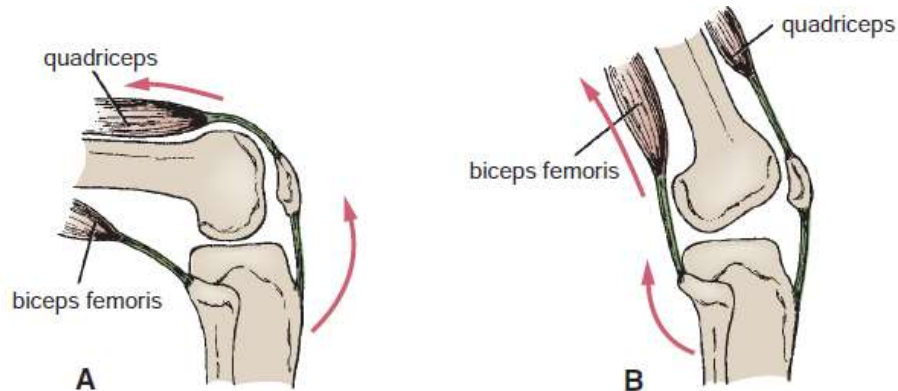


Example: Deltoid muscle

# Coordination among muscles:

- It is common to attribute a specific action at a joint to a single muscle, but remember that muscles do not work in isolation.
- Movements usually result from several skeletal muscles acting as a group.
- 1) Most skeletal muscles are arranged in opposing pairs at joints (antagonistic) (e.g., flexors vs. extensors):
  - **Prime mover** or **agonist** and is responsible for the action (Contract) بصيرلها contraction
  - **Antagonist** stretches (relaxed) and yields to the effects of the agonist. يعزى نتيجة الحركة.

مهم نعرف انه ما في عضلة تشتغل على joint لوحدها  
يمكن more than one muscle act on one joint  
One muscle act on more than one joint





# Muscles Of The Upper Limb

Shoulder girdle

في عمله fixation ليش؟ لانها مو ثابتة زي pelvic girdle

## Muscles that move the Pectoral Girdle

بعض muscles بتكون من vertebral column على pectoral girdle او بتعمله movement

مسننة

هي يلي بتشتغل ب boxing

- 1) **Serratus anterior (Punching muscle):** connects first 8 or 9 ribs to the scapula Known as “boxer’s muscle” because it is important in horizontal arm movements such as punching and pushing.

مرهم بردا ، يذكي راحته.

(Long thoracic nerve)

لما نعمل forward movement هي يلي بتثبت  
مع scapula other muscles طبعاً

جاية anterior

- 2) **Pectoralis minor:** connects ribs 3 to 5 and Coracoid process of scapula. **Moves scapula and helps in inhalation**

- إما يحركها أو يشدّها.

الاستنشاق

pectoralis major تحت

- 3) **Subclavius:** connects 1<sup>st</sup> rib to clavicle

→ الوهيرة التي تحل فطة  
Clavicle على → Fixing or Movement of pectoral girdle.

يعني بتزفح.

- 4) **Levator scapulae, Rhomboid major and rhomboid minor:**

Originate from the vertebrae and insert into the scapula. They elevate and adduct the scapula.

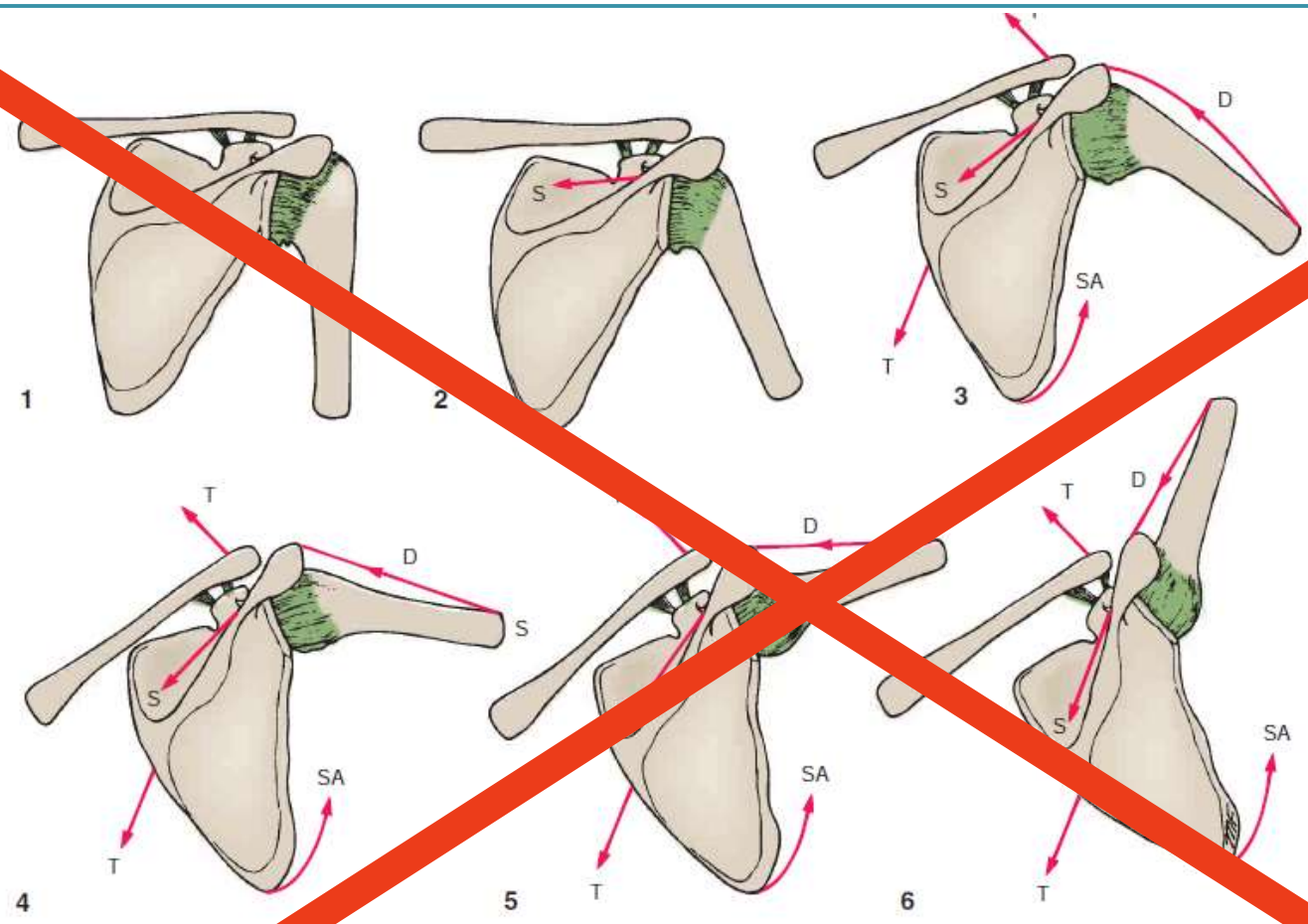
3,4,5 → posterior They connect vertebral column to the scapula

