

Introduction to Human Anatomy

General Anatomy of Muscles

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Muscles

□ Definition:

↗ Red flesh of our body. اللحم الأحمر في أجسامنا

↗ Contractile (becomes short in response to nerve impulse). يقصّر استجابة السائل العصبي

↗ Responsible for movements. مسؤول عن الحركة

□ Functions:

↗ Production of movements (body movement, expressions, respiration, circulation, ...). إنتاج الحركة

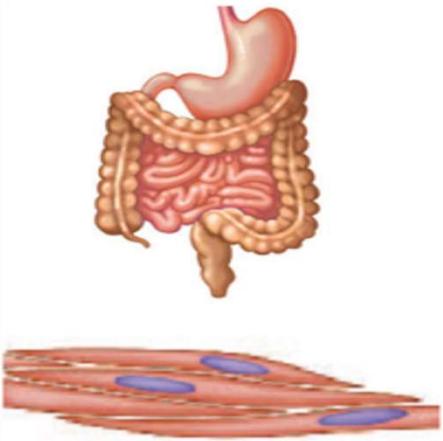
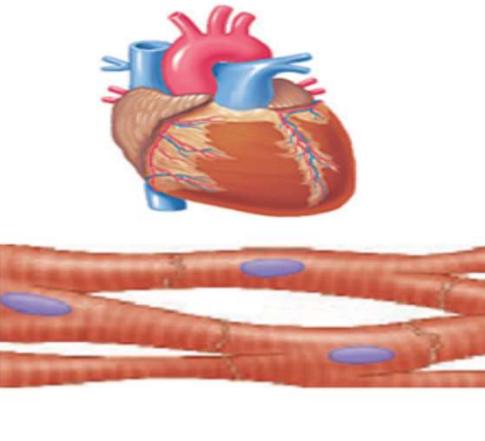
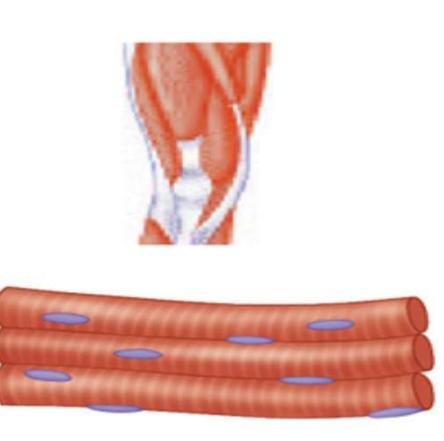
↗ Maintenance of posture. الحفاظ على الوضعية

↗ Stabilization of the joints. تثبية المفاصل

↗ Generation of heat. توليد الحرارة

- 1- Responsible for movement
- 2- Maintenance of Posture
- 3- Stabilization of joints
- 4- Generation of heat

Types of Muscles

	1. Smooth Muscle	2. Cardiac Muscle	3. Skeletal Muscle
Site: الموضع	Wall of internal viscera الرائحة والأنفوجة & blood vessels	<ul style="list-style-type: none"> Myocardium middle layer 	<ul style="list-style-type: none"> Attached to skeleton
Nerve supply: نوع التزود بالعصبية	Autonomic	<ul style="list-style-type: none"> Autonomic 	<ul style="list-style-type: none"> Somatic
Contraction: انقباض	<ul style="list-style-type: none"> Involuntary 	<ul style="list-style-type: none"> Involuntary 	<ul style="list-style-type: none"> Voluntary
Striation: التقطير	Absent	Present	Present
Muscle cell: عضلة	Spindle-shaped	Branch & anastomose	Doesn't branch
Nucleus: النواة	Single & central	<ul style="list-style-type: none"> Single & central 	Multiple & peripheral
Fatigue: الإرهاق	Doesn't occur	<ul style="list-style-type: none"> Never 	Occurs
			

العَضَمِيُّ وَرَبْطُهُ (عَضَلَةُ الْعَضَمِيُّ)

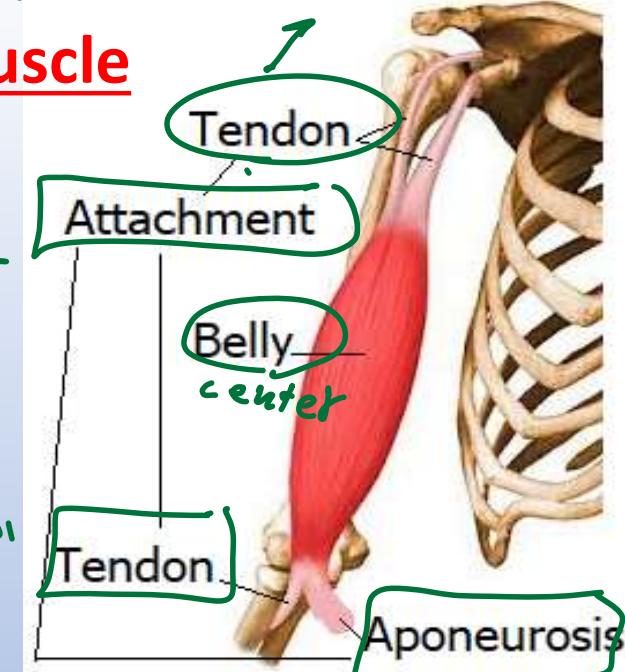
Skeletal (Striated / Voluntary) Muscle

□ Definition:

- Muscles which are attached to the skeleton to generate movement.
- It has belly and two or more attachments.

