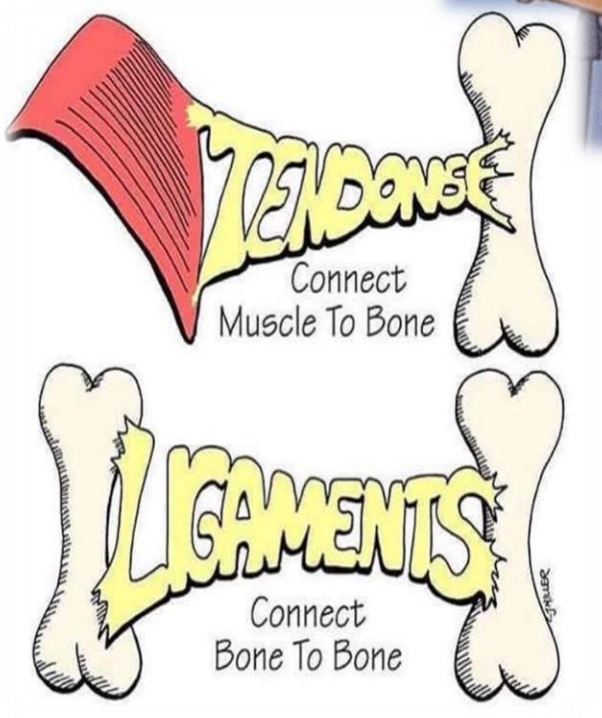
Human Anatomy -1st year 2020-2021



Basic Anatomical Structures

2. Muscles ,Tendons And ligament

Lecture (5)

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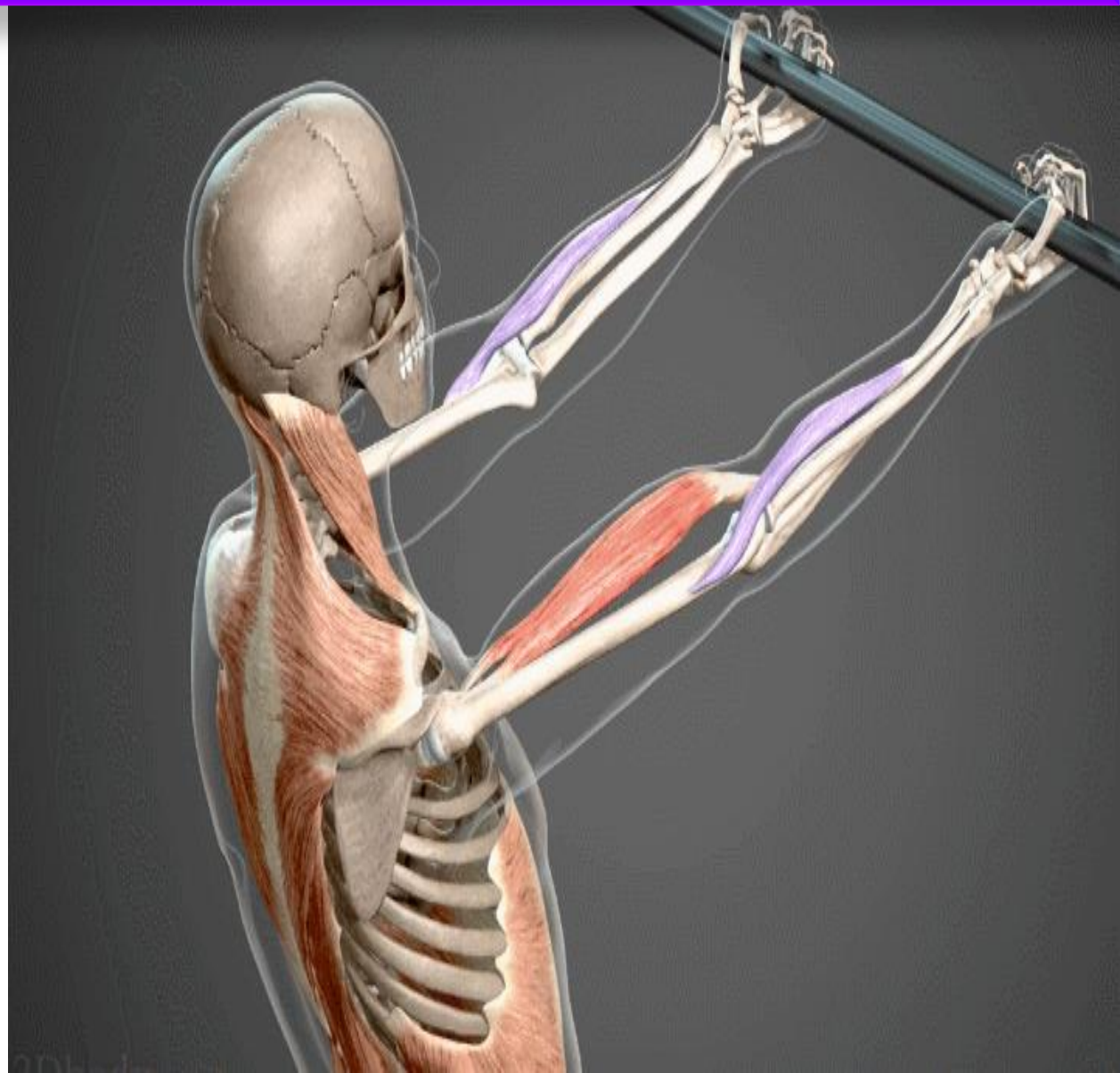
Objective Learning

1. What is muscle?
2. What are Muscle functions
3. What are the types of the muscles
4. Nomenclature of Skeletal muscle
5. Classification of the muscle
6. Organization of skeletal muscle
7. Define the tendon
8. Define ligament and its type

Muscles

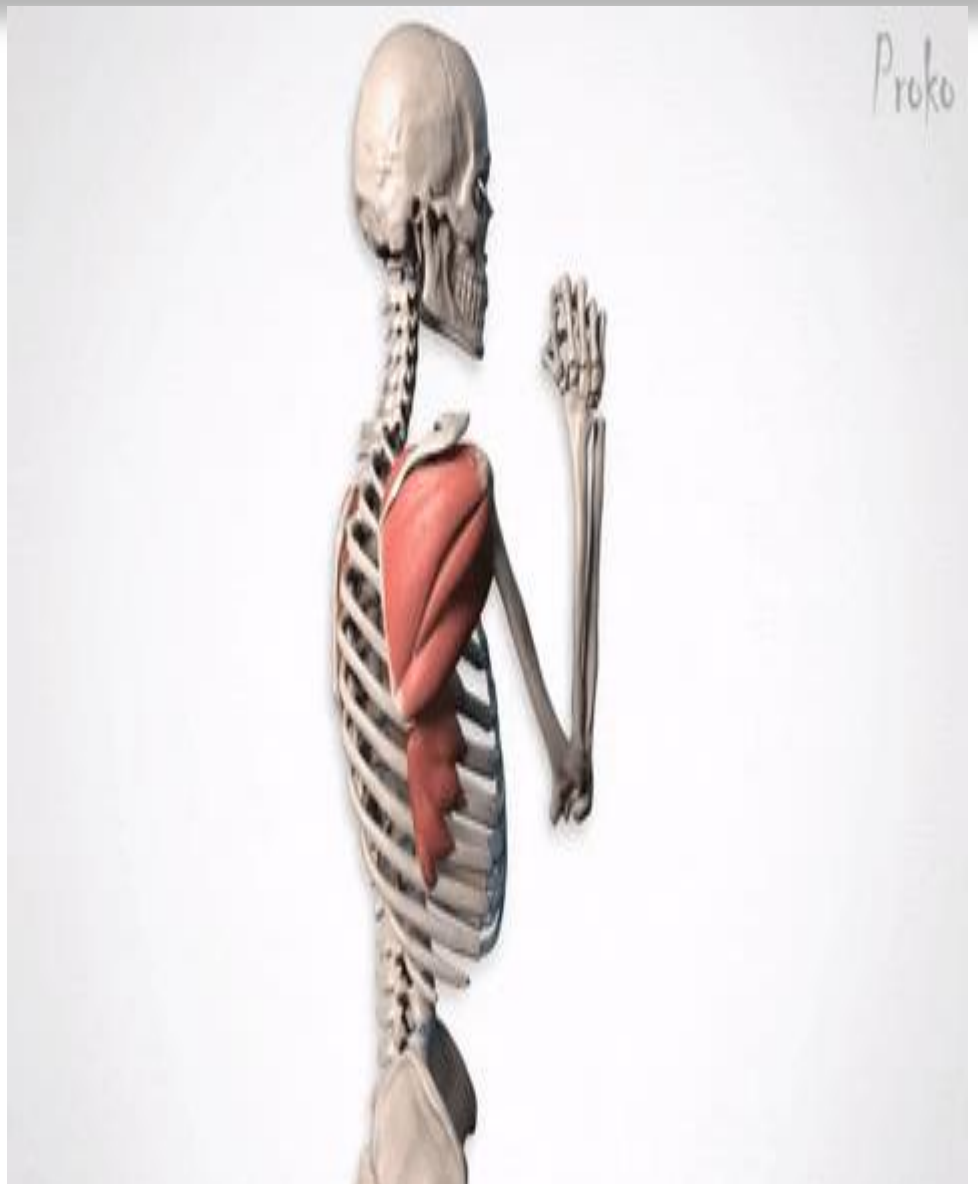
Muscle comes from Latin word MUS (small mouse)

Muscle is Specialized tissue that enable the body and its parts to move. About 640 make up about 40 % of the body mass.