5) **Trapezius**: The trapezius is a **large, flat, triangular** sheet of muscle extending from the skull and vertebral column medially to the pectoral girdle laterally (clavicle, acromion, scapulae spine). It is the most superficial back muscle and covers the posterior neck region and superior portion of the trunk. (**spinal accessory nerve (11<sup>th</sup> cranial N.)**). **Very wide origin scapula و clavicle** **insertion على** بتعمل

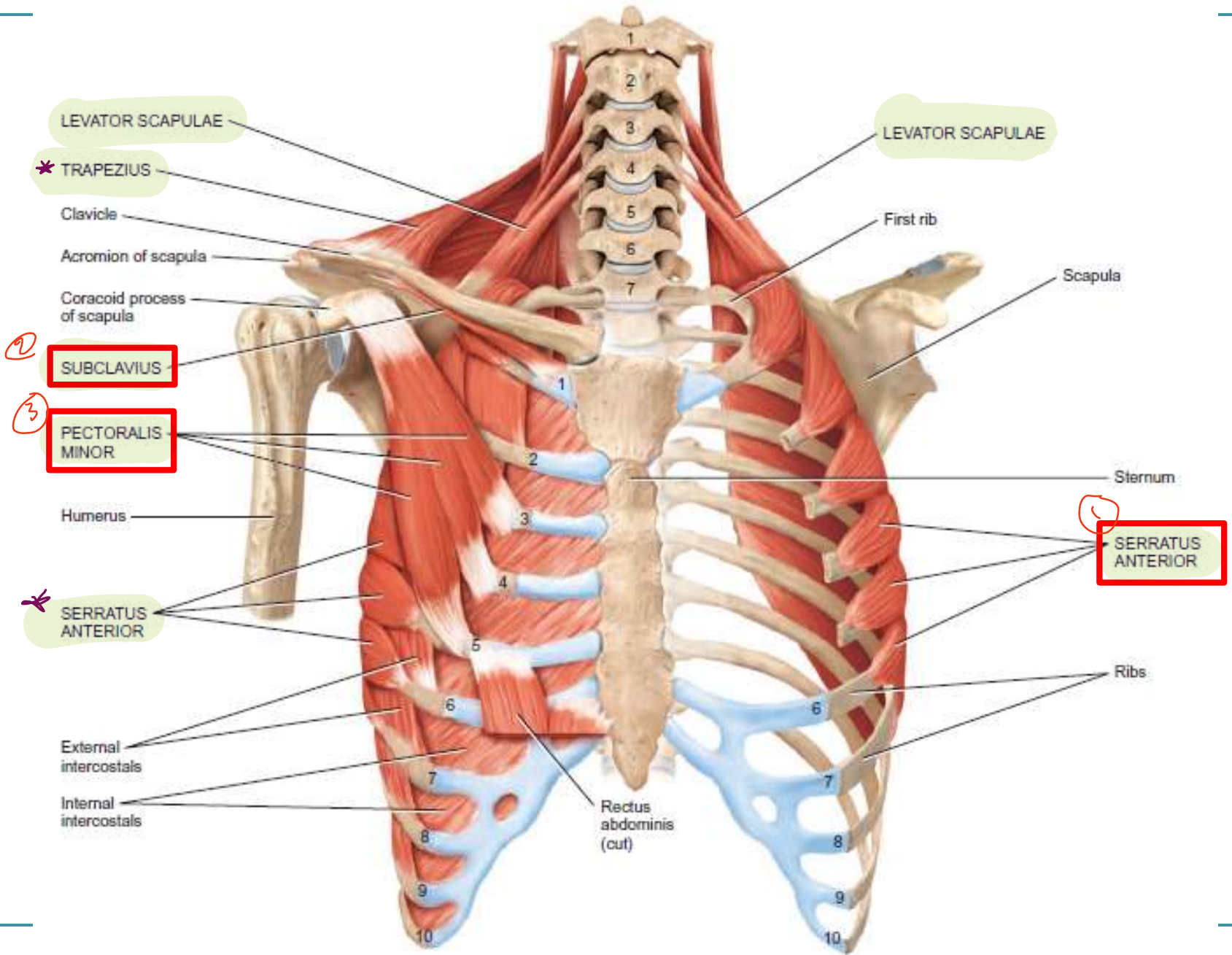
*Posterior*  
**Both Trapezius and Serratus anterior** *Anterior* **muscles will rotate the scapula so that its glenoid cavity is raised. This allows the arm to be raised above the head (abduction of arm > 90°).**