□ Attachment:

- It has belly & two or more attachments.
- The more fixed attachment is called origin.
- The more mobile attachment is called insertion.
- Muscle may be attached to bone, cartilage, ligament, fascia, skin or other muscle.
- Muscle attachment may be direct **or** through fibrous tissue (tendon / aponeurosis) **or both**
- Tendon is a rounded cord-like white fibrous tissue.
- Aponeurosis is an expanded sheet-like white fibrous tissue.



الأجهزة الداعنة للعضلة
الجزء الأذتر ثباتاً

نوع عريض و مطلع
نوع فاصي
من الأذونات

قطع دوائري

Skeletal (Striated / Voluntary) Muscle

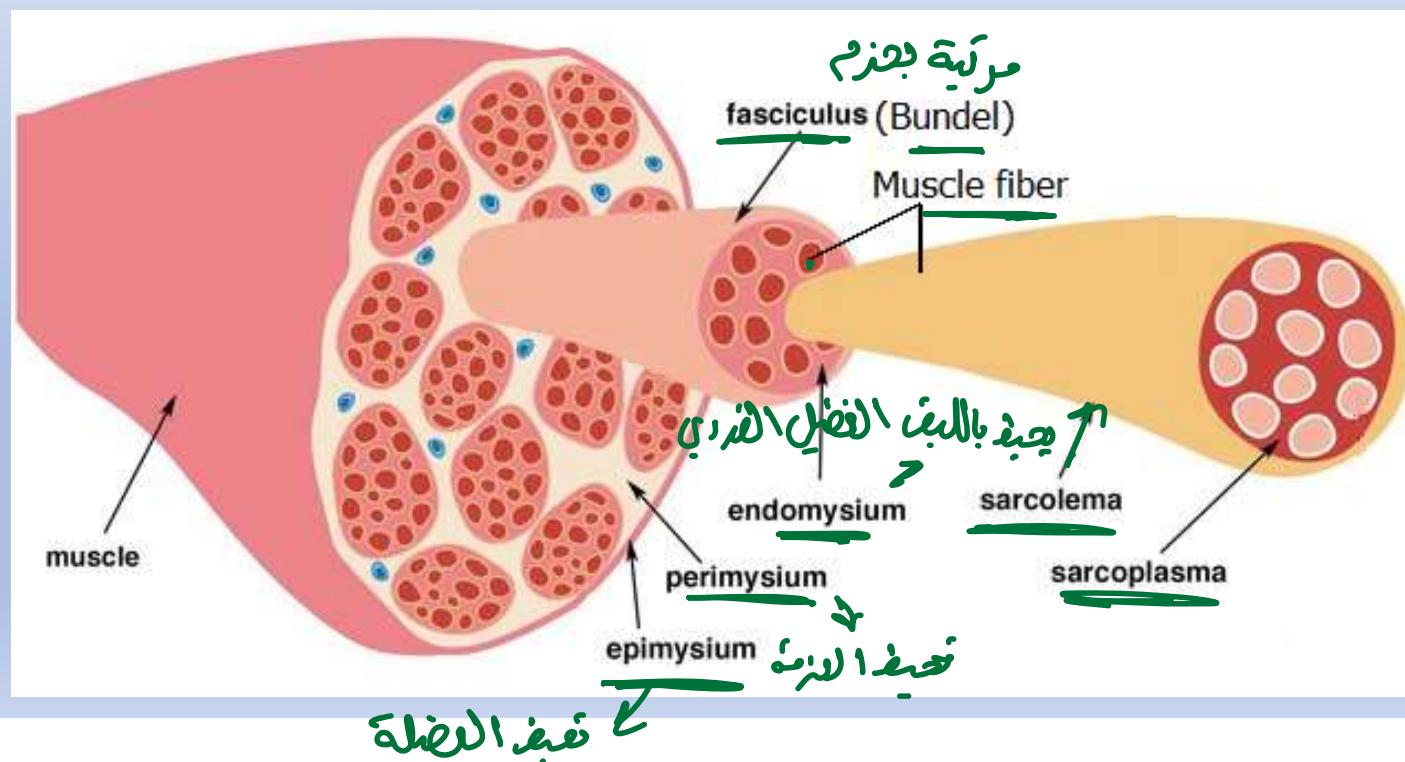
□ Connective tissue coverings:

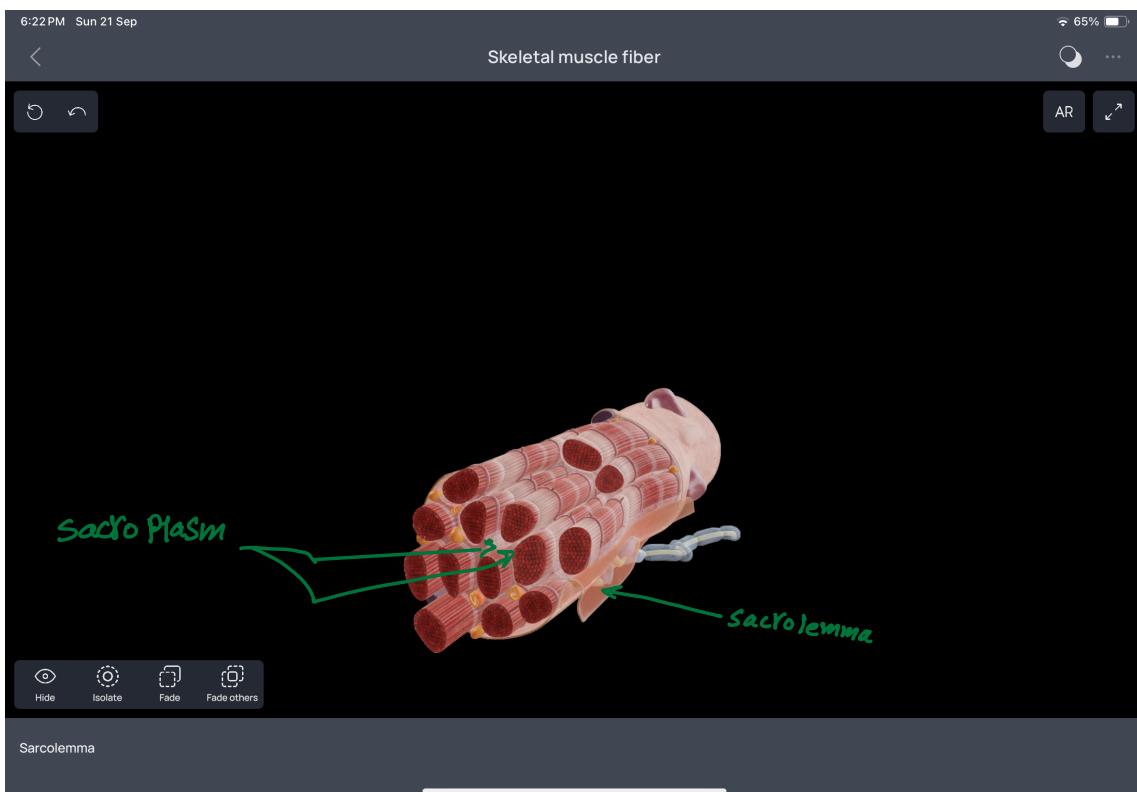
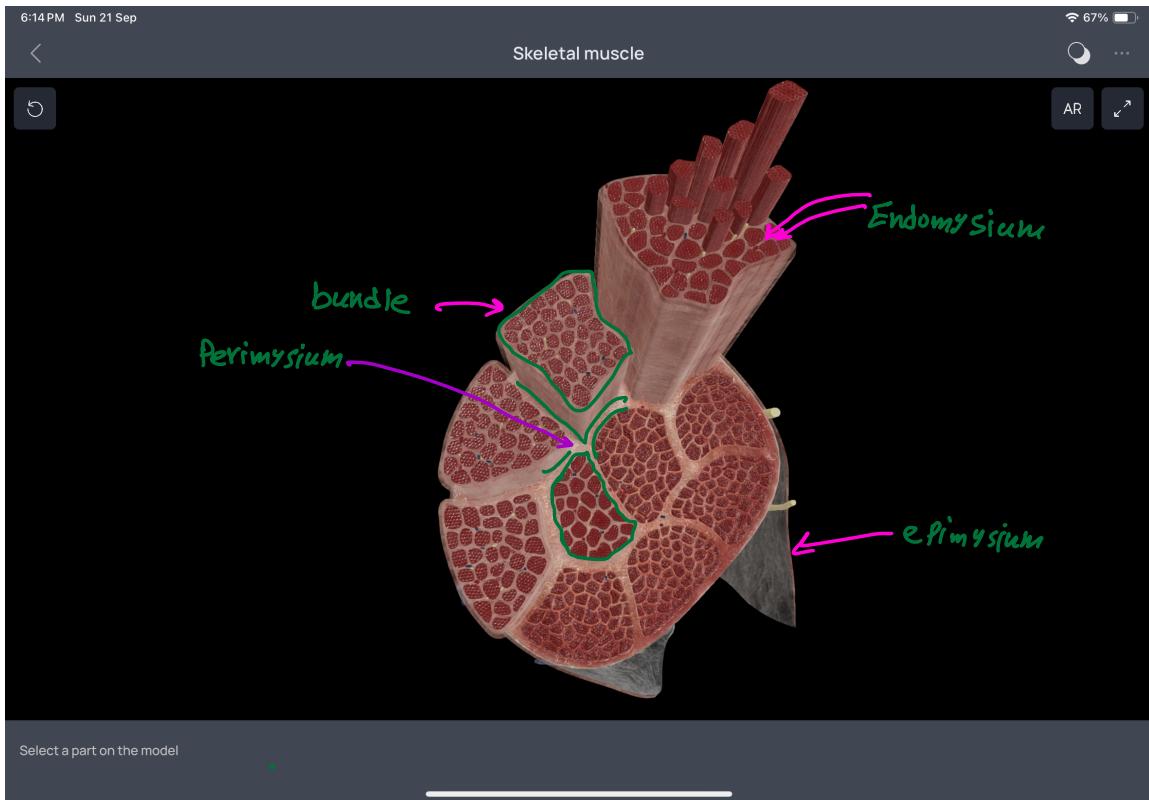
- Epimysium: the outermost connective tissue sheath which surrounds the entire muscle.
- Perimysium: the connective tissue sheath which covers each bundle (fasciculus).
- Endomysium: the innermost connective tissue sheath which surrounds the individual muscle fiber.