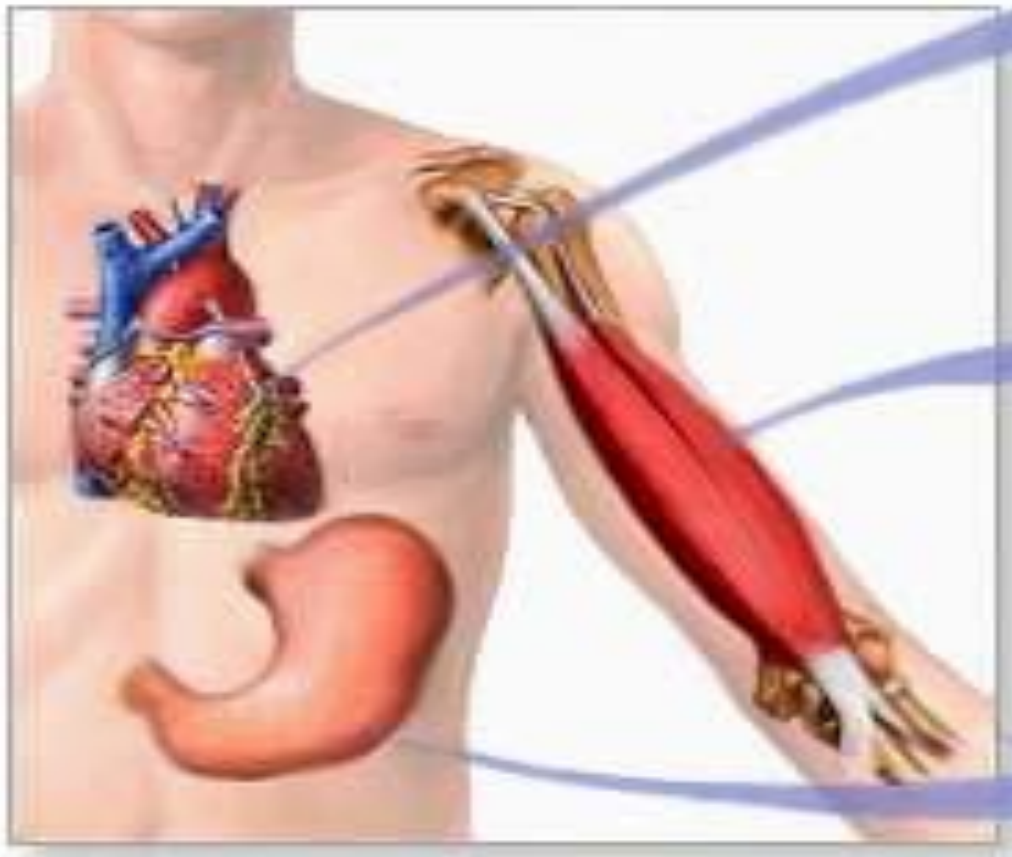


Function Of Muscles

1. Production of Movement
2. Maintenance of posture and muscle tone
3. Heat production by thermogenesis process
4. Protects the bones and internal organs.



Types Of Muscles



Cardiac muscle cell

Skeletal muscle cell

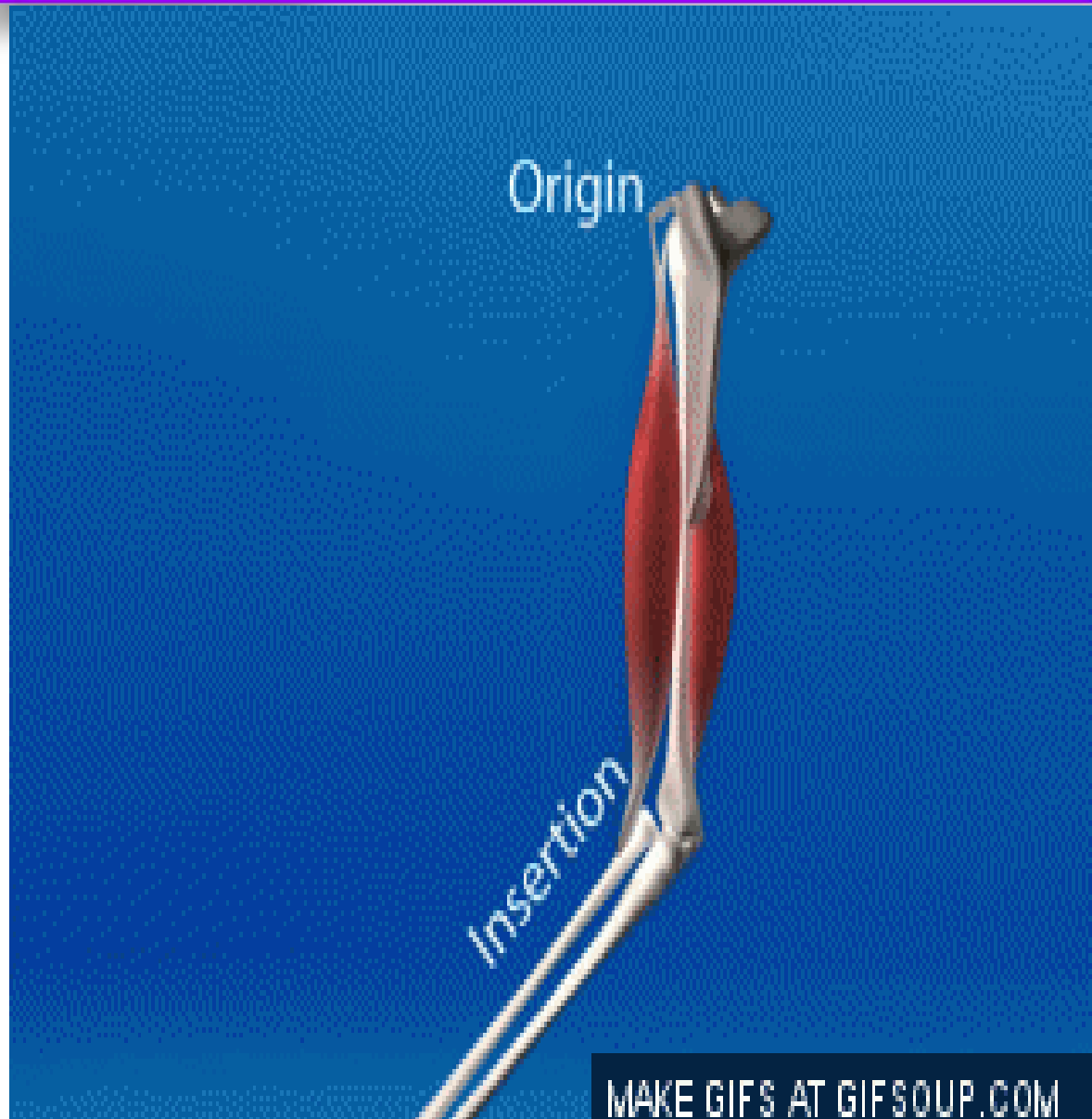
Smooth muscle cell

Skeletal muscle
Voluntary muscle

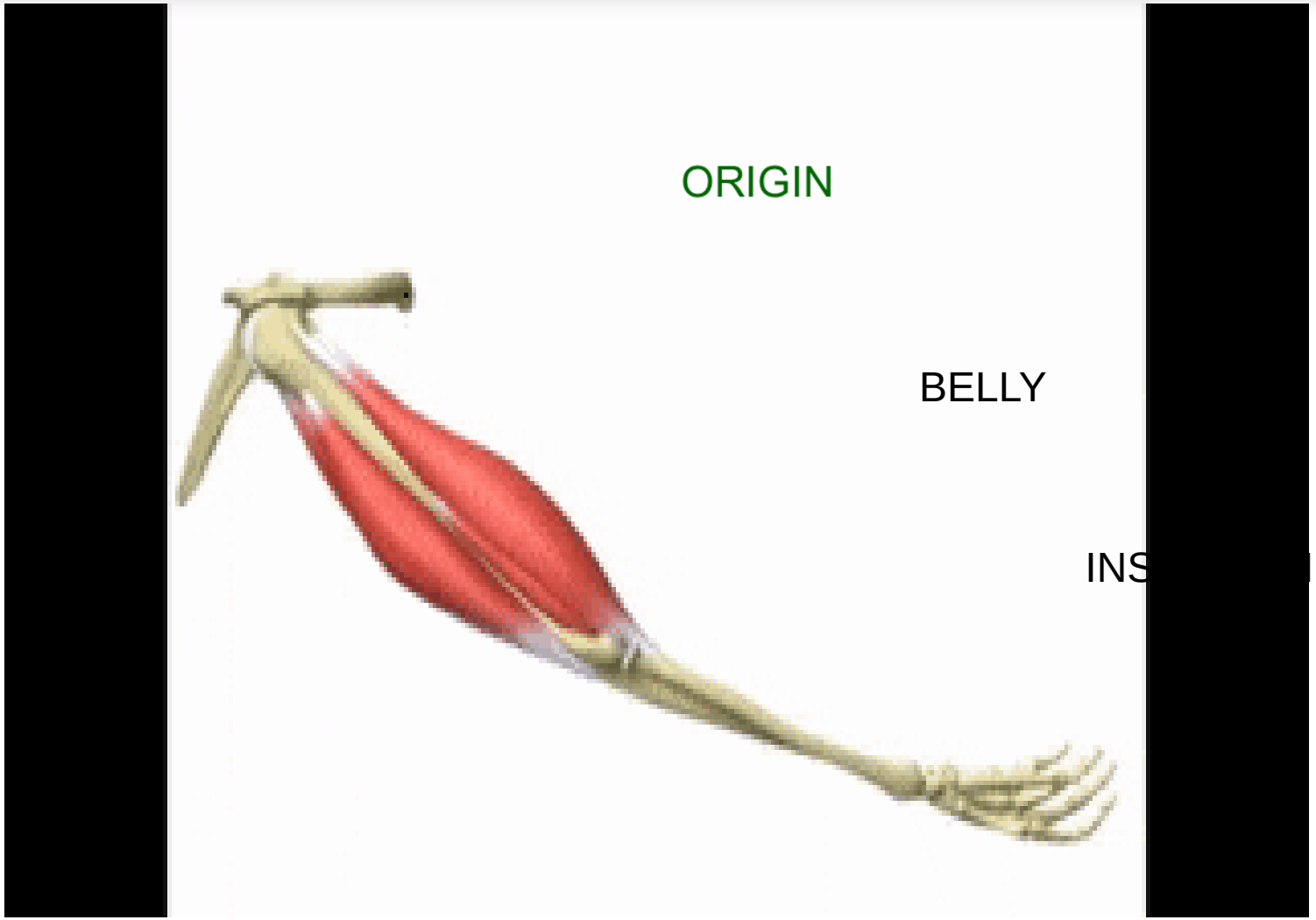
Each skeletal muscle is consisted of 3 parts:

1. The attachment point to the bone that does not move is the origin.
2. Belly: the fleshy part of the muscle between the tendons of origin and insertion
3. The attachment point to the bone that moves is the insertion.