على 90 بييسكر مع acromin process head of the humerus ف لا يحدث abduction للاعلى  
لانه هو ما بصير على shoulder joint و انما على scapular rotation

□ These muscles also stabilize (**fixators**) the girdle so that the free limb can have a firm base to move on & Move the scapulae



→ **Winging of the scapula:**  
**Paralysis of serratus anterior muscle**



LEVATOR SCAPULAE

LEVATOR SCAPULAE

\* TRAPEZIUS

Clavicle

Acromion of scapula

Coracoid process of scapula

First rib

Scapula

2

SUBCLAVIUS

3

PECTORALIS MINOR

Humerus

Sternum

SERRATUS ANTERIOR

\* SERRATUS ANTERIOR

Ribs

External intercostals

Internal intercostals

Rectus abdominis (cut)

(a) Anterior deep view

(b) Anterior deeper view



Sternocleidomastoid

TRAPEZIUS (superior fibers)

TRAPEZIUS (middle fibers)

Acromion of scapula

Deltoid

Infraspinatus

Teres minor

Teres major

TRAPEZIUS (inferior fibers)

SERRATUS ANTERIOR

Triceps brachii

Twelfth thoracic vertebra

Occipital bone

Ligamentum nuchae

Cervical vertebrae

LEVATOR SCAPULAE

Clavicle

SUBCLAVIUS

RHOMBOID MINOR

Scapula

RHOMBOID MAJOR

SERRATUS ANTERIOR

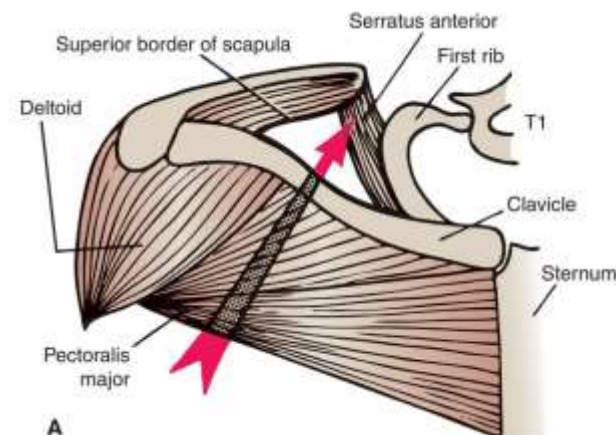
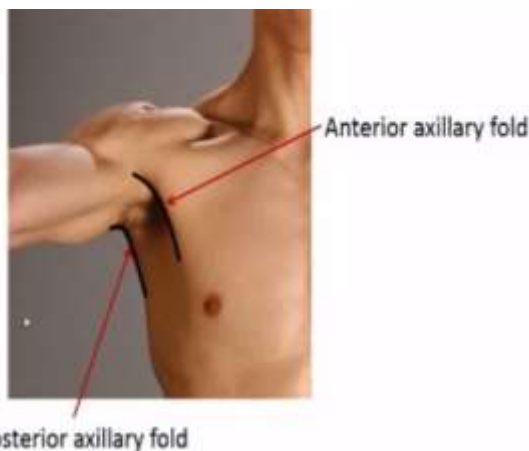
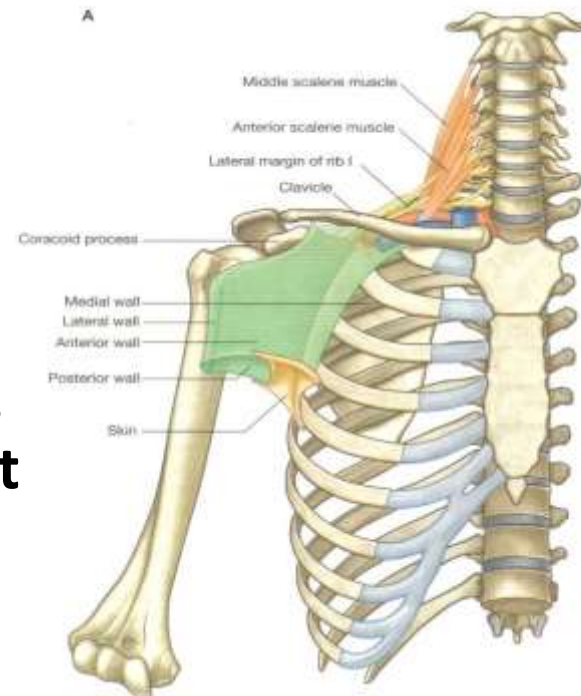
Ribs