ملاحظة

□ NB:

- Sarcolemma: the cell wall membrane of skeletal muscle.
- Sarcoplasm: the cytoplasm of skeletal muscle.

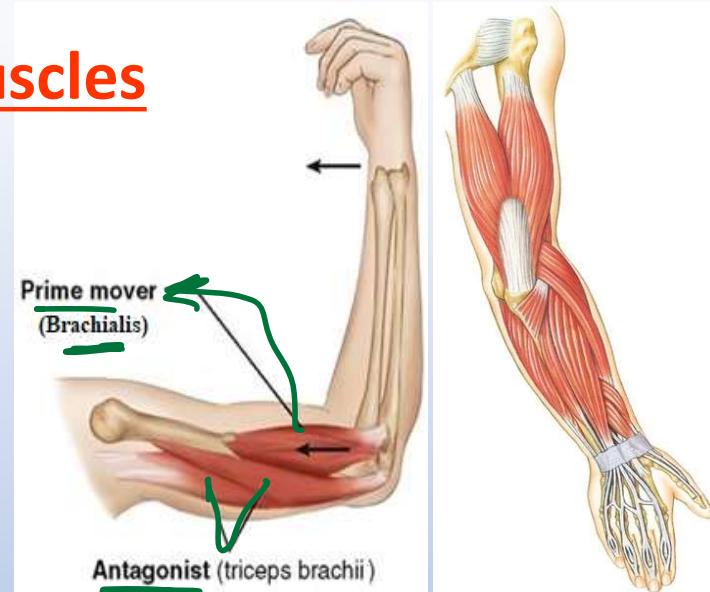




Classification of Skeletal Muscles

According to action:

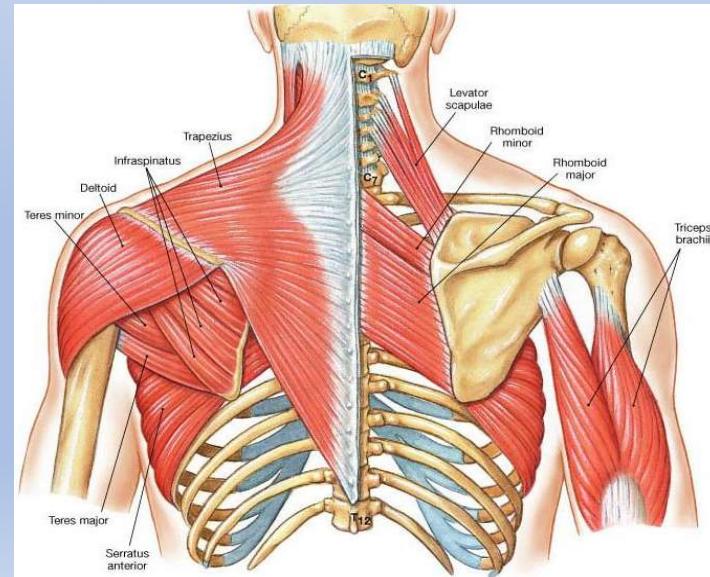
Prime mover: muscle which initiates particular movement. (eg. Brachialis is a prim flexor to the elbow).



➤ Antagonists: muscle which opposes the action of the prime mover (e.g. triceps antagonizes elbow flexion).

➤ Synergists: muscle which eliminates unwanted movement in proximal joints while distal joints are in action (e.g. extensors of wrist contract during flexion of fingers, to eliminate the unwanted flexion at the wrist).

➤ Fixators (Stabilizers): muscles which help the prime mover by fixing (stabilizing) its origin (e.g. muscles attaching the scapula to the trunk act as fixators to allow other muscles to move the shoulder joint).