The muscles anchor firmly to bones by Tendons or aponeurosis

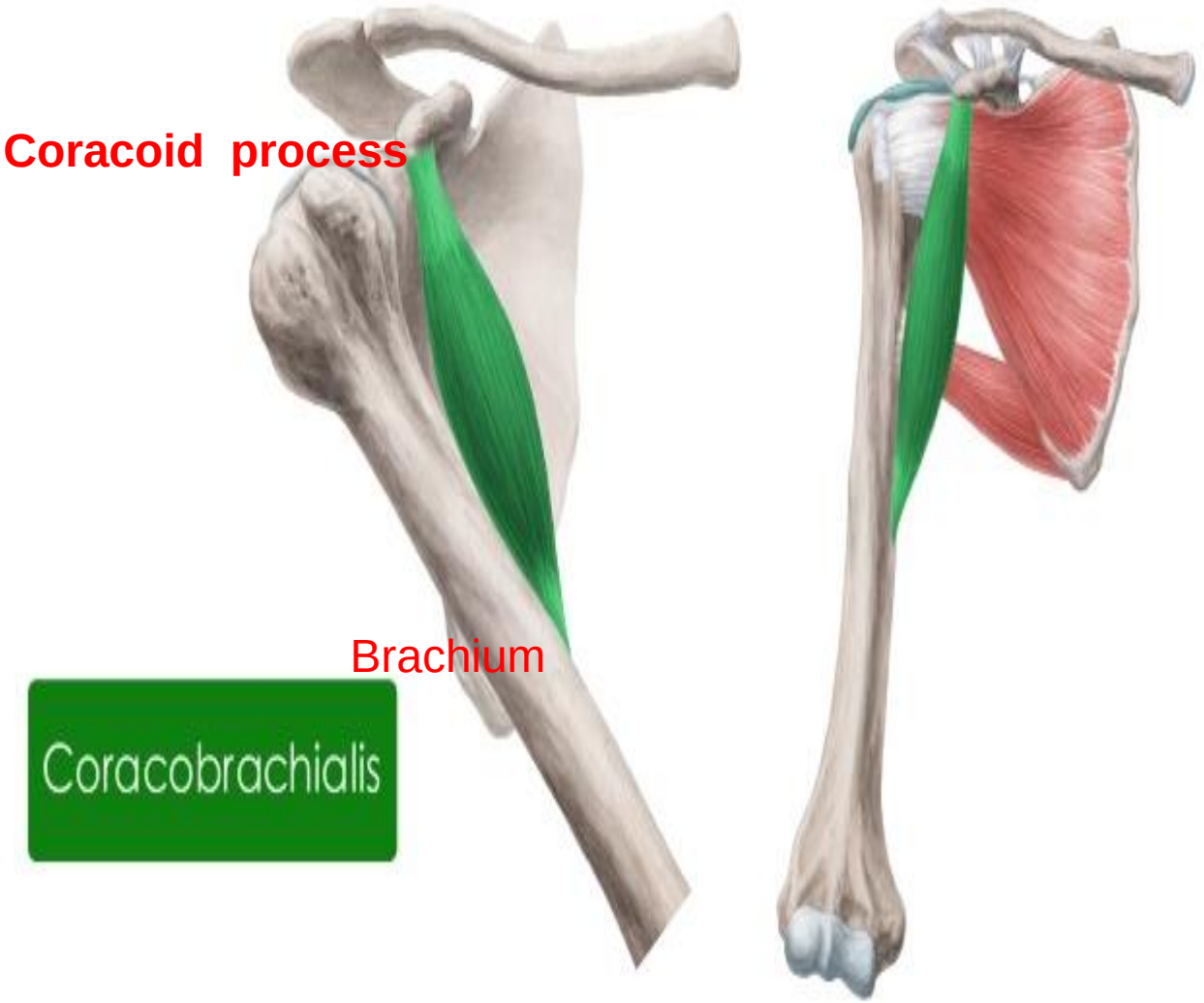


Muscles Attachments



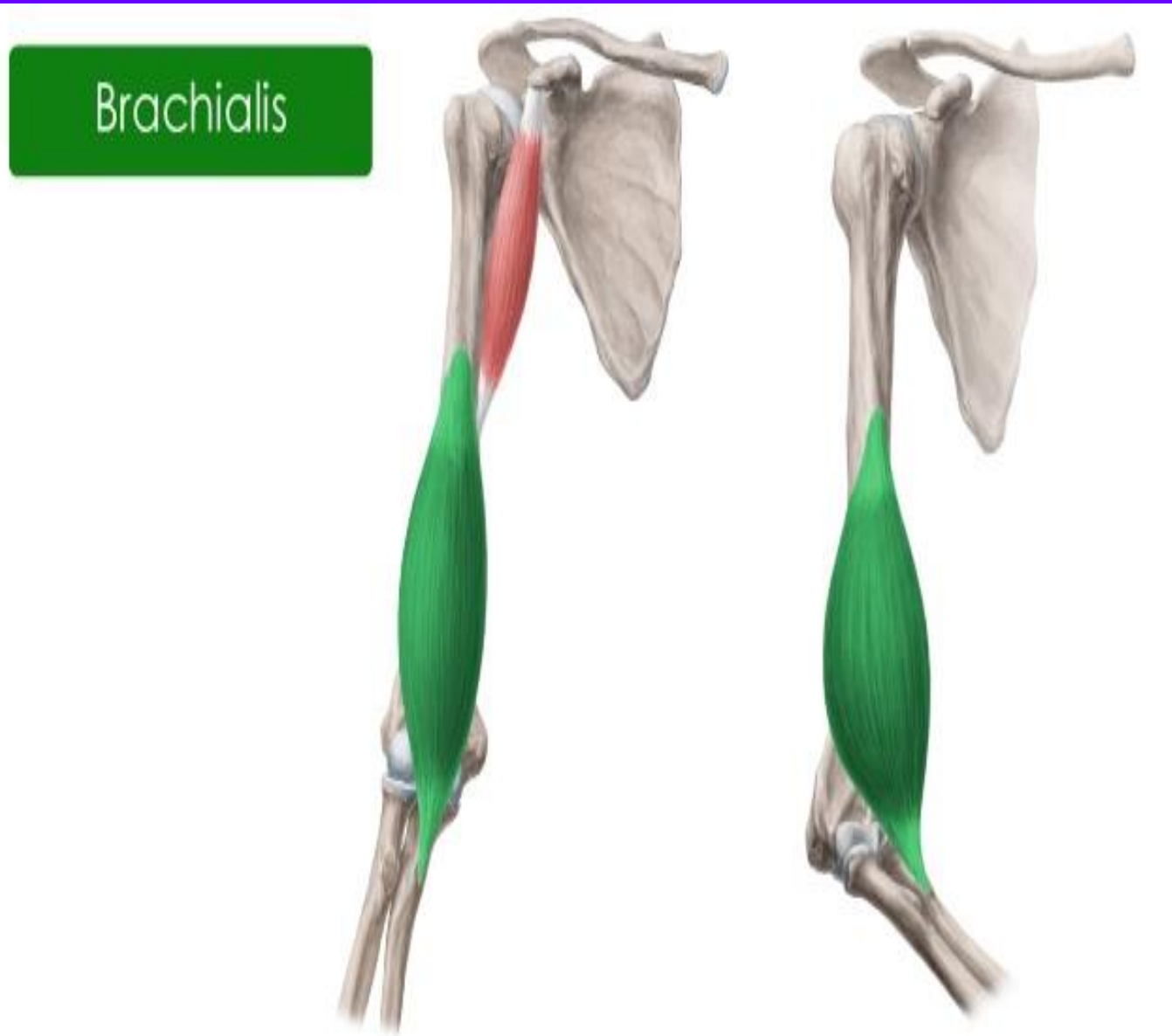
Nomenclature of Skeletal muscle

- **Number of origins** – e.g., biceps (two origins) and triceps (three origins)
- **Location of attachments** – named according to point of origin and insertion e.g. coracobrachialis



Nomenclature of Skeletal muscle

- **Action**
- e.g., adductor ,abductor ,flexor or extensor, as in the names of muscles that adducts, abducts flexs or extends .
- **Location of muscle** on the bone or body region
- e.g. Tibialis anterior brachialis