(d) Posterior superficial view

(e) Posterior deep view

# AXILLA → منطقة على الإبط بين حرفي ت اسم.

- It is a pyramidal space between the upper part of the arm (laterally) and the side of the chest wall (medially).
- Forms an important passage for nerves, blood and lymphatic vessels from the root of the neck to the upper limb.
- Has an **apex** directed upwards into the root of the neck, lower end or **base**, and **4 walls** (anterior, posterior, medial and lateral).



# Muscles of shoulder and thorax that move the (humerus) (cross shoulder joint)

Muscle	Origin	Insertion	Main Actions/Nerve supply
<p>Large muscle</p> <p><b>Deltoid</b></p> <p><b>Injection</b></p> <p>لما بدنا نعطي ابرة او مطاعيم بنحتاج نعطيه في هيك مكان</p>	Clavicle and scapula	Deltoid tuberosity humerus	<p><u>Abduction of arm (15-90°)</u></p> <p>فقط هنا المهم .</p> <p><u>Axillary nerve.</u></p>
<p>* <b>Teres major</b></p> <p>on the back</p>	Scapula	Intertubercular sulcus (Bicipital groove) humerus	<p><u>Adduction, extension &amp; medial rotation of shoulder joint.</u></p> <p><u>Subscapular nerve</u></p>
<p><b>Pectoralis major</b></p> <p>جاي من الأمام .</p>	Clavicle, sternum and costal cartilages → ribs		<p><u>Adduction, flexion &amp; medial rotation of the arm.</u></p> <p><u>Lateral &amp; Medial pectoral Ns</u> branches of axilla</p>
<p>* <b>Latissimus dorsi</b></p> <p>“swimmer’s muscle”</p> <p>on the back</p>	<p>Vertebrae (T-L-S) → Thoracic lumber sacrum</p> <p>Iliac crest of the hip bone</p>		<p><u>Adduction, medial rotation and extension of the arm.</u></p> <p>/</p> <p><u>Nerve to latissimus dorsi</u></p>

↓  
هي العصبية التي يتأخذ من  
-pelvis

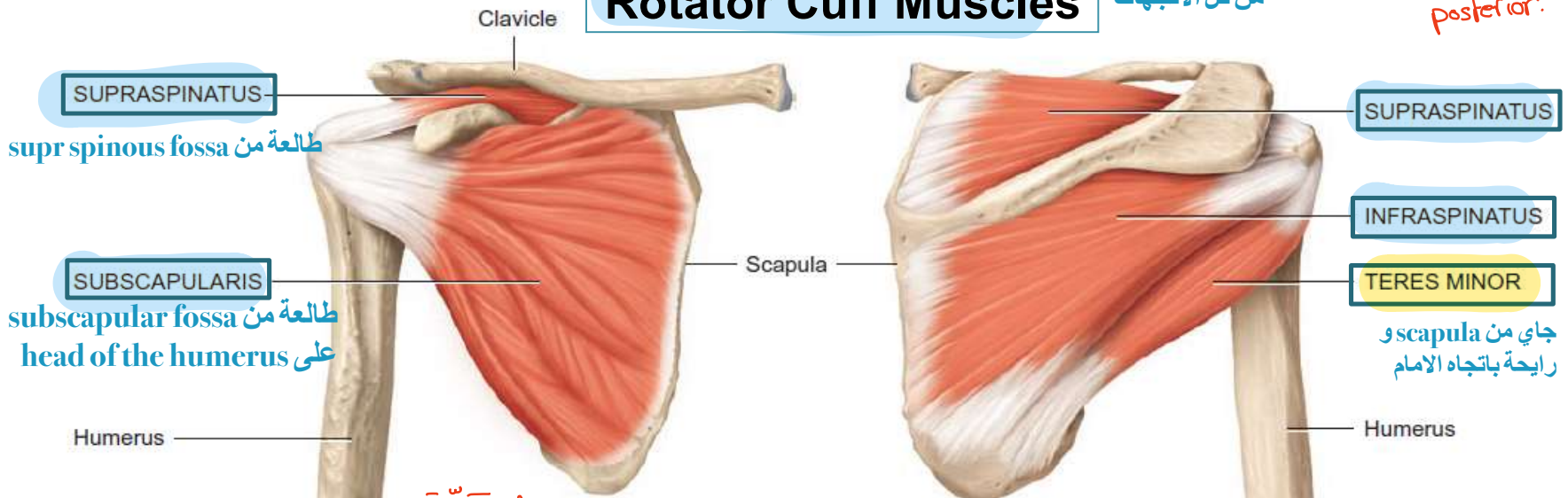
لا دائماً عليهم سؤال جالا مكان

<b>Subscapularis</b> من الأمام	<b>Scapula</b>	<b>Insertion</b> <b>Humerus</b>	<b>Medial rotates arm</b>
<b>Supraspinatous</b> من الأعلى			<b>helps initiate abduction of the arm 0-15°</b> من آتج بسطة
<b>Infraspinatous</b> من [أكتف]			<b>Lateral rotate arm</b>
<b>Teres minor</b>			

### Rotator Cuff Muscles

من كل الاتجاهات

posterior.



