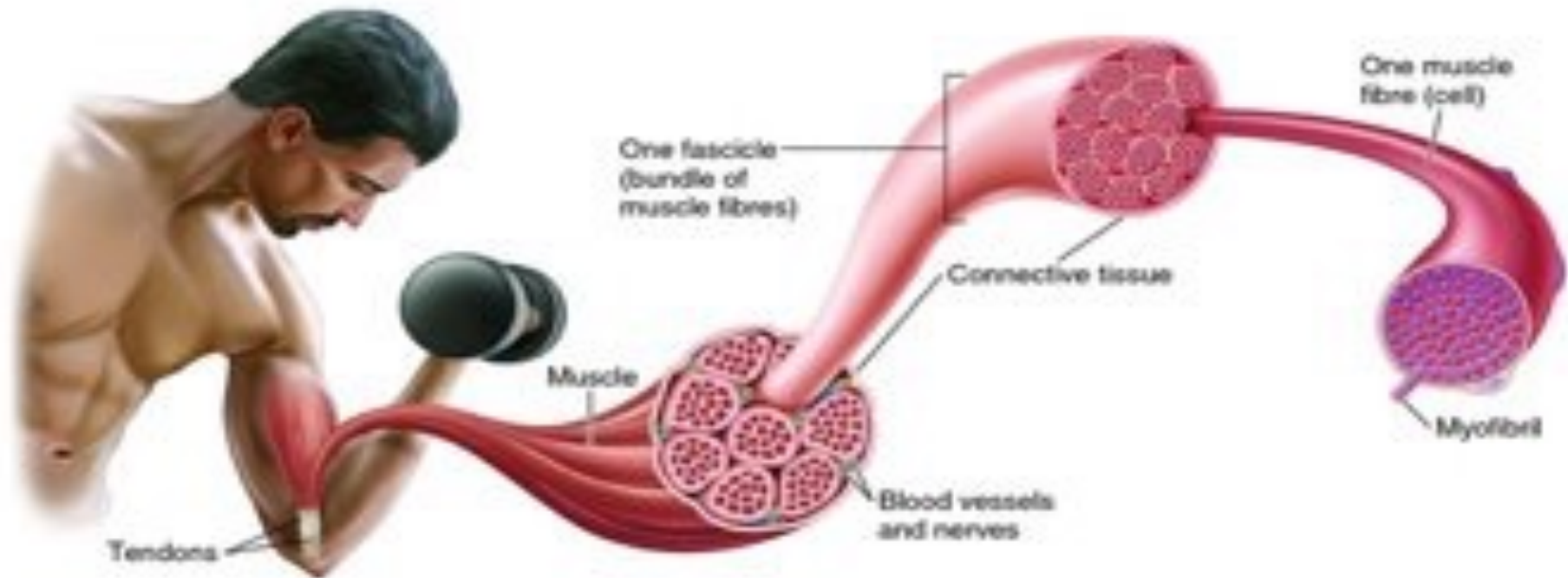


Muscular system, part 2

<https://www.youtube.com/watch?v=8Qr0I7J7MwU>

Skeletal muscle-functions

- Movement
- Support and maintain posture (constant partial contraction)
- Heat production.