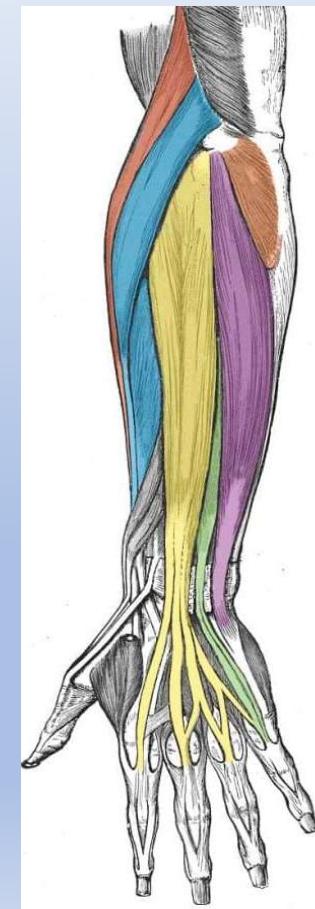
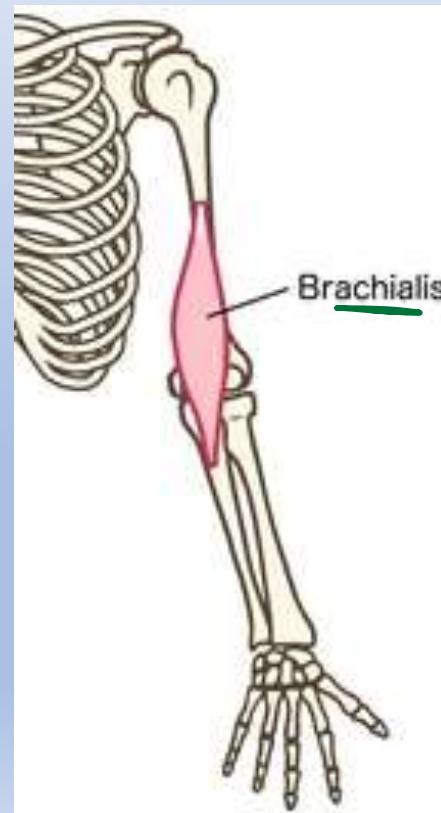
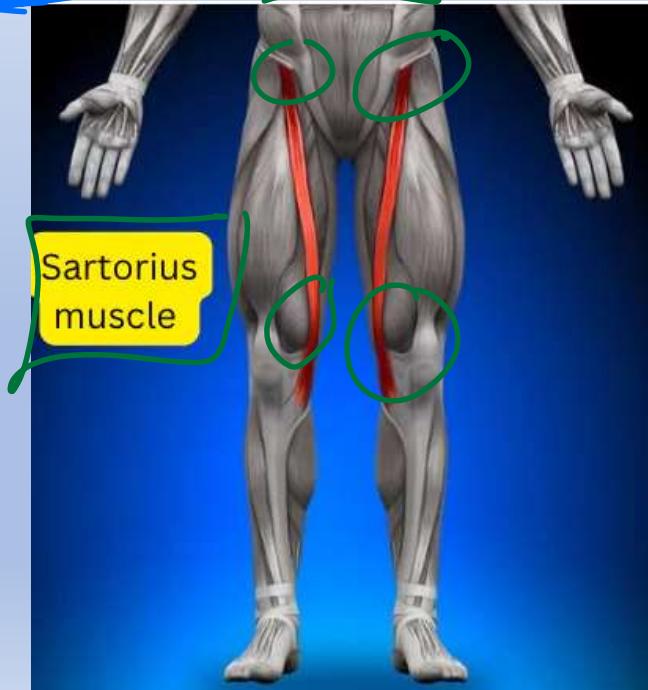


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Classification of Skeletal Muscles

According to the number of joints they act upon:

- Uni-articular: muscle which acts on one joint only (e.g. brachialis acts only on the elbow joint).
- Bi-articular: muscle which acts on 2 joints (e.g. sartorius acts on both hip & knee joints).
- Multi-articular: muscle which acts on more than 2 joints
(e.g. long flexors & extensors of digits).



خريطة خارجية

Classification of Skeletal Muscles

□ According to arrangement of muscle fibers (shape):

- Parallel: muscle fibers run parallel to the line of pull
- ✓ Quadrilateral (e.g. quadratus lumborum).
- ✓ Rhomboid (e.g. rhomboids major).
- ✓ Strap-like (e.g. sartorius).
- ✓ Strap-like with tendinous intersections (e.g. rectus abdominis).
- Fusiform (e.g. biceps brachii).



Quadrilateral

Rhomboid

Strap-like

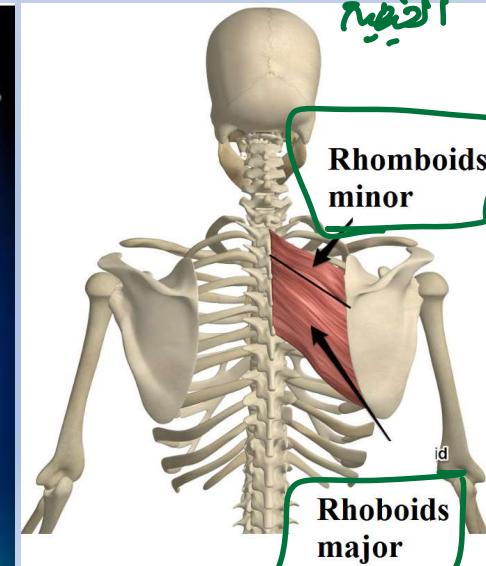
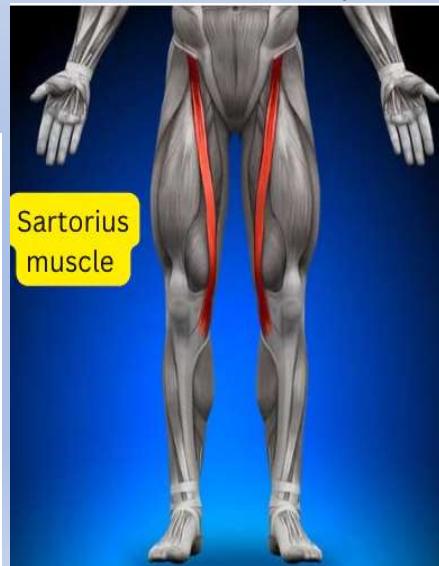
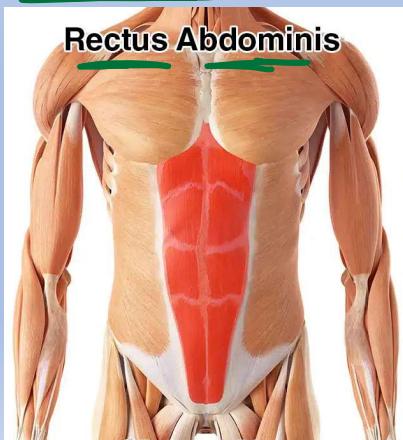
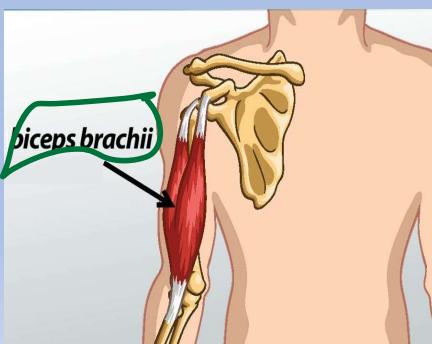
Strap-like with tendinous intersections