مثل اللقطة.

➤ The Rotator Cuff Muscles tendons all blend with the capsule of the shoulder joint, thus help in stabilizing it.



DELTOID (cut)

SUPRASPINATUS

SUBSCAPULARIS

CORACOBRACHIALIS

PECTORALIS MAJOR (cut)

TERES MAJOR

Biceps brachii (cut)

LATISSIMUS DORSI

Brachialis

Biceps brachii (cut)

Radius

Ulna

Coracoid process of scapula

Clavicle

Subclavius

Serratus anterior

PECTORALIS MAJOR (cut)

2nd rib

Pectoralis minor

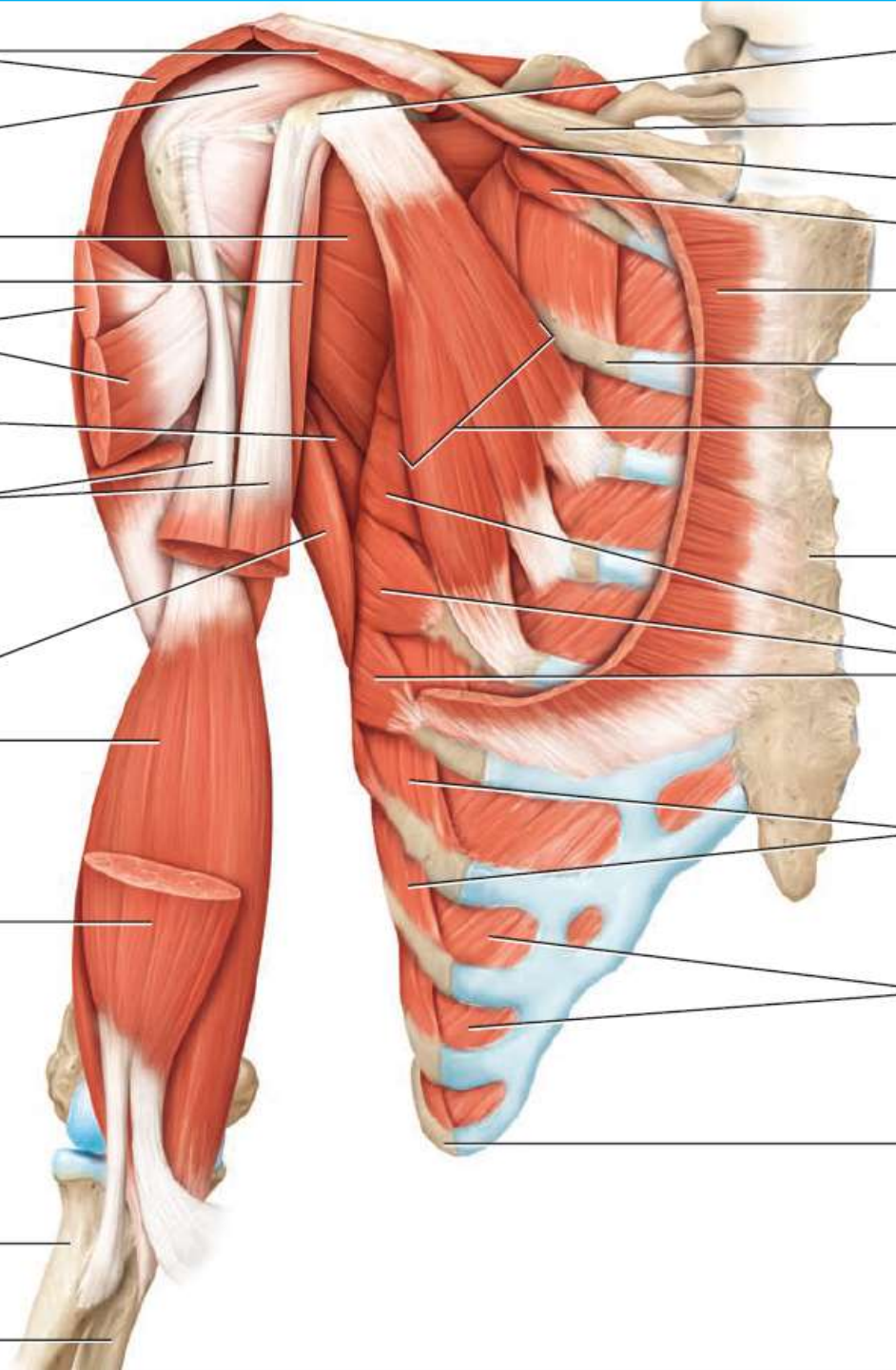
Sternum

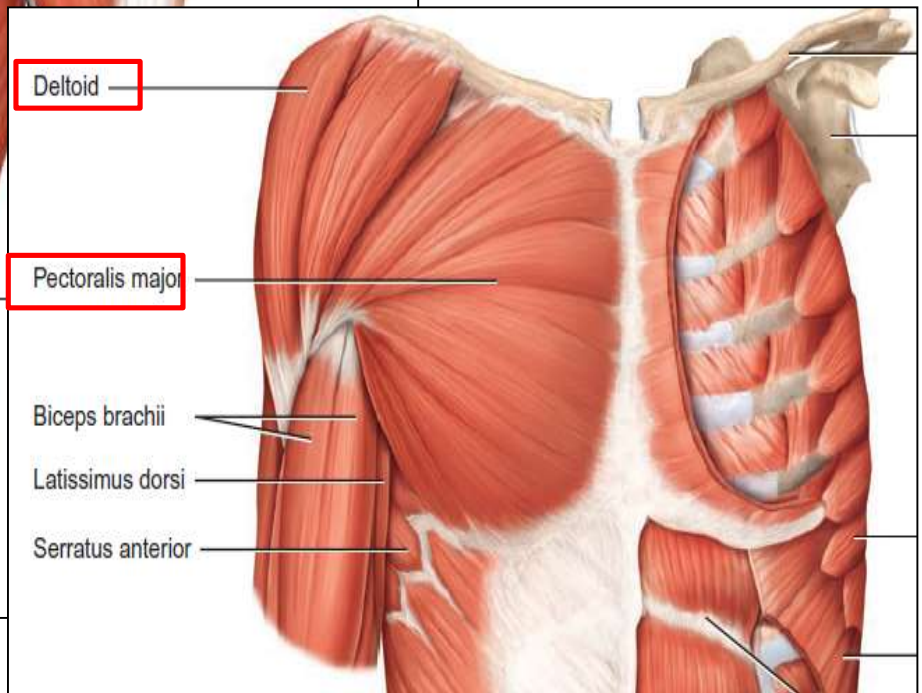
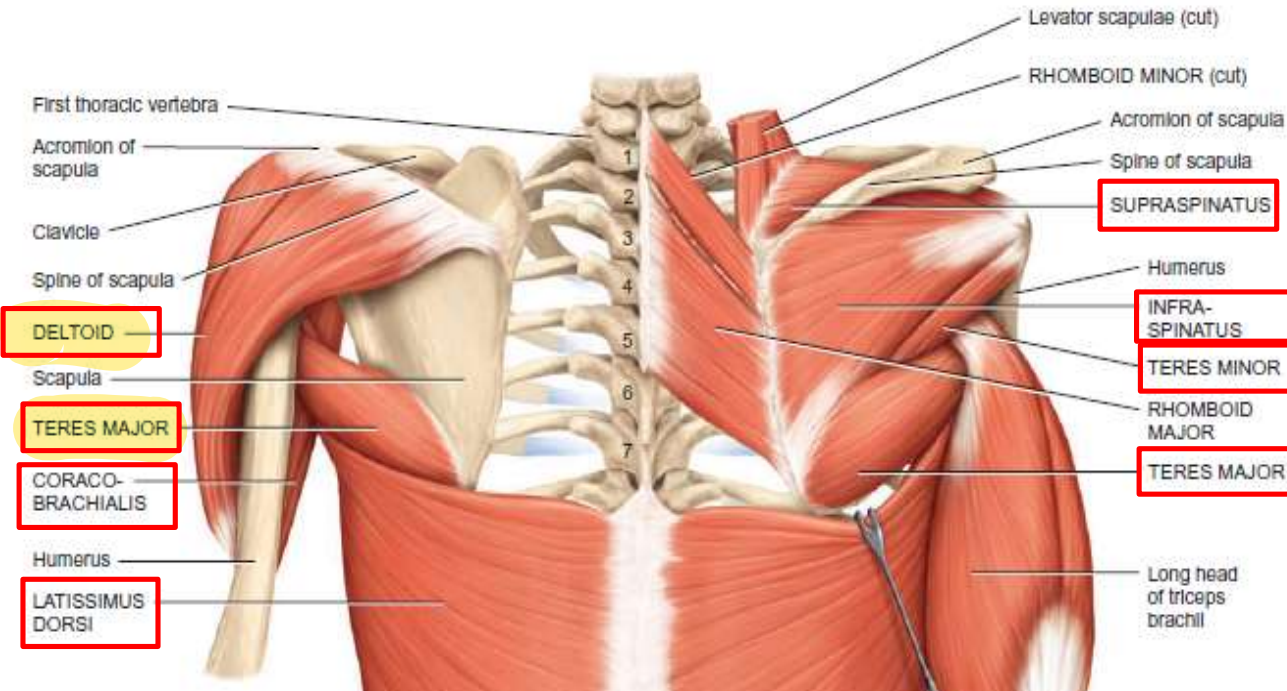
Serratus anterior