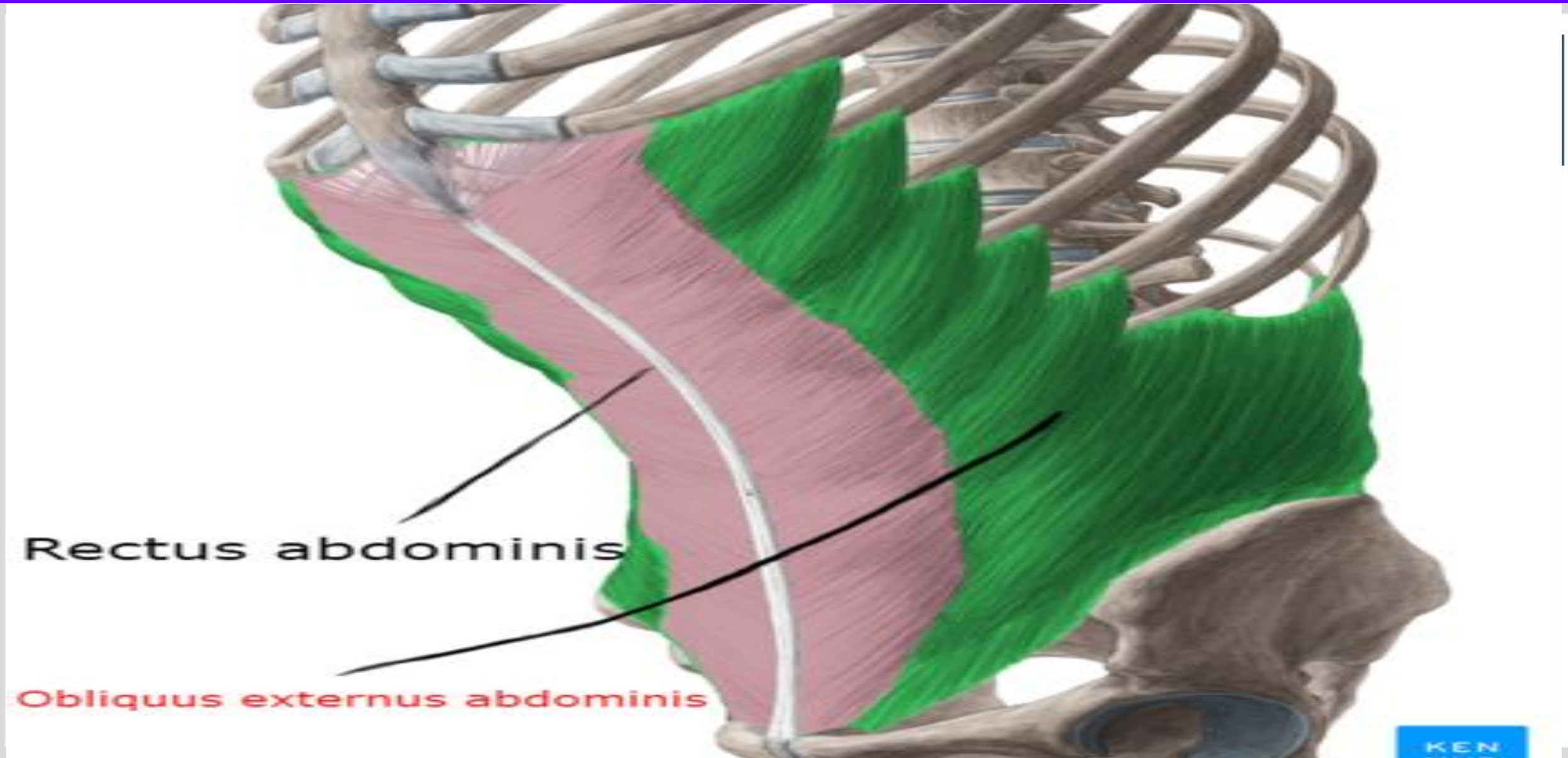
Nomenclature of Skeletal muscle

- **Shape of muscle** – e.g., the deltoid muscle (deltoid = triangle) Piriformis (spindle shaped
- **Relative size** – e.g. medius, maximus (largest), minimus (smallest), longus (long)

Gluteus Maximus

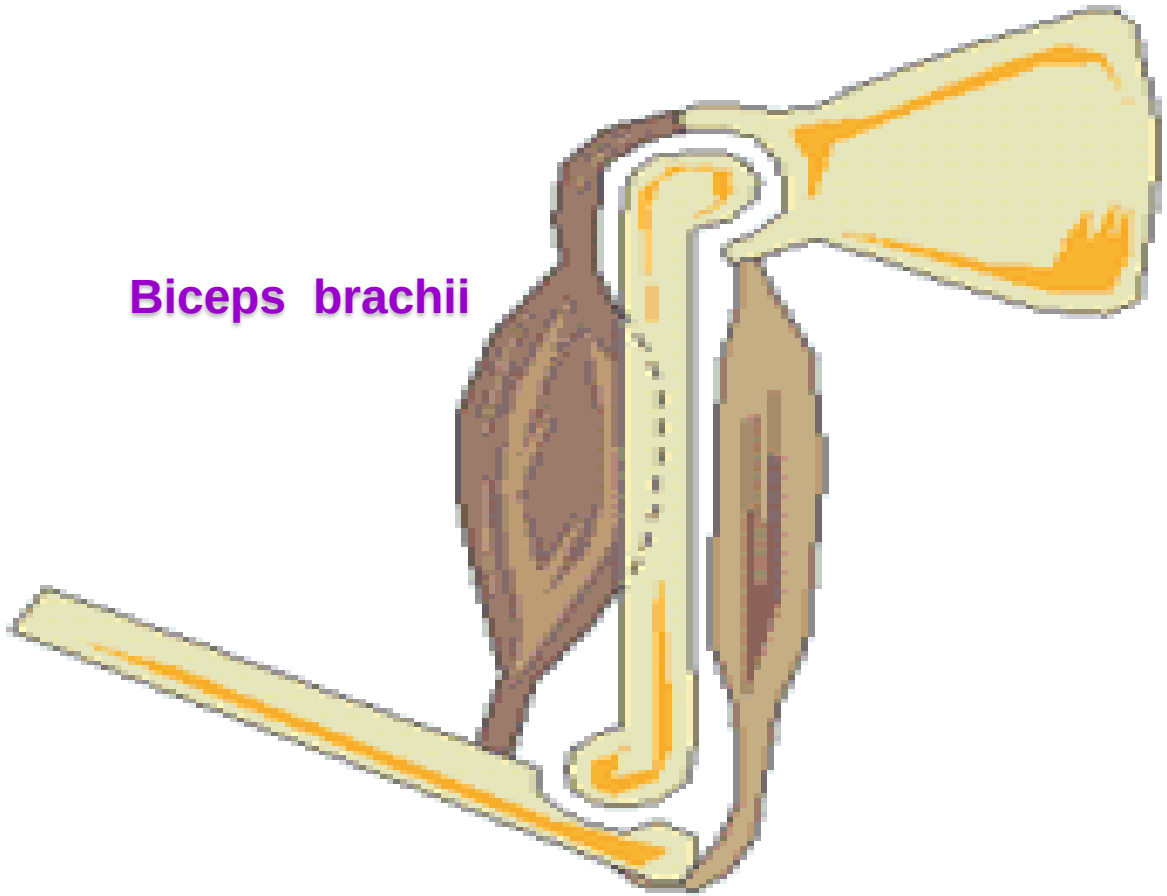
Musculus gluteus maximus

Nomenclature of Skeletal muscle



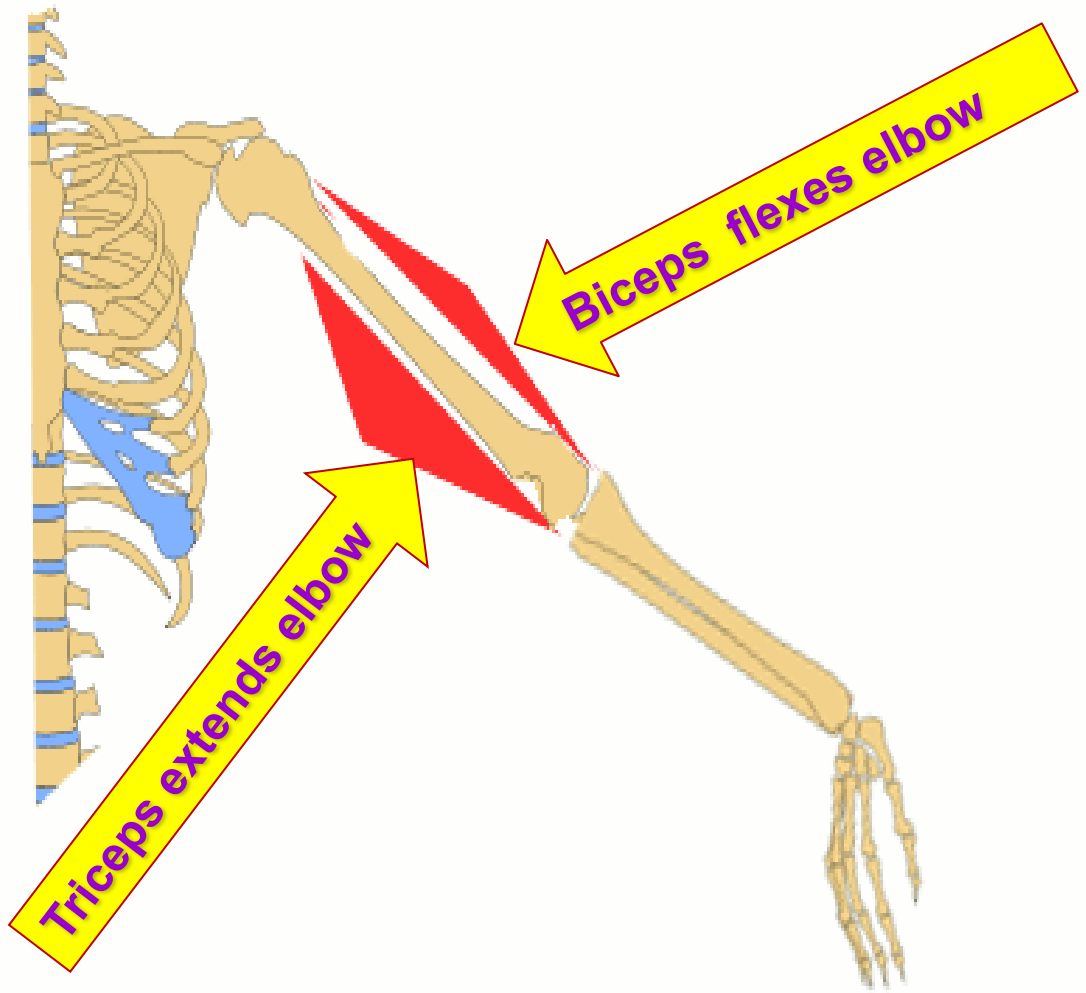
classification of muscle

- **Prime movers agonist – Chief muscle which provide the major force for producing a specific movement e.g. Biceps brachii in flexion of elbow**



Nomenclature of Skeletal muscle

- **Antagonists – oppose or reverse the action of prime movers**
- **e.g Triceps brachii muscle anagonist the action of prime mover biceps**