طولي

بيضاوي

مرباعي

ذيل الكلب



بولي

Rectus Abdominis

Sartorius
muscle

Rhomboids
minor

Rhomboids
major

Quadratus lumborum

Classification of Skeletal Muscles

□ According to arrangement of muscle fibers (shape):

نحوة

Oblique: muscle fibers run oblique to the line of pull.

✓ Convergent / triangular (e.g. trapezius).

✓ Cruciate / X-shaped (e.g. masseter).

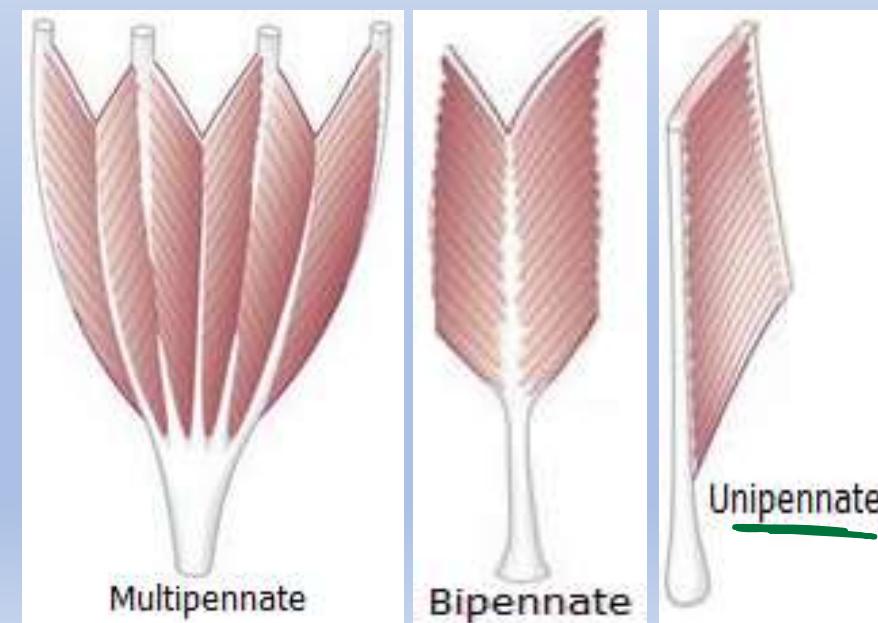
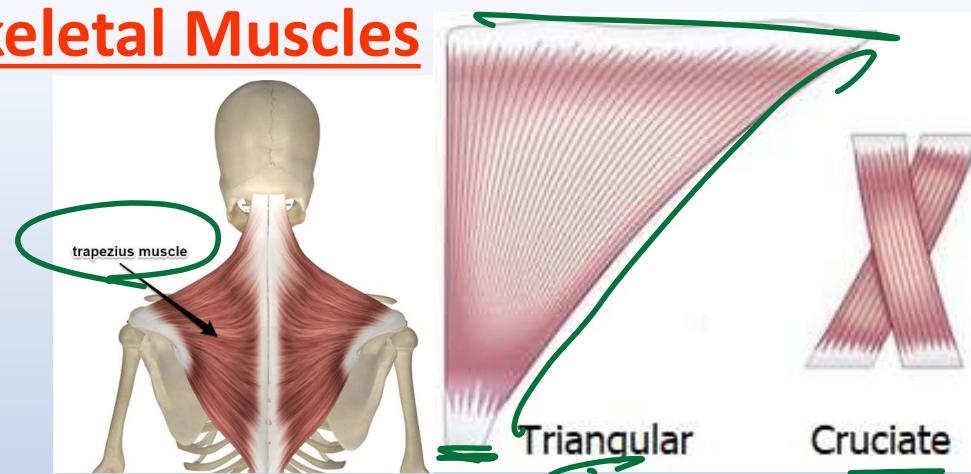
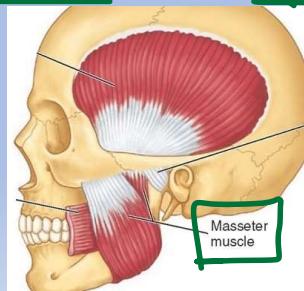
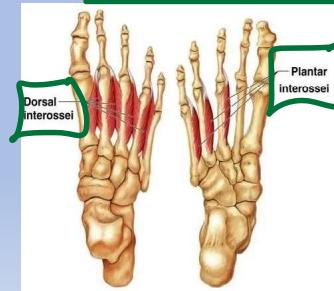
النحوة

Pennate (feather-like):

- Unipennate: fibers arranged at one side of the tendon (e.g. plantar interossei).

- Bipennate: fibers arranged at both sides of the tendon (e.g. dorsal interossei).

- Multipennate: formed of multiple bipennate (e.g. deltoid).