External intercostals

Internal intercostals

10th rib

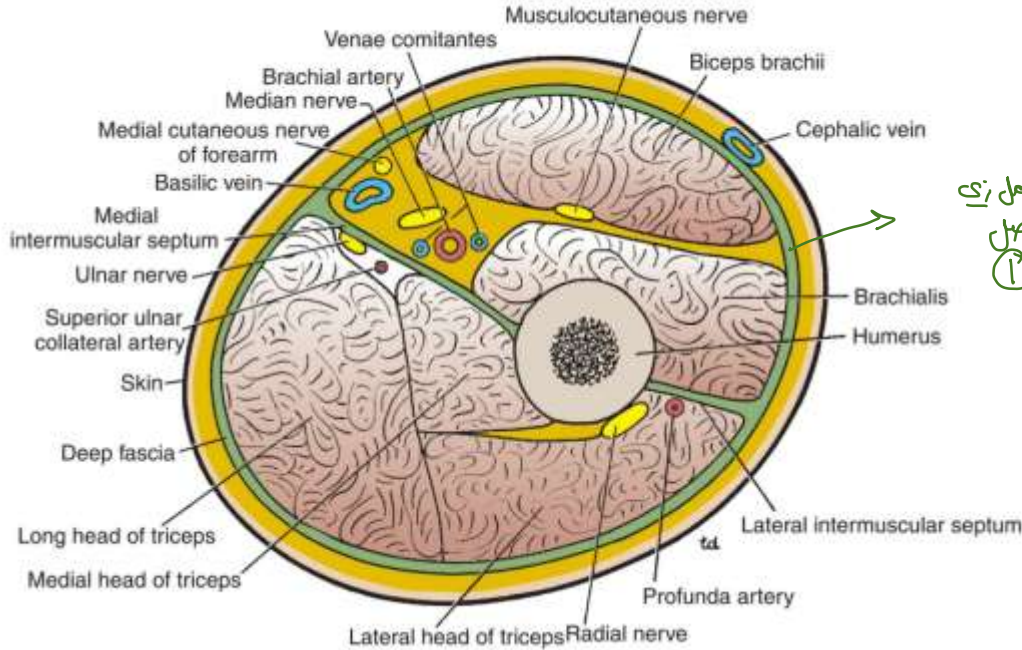




# Arm

بتشغل علی elbow joint →

1 Anterior



Medial

عامل زي  
فاصل  
1 2

lateral

2 Posterior



# Muscles of the arm (that move the forearm)

## Anterior compartment

Nerve supply: **Musculocutaneous nerve** <sup>مطلوب</sup>

There are 4 muscles related to the bicipital groove : biceps major , long of the biceps, pectoralis major, Latissimus dorsi

Muscle	Origin <sup>الثابتة</sup>	Insertion <sup>المستقرّة</sup>	Action
<b>Biceps brachii</b> Forearm ↓	<b>Two heads</b> (Long / Short) <sup>Bicipital groove</sup> scapula <sup>Coracoled process</sup>	Radial tuberosity (radius)	<b>Flexion and Supination</b> of forearm ↓ Because of the tendon.
<b>Brachialis</b> ↓ طالحة من Humerus	Humerus	Ulna	<b>Most powerful Flexor of the forearm</b>

Main flexor of the elbow <sup>مطلوب</sup>

The **biceps** long head pass through the humerus intertubercular sulcus and inserts into the **radial** tuberosity. Biceps at elbow forms an aponeurosis that inserts medially (ulna) which can produce supination of the forearm. <sup>Flat tendon</sup>

## Posterior compartment

Nerve supply: **Radial nerve** <sup>مطلوب</sup>

Muscle	Origin <sup>الثابتة</sup>	Insertion <sup>المستقرّة</sup>	Action
<b>Triceps brachii</b>	<b>Three heads</b> Long (scapula)/ Lateral / Medial (humerus)	<b>Olecranon process (ulna)</b>	<b>Most powerful Extensor of the forearm</b> (elbow)



# Coracobrachialis

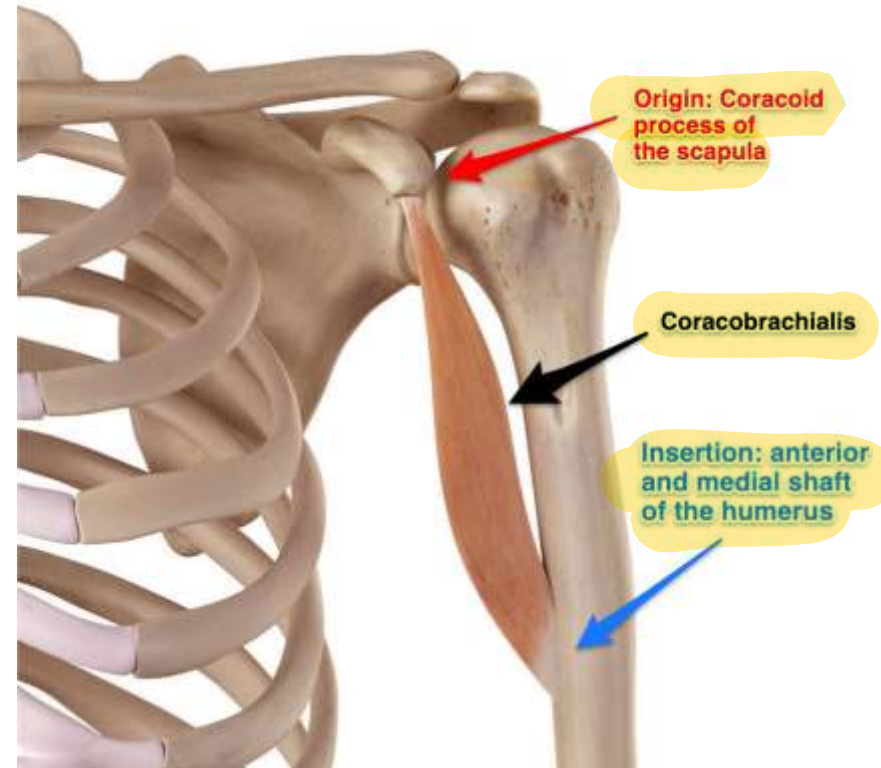
Arises from the **apex of coracoid** process scapulae and is inserted into the **middle** of the **humerus**.