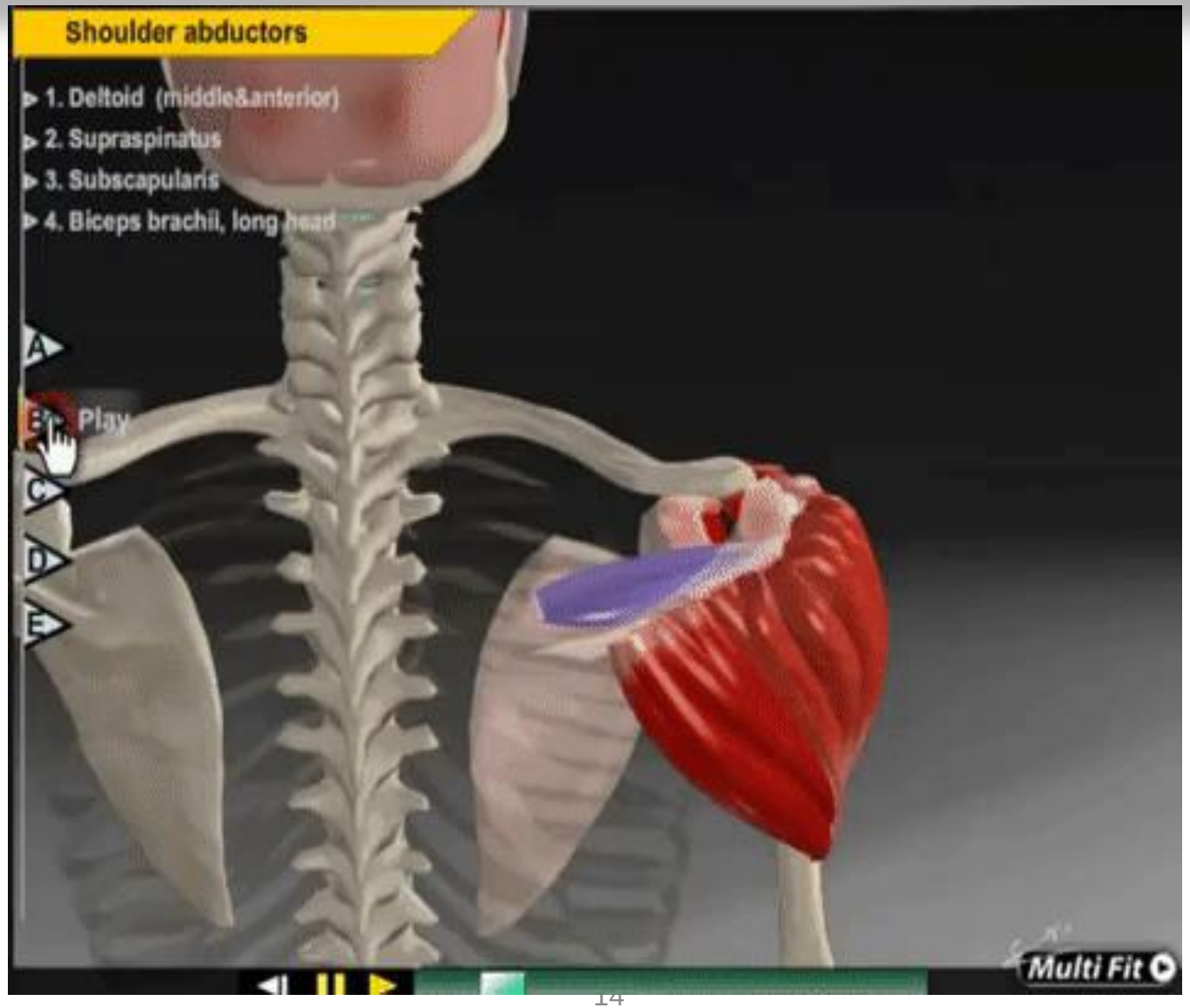


classification of muscle

Synergists

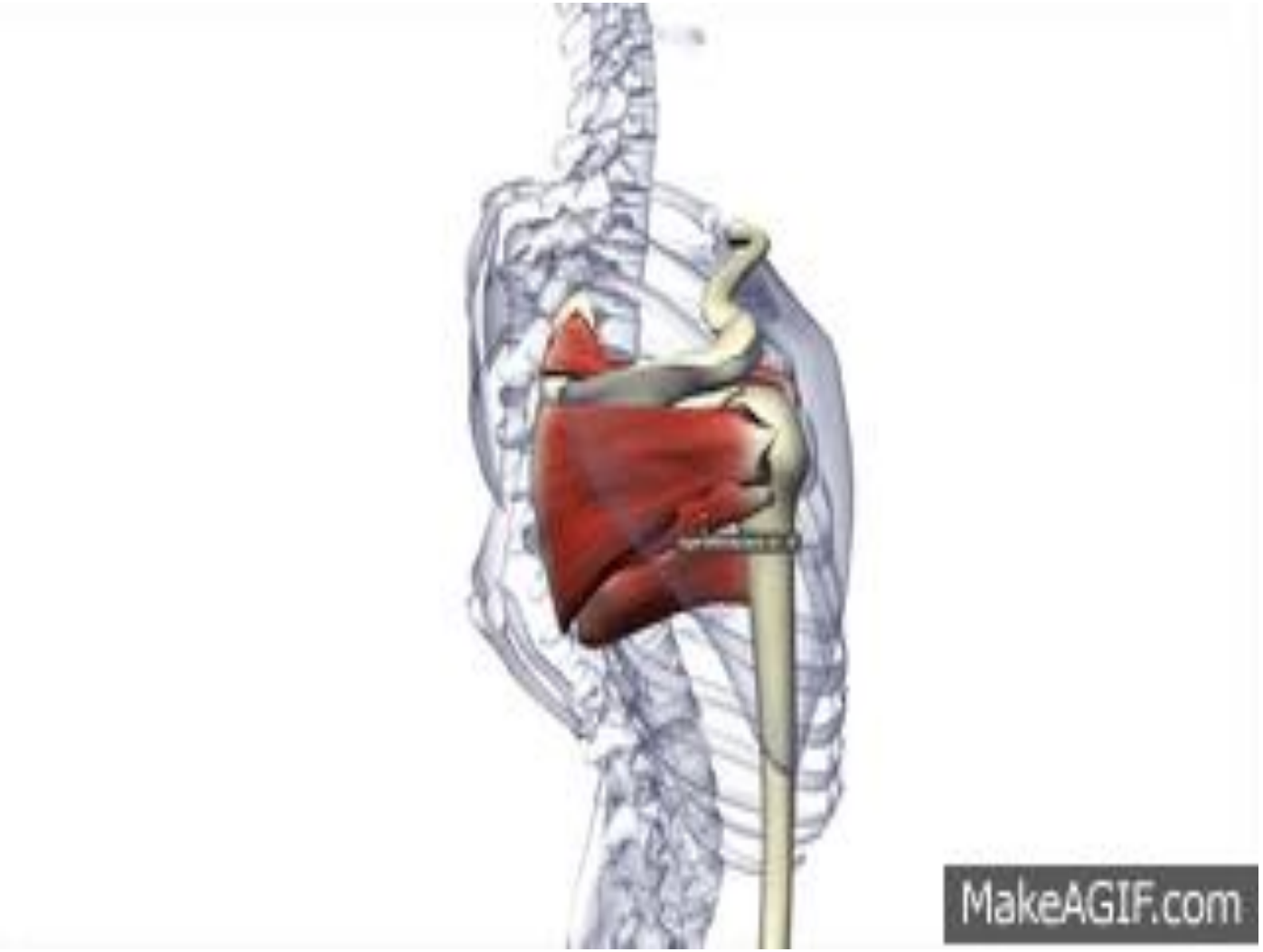
- Add force to a movement. Assist the prime mover in action
- Example . Abductors of shoulder

Deltoid
Supraspinatus



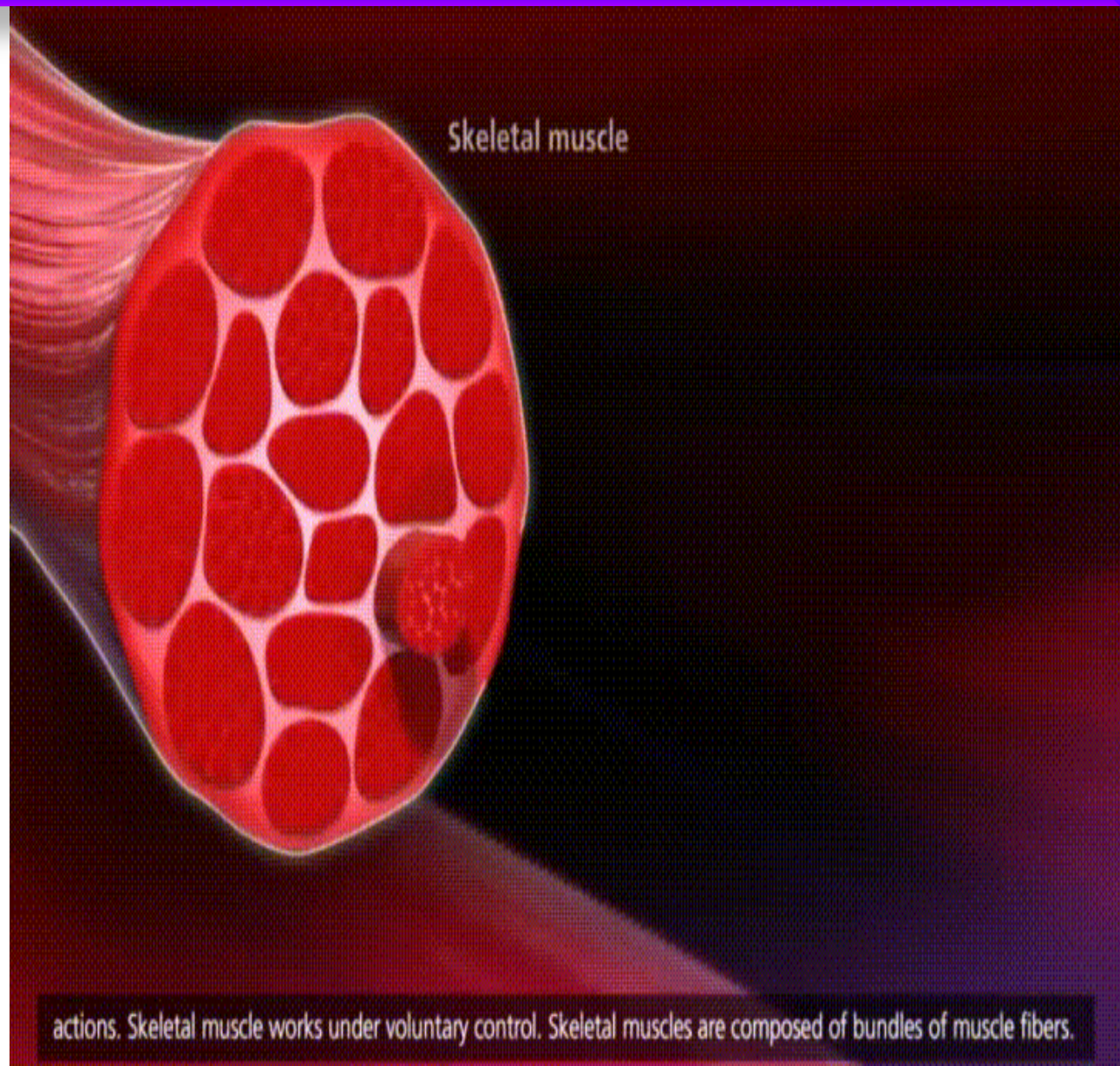
classification of muscle

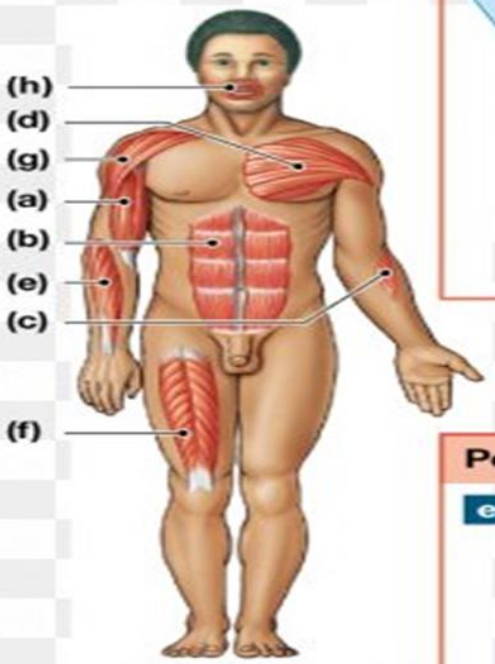
- **Fixators –**
- **It only increase the tone to stabilize the joint e.g. muscles around the shoulder joint .**