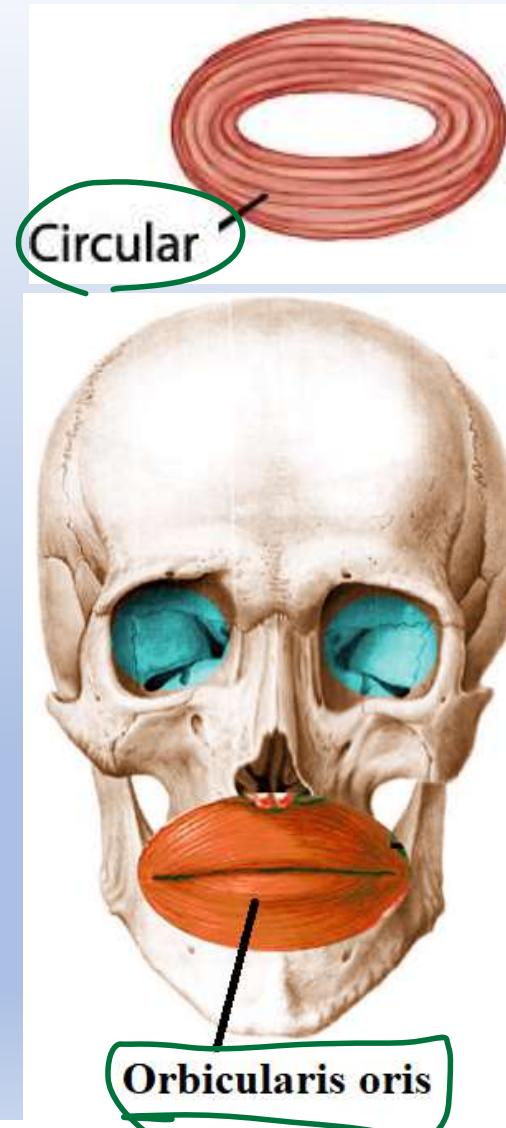
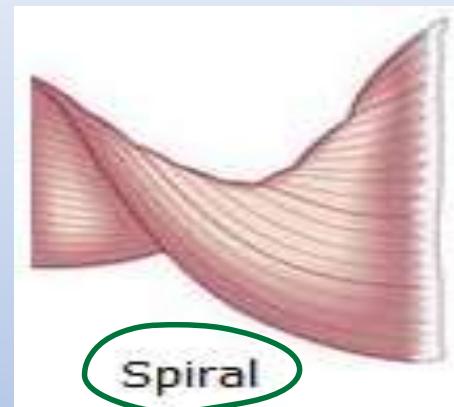


Classification of Skeletal Muscles

According to arrangement of muscle fibers (shape):

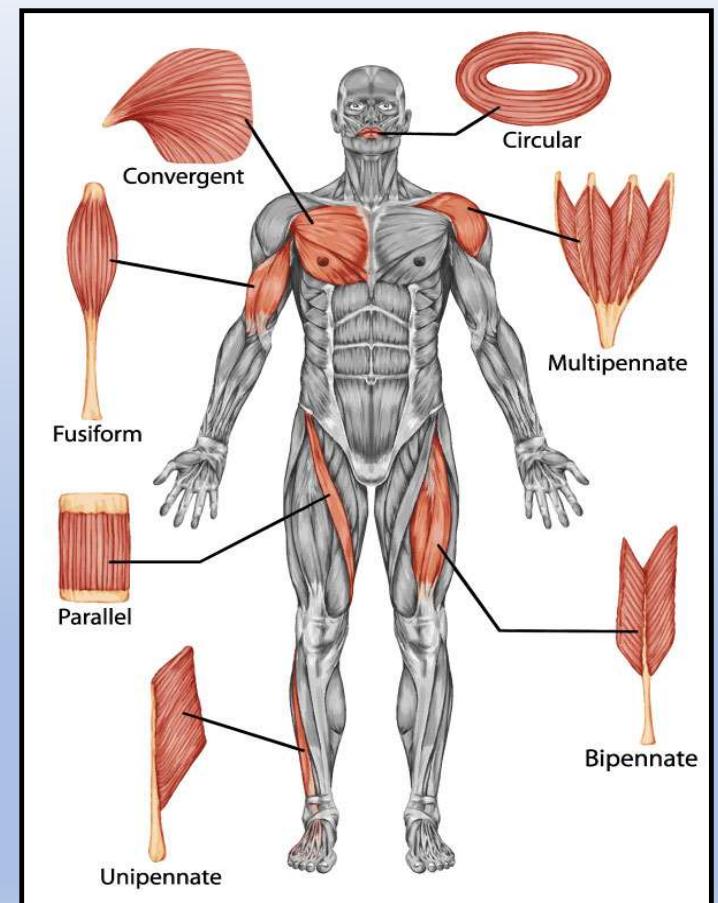
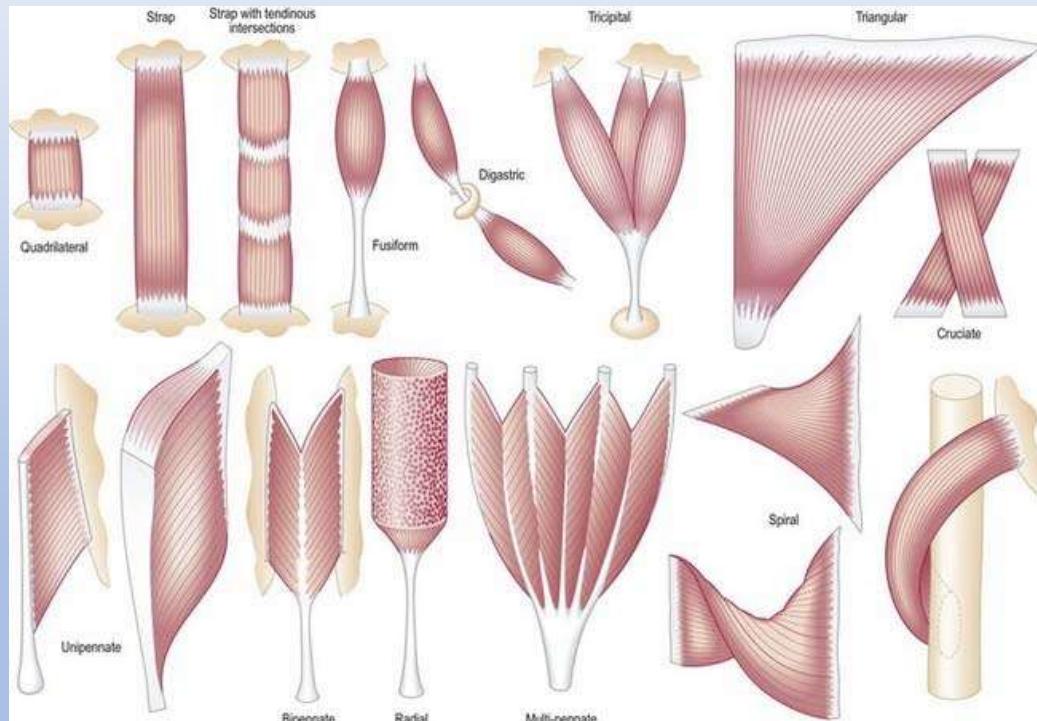
- Circular: muscle fibers run in circles around orifice.(e.g. Orbicularis oris).
- Spiral: (e.g. supinator)