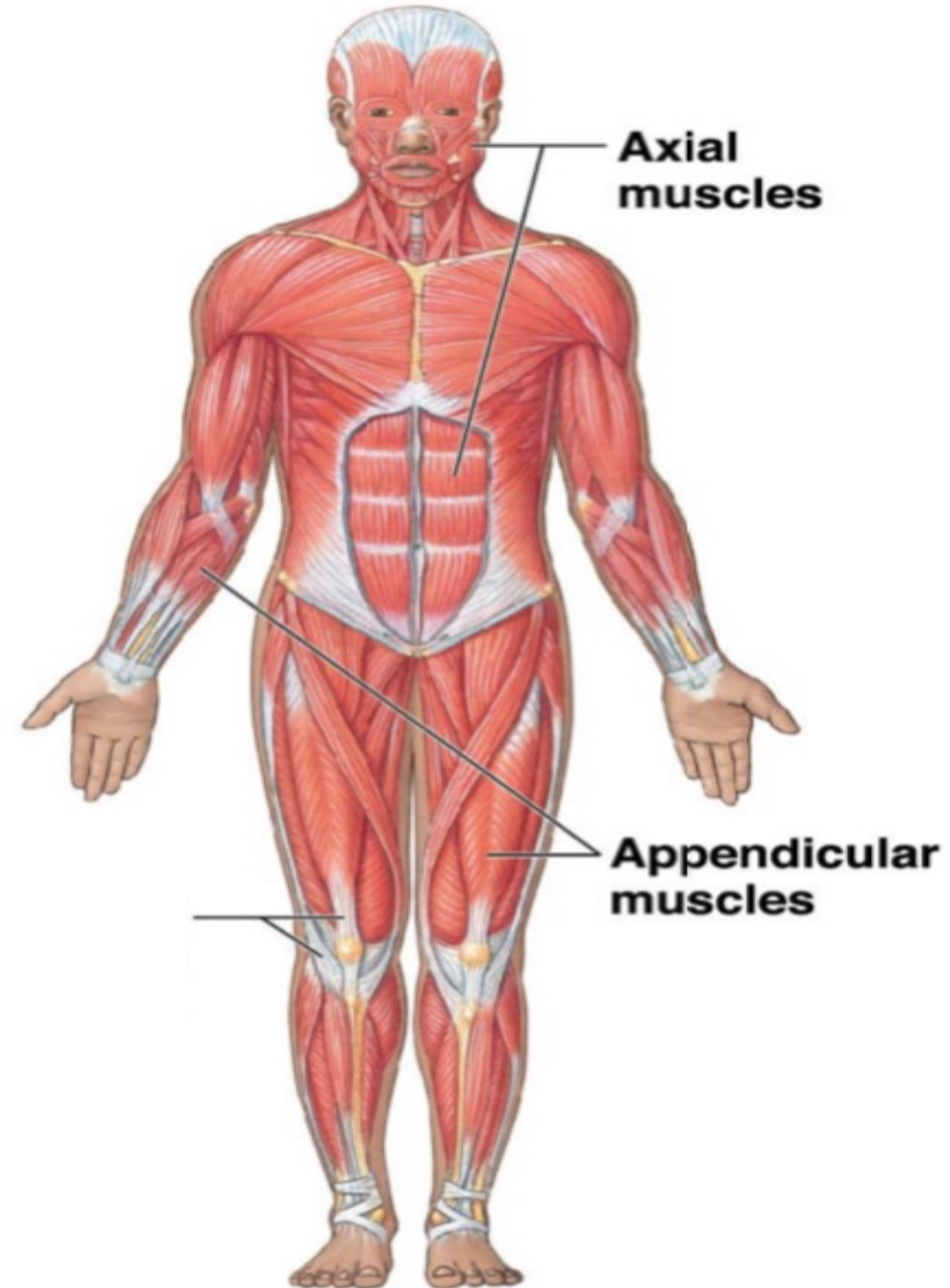
Divisions

- **Axial division**

Axial muscles support and position axial skeleton