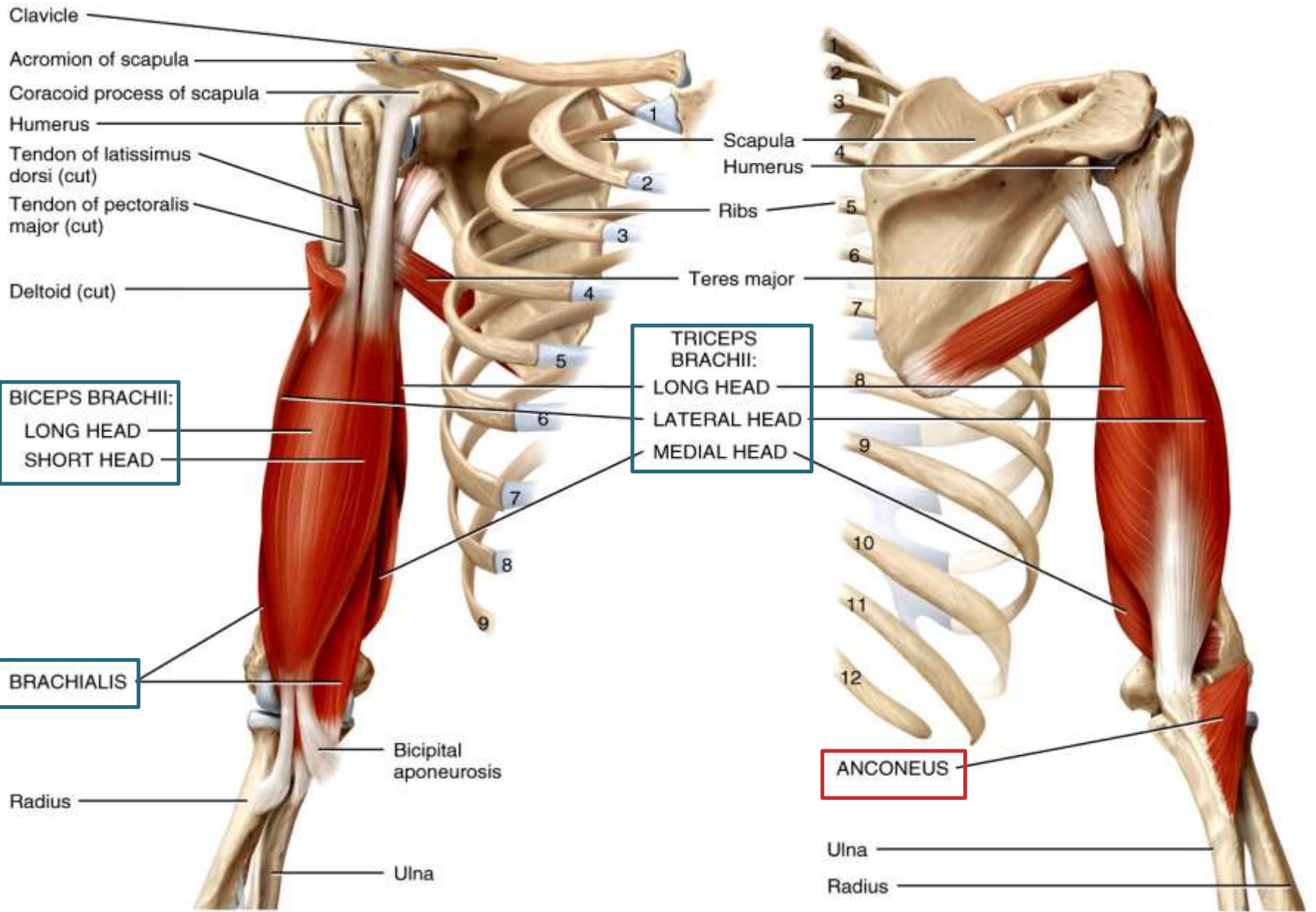
## Action:

- Flexion & Adduction of Arm.

## Nerve supply:

- Musculo-cutaneous nerve. *مطالوب حفظه. Anterior*





(a) Anterior view

(b) Posterior view

<p><b>Movement of Forearm</b></p>	<p><b>Muscles that produce them</b></p>
<p><b>Flexion</b> (elbow)</p>	<p>① Biceps ② Brachialis</p>
<p><b>Extension</b> (elbow)</p>	<p>Triceps</p>
<p><b>Supination</b> Twist a corkscrew (radioulnar)</p>	<p>① Biceps ② Supinator (forearm muscle) رح ينذكر لقدا م</p>
<p><b>Pronation</b> Twist a corkscrew (radioulnar)</p>	<p>① Pronator teres (forearm muscle) ② Pronator quadratus (forearm muscle) برهنو لقدا م Forearm</p>