حلزوني



Classification of Skeletal Muscles

□ According to arrangement of muscle fibers (shape):

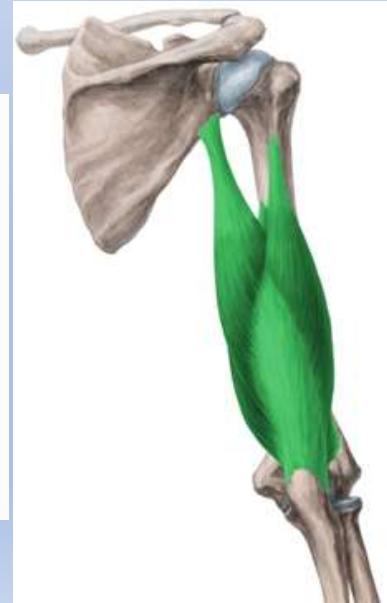
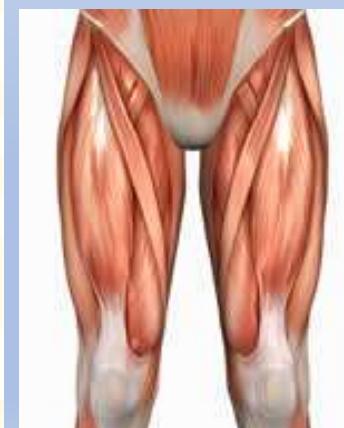
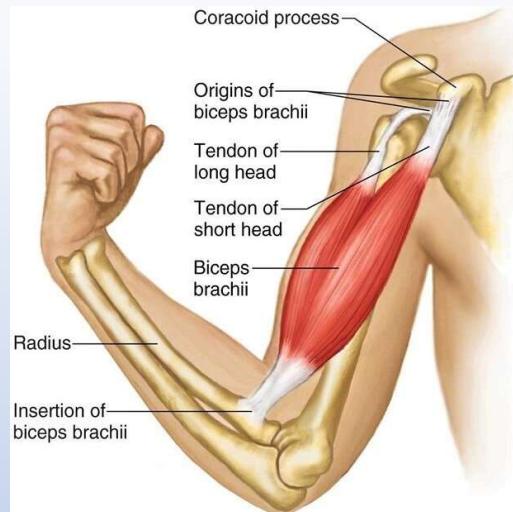


Delta

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Name	Shape	Size	Number of Heads or Bellies	Position	Depth	Attachments	Actions
Deltoid	Triangular						
Teres	Round						
Rectus	Straight						
Major	Large						
Latissimus	Broadest						
Longissimus	Longest						
Biceps	Two heads						
Quadriceps	Four heads						
Digastric	Two bellies						
Pectoralis	Of the chest						
Supraspinatus	Above spine of scapula						
Brachii	Of the arm						
Profundus	Deep						
Superficialis	Superficial						
Externus	External						
Sternocleidomastoid	From sternum and clavicle to mastoid process						
Coracobrachialis	From coracoid process to arm						
Extensor	Extend						
Flexor	Flex						
Constrictor	Constrict						

Naming of Skeletal Muscles



Questions

The more fixed attachment of skeletal muscle is called:

- A. Tendon.
- B. Belly.
- C. Insertion.
- D. Origin.

Answer: D

Questions

Muscles opposing action of prime movers are called:

- A. Synergists.
- B. Fixators.
- C. Antagonists.
- D. Stabilizers.

Answer: C