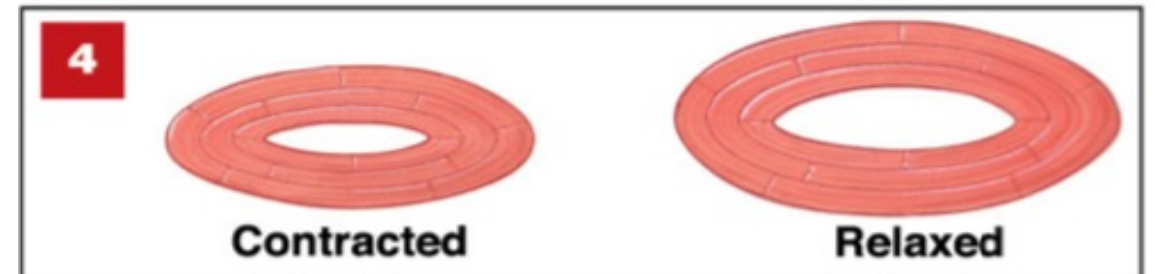
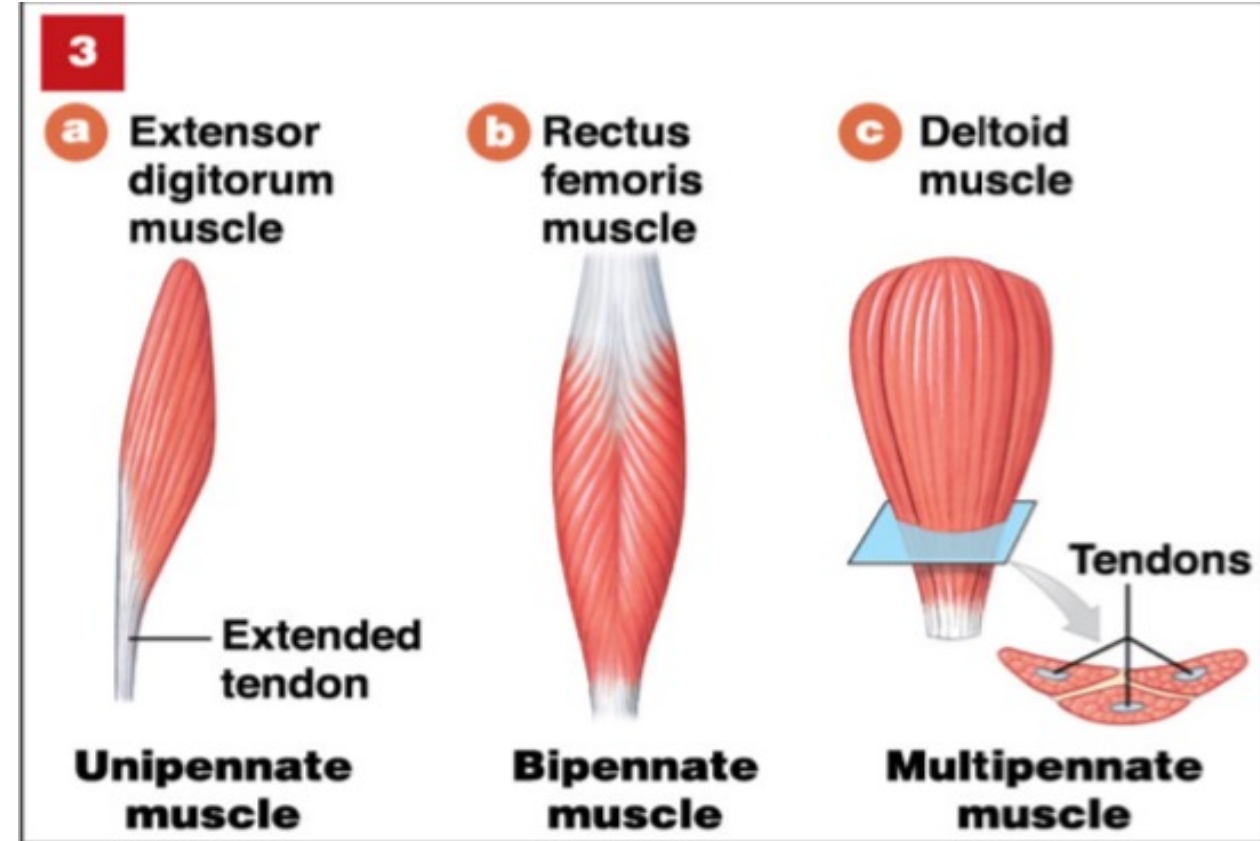
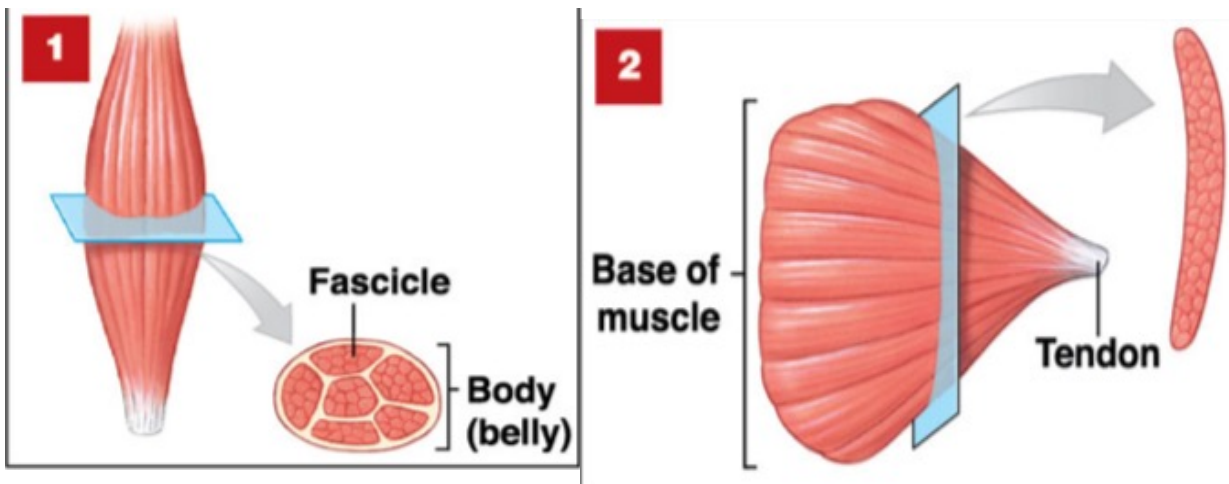
- **Appendicular division**