fibers Orgnization of muscle

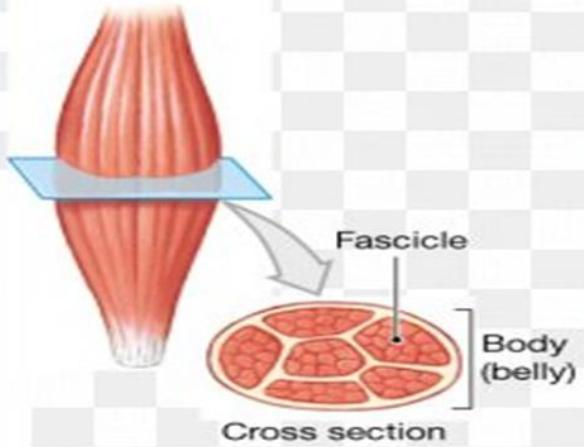
- Muscle fibers are organized in bundles (fascicles) Fibers in fascicle run parallel and arranged in 4 different shapes with respect to tendon



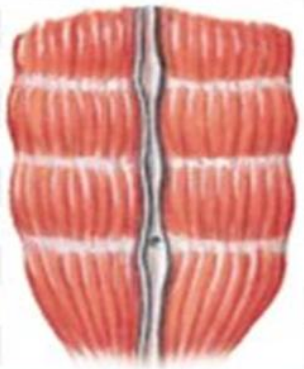


Parallel Muscles

a Parallel muscle (Biceps brachii)



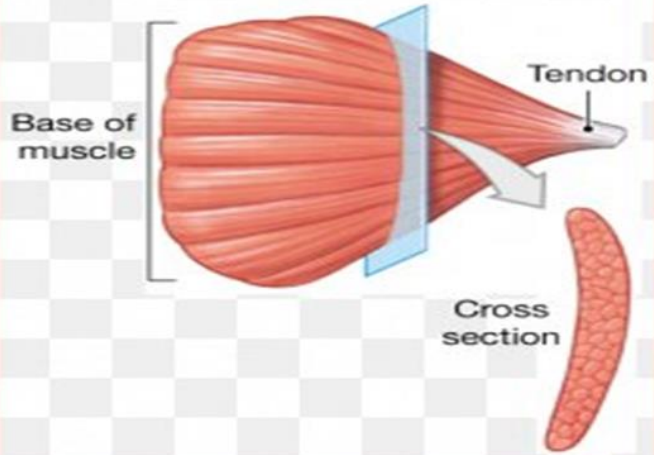
b Parallel muscle with tendinous bands (Rectus abdominis)



c Wrapping muscle (Supinator)

Convergent Muscles

d Convergent muscle (Pectoralis)

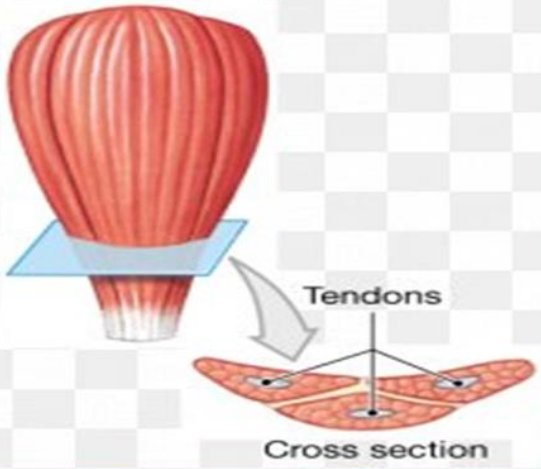


Pennate Muscles

e Unipennate muscle (Extensor digitorum)

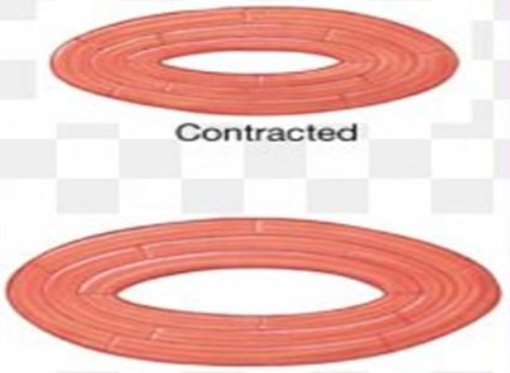
f Bipennate muscle (Rectus femoris)

g Multipennate muscle (Deltoid)

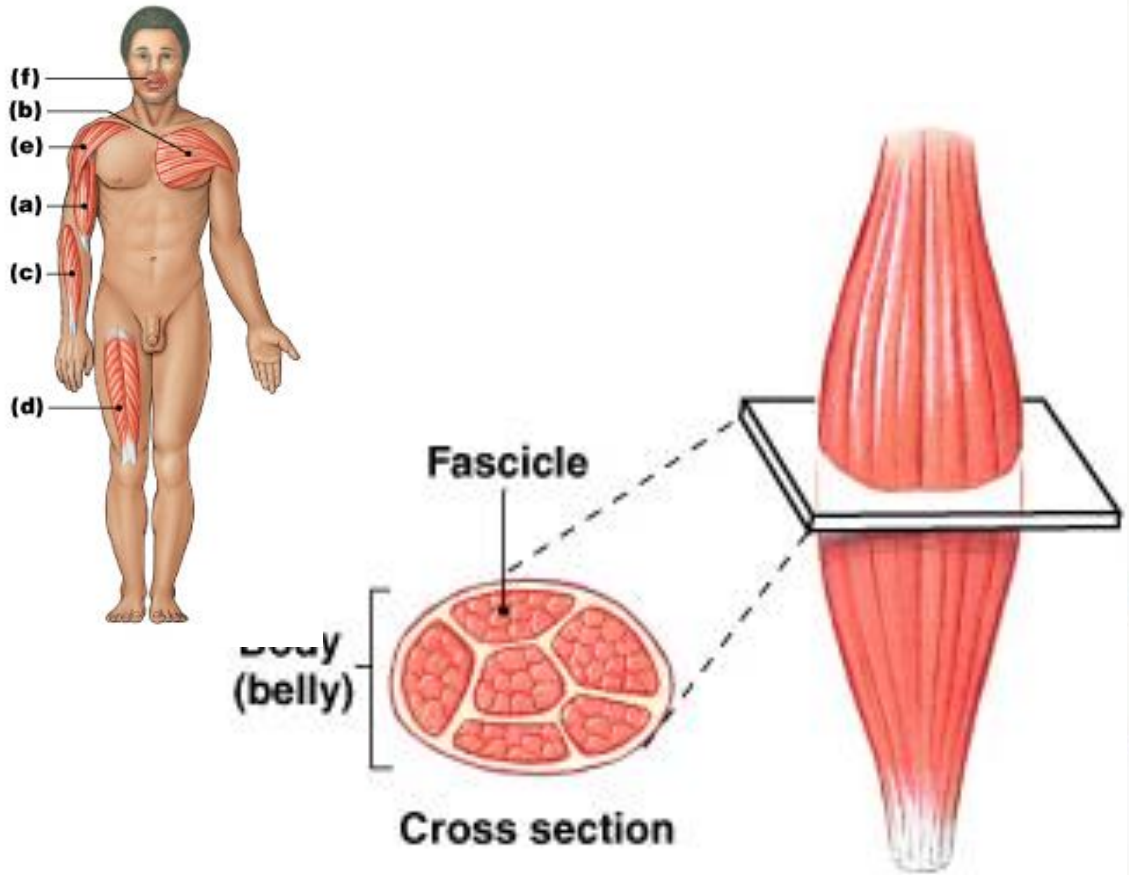


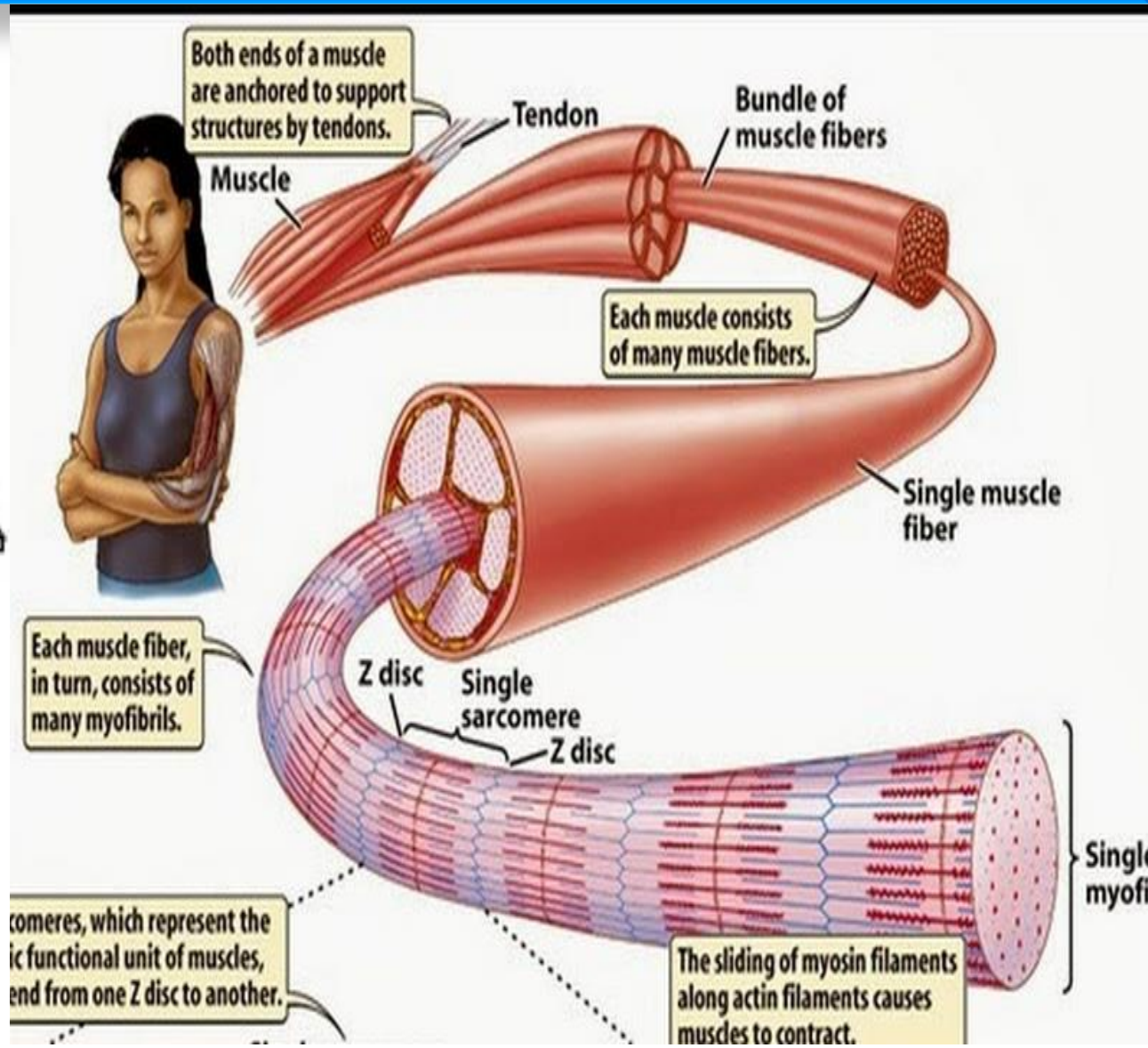
Circular Muscles

h Circular muscle (Orbicularis oris)

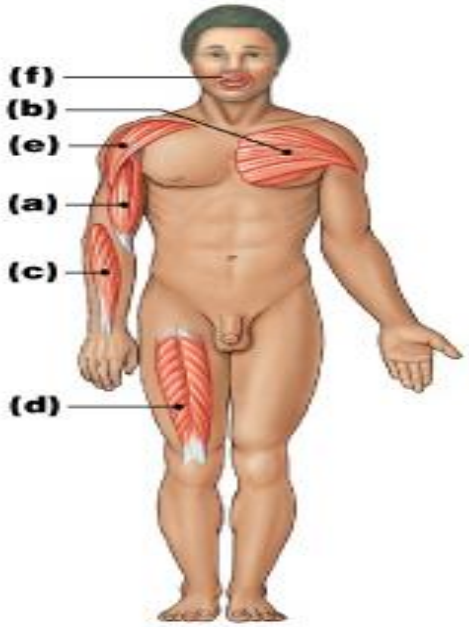


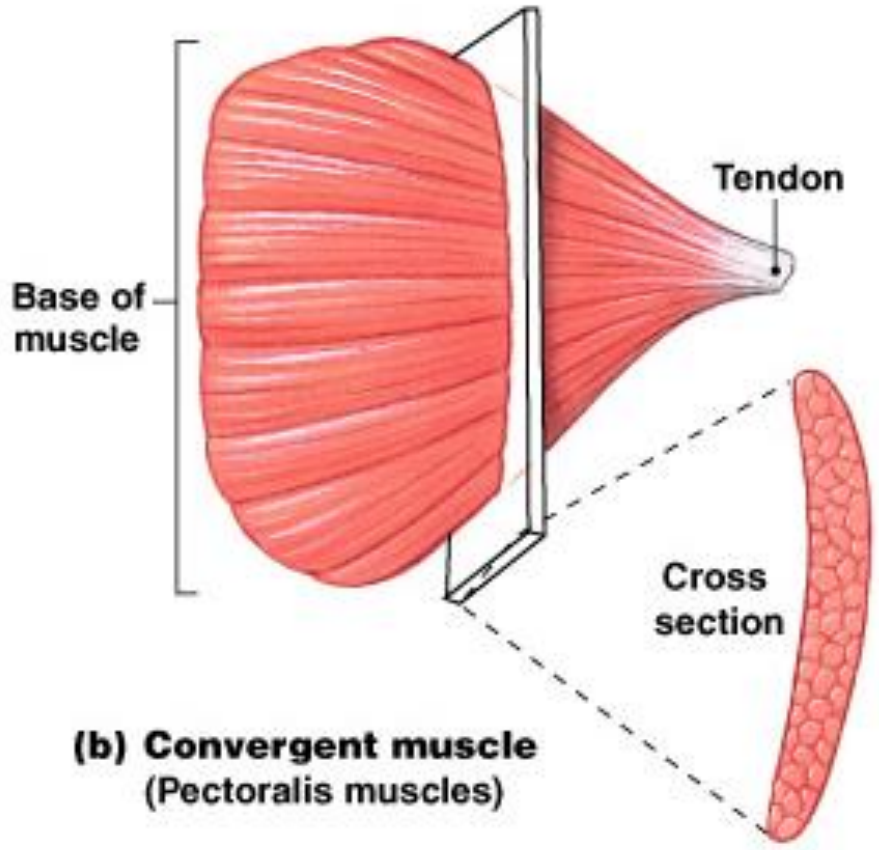
1. Parallel Muscles





2. Convergent Muscles





- **Fascicles spread out like a fan on one end and converge to a single point on the other
- **Produce less tension and distance than parallel muscles
- **Muscle fibers pull in different directions.

Figure 11–1b

3. Pennate Muscles

Fascicles are arranged at an angle to tendon •

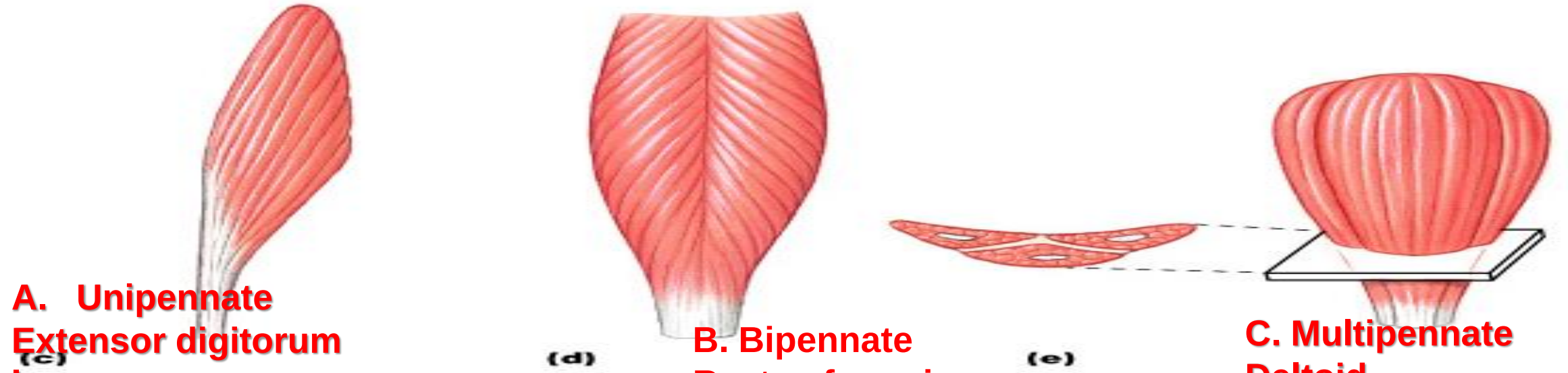
A. Unipennate: Fascicle angled on one side of tendon