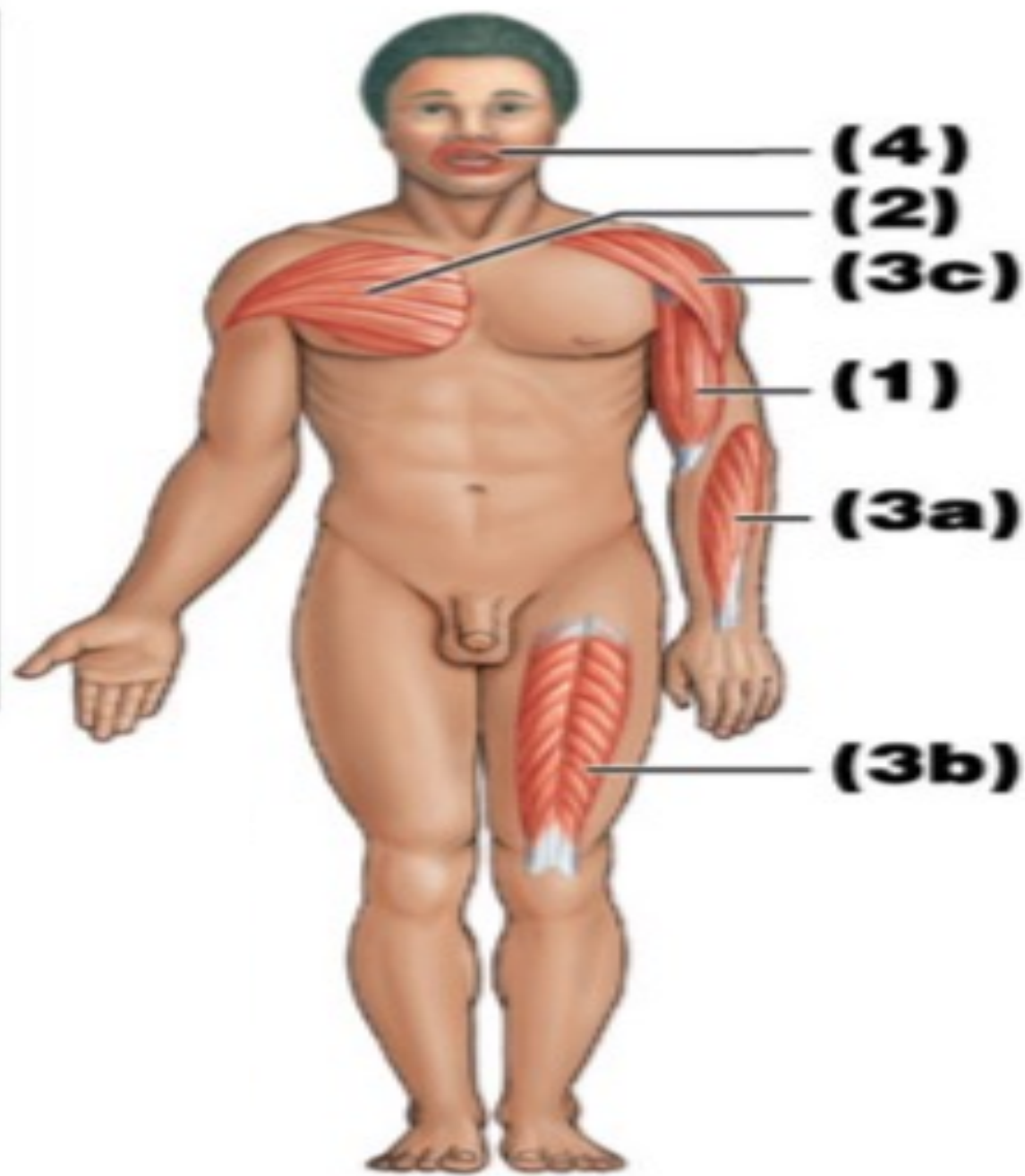
Appendicular muscles support, move, and brace the limbs



Categorization based on fascicles

- Parallel muscles.
- Convergent muscles.
- Pennate muscles.
- Circular muscles (sphincter).





(4)

(2)

(3c)

(1)

(3a)

(3b)

Origin, insertion, action

Origin

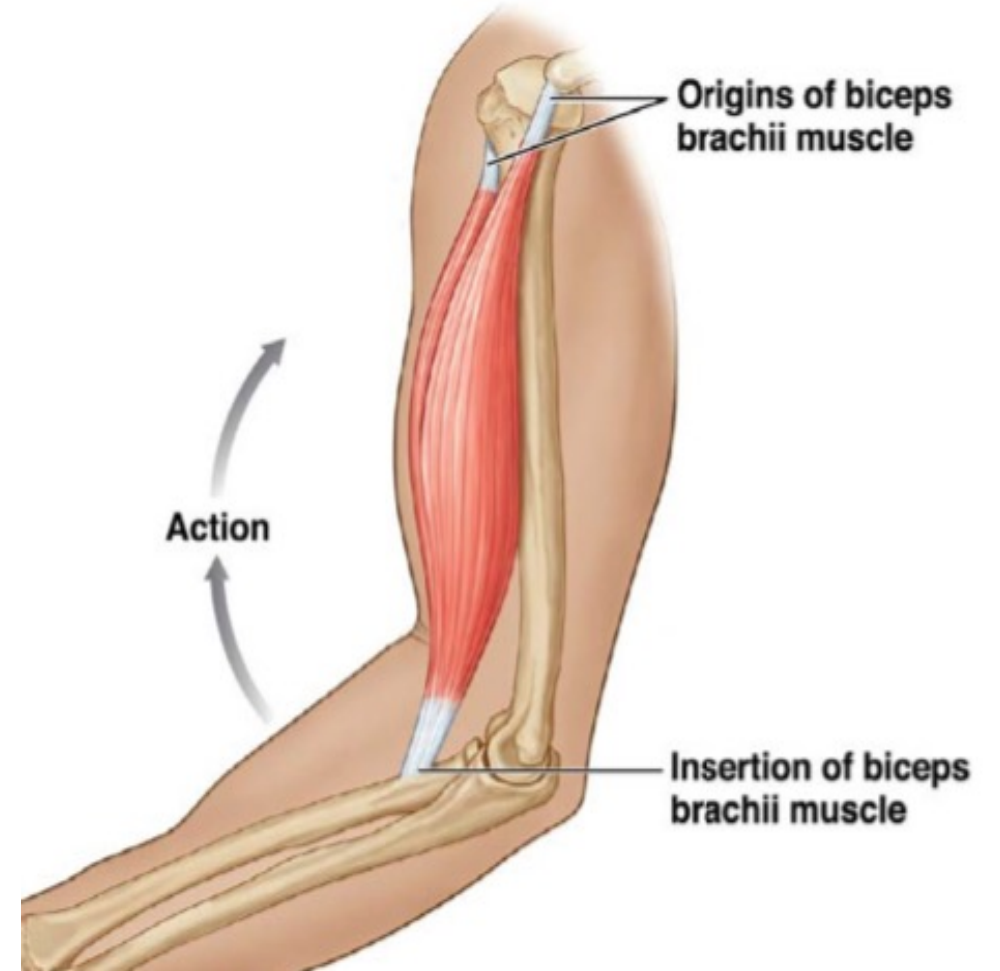
- Fixed end of a skeletal muscle attaches.
- Most are bones
- Some are connective tissue sheaths or bands
- Proximal to *insertion* in anatomical position

Insertion

- Movable end of a skeletal muscle attaches

Action

- Specific movement produced by a skeletal muscle