B. Bipennate: Tendon in middle with angled fascicles on either side

C. Multipennate:

Branched tendon with fascicles organized around each branch

**Pennate muscles produce more tension than parallel muscles but cannot move so far, less distance produced

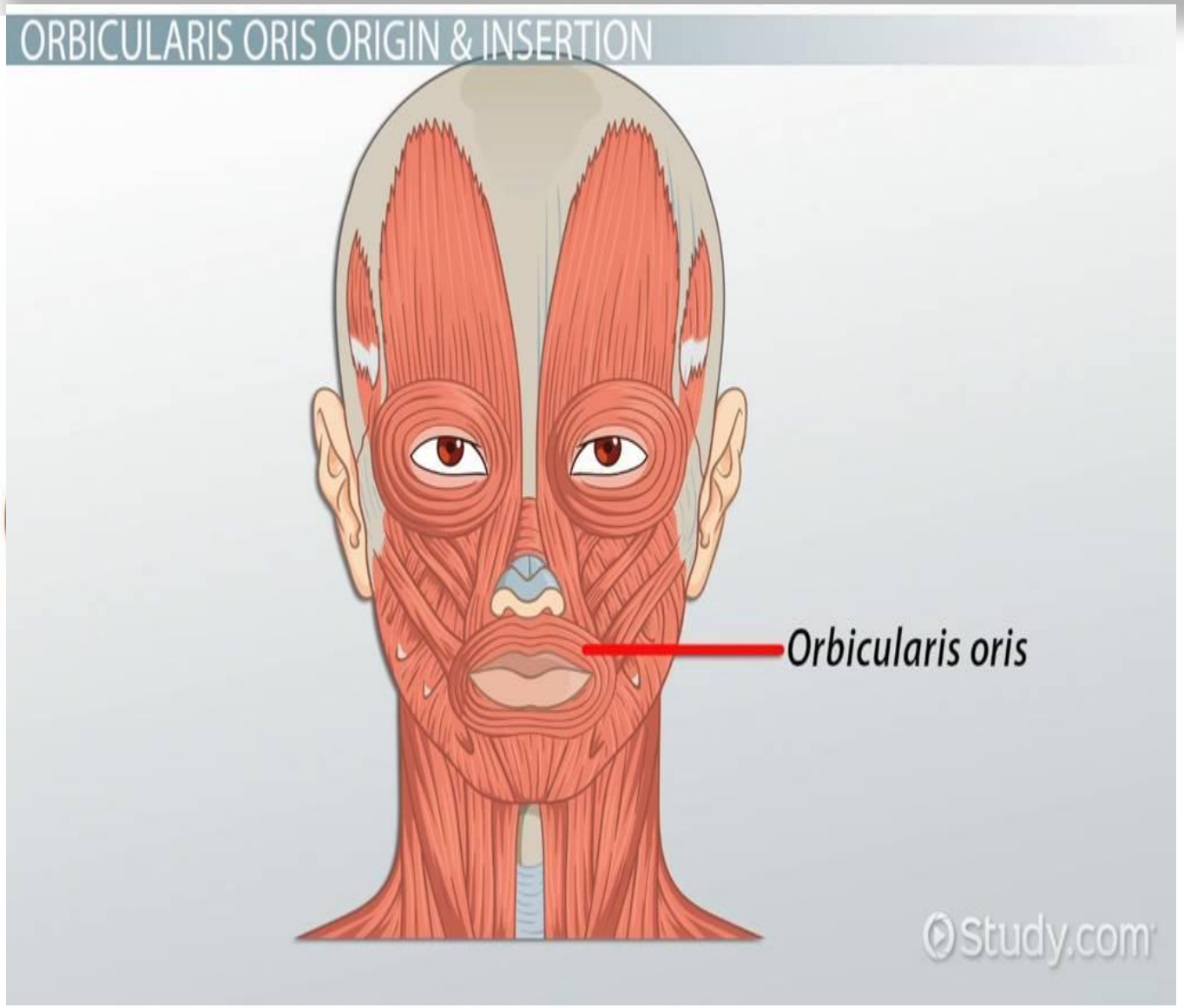


A. Unipennate
Extensor digitorum longus

B. Bipennate
Rectus femoris

C. Multipennate
Deltoid

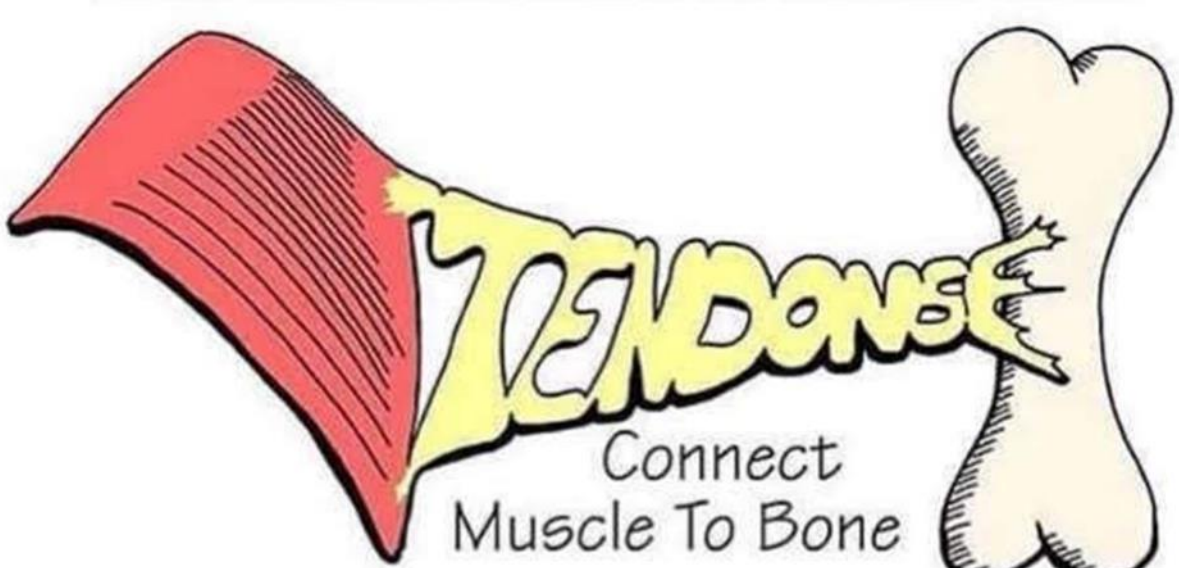
4. Circular Muscles



- Also called sphincters
- Concentric arrangement of fascicles is circular
- **Function:**
- Decrease diameter – of openings to guard entrances and exits
- *e.g.*, orbicularis oris

Tendon

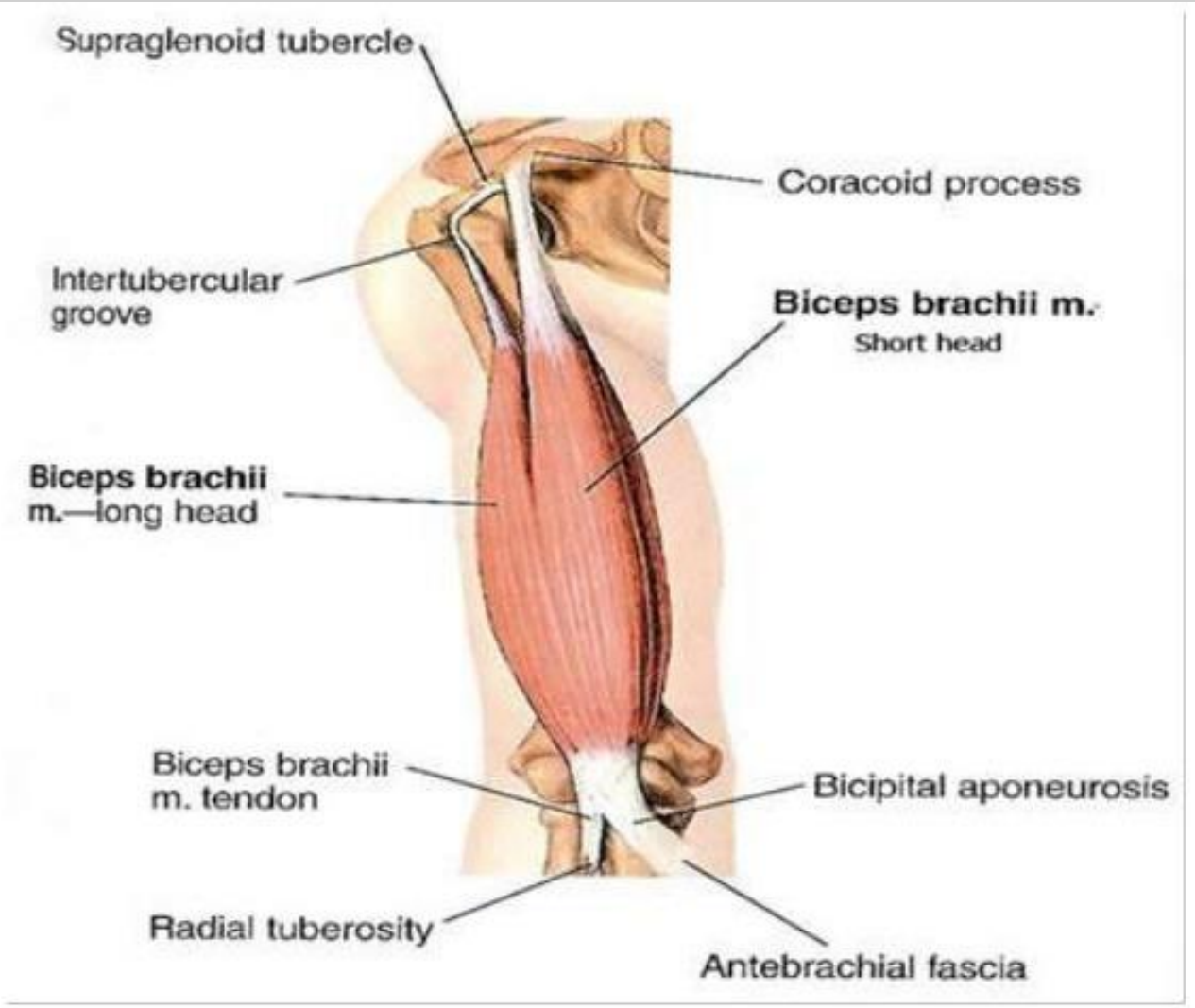
Tissue attaches the skeletal muscle to other structures. Its proximal end attaches to the muscle and its distal end blends with the periosteum of the bone .



Tendon

It is broad and flat when they are a part from flat muscle and cored like when it is a part of long slender muscle.

***Very broad flat tendon are known aponeurosis**



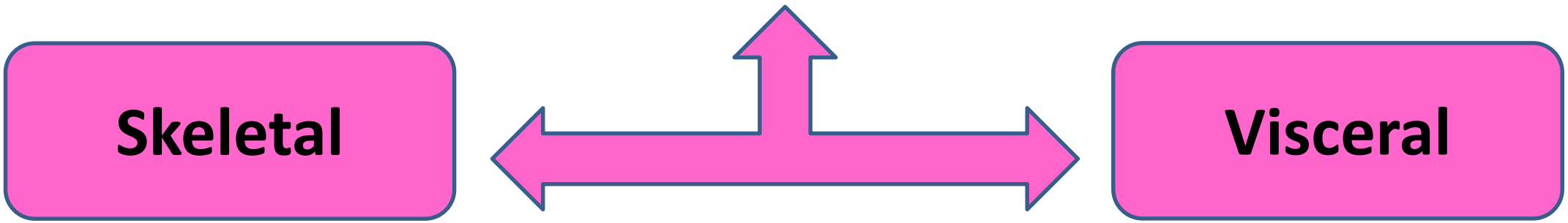
Ligament

Ligament means binding together. It is connective tissue consist of collagen and elastic fibers

With stand pull at the joint they cross.

- **Most consists of collagen fiber and therefore allow stretch.**
- **Some consists elastic fiber as in ligamentum flavum of vertebral column.**

Types of ligament :



1.Skeletal ligament

Band of connective tissue connects two bones and blends with the fibrous wall of joint cavity.
Example : Anterior and Posterior cruciate ligament in knee joint

2. Visceral ligament

Ligament connects viscera to one another or to the body wall e.g. hepato-duodenal ligament between liver and duodenum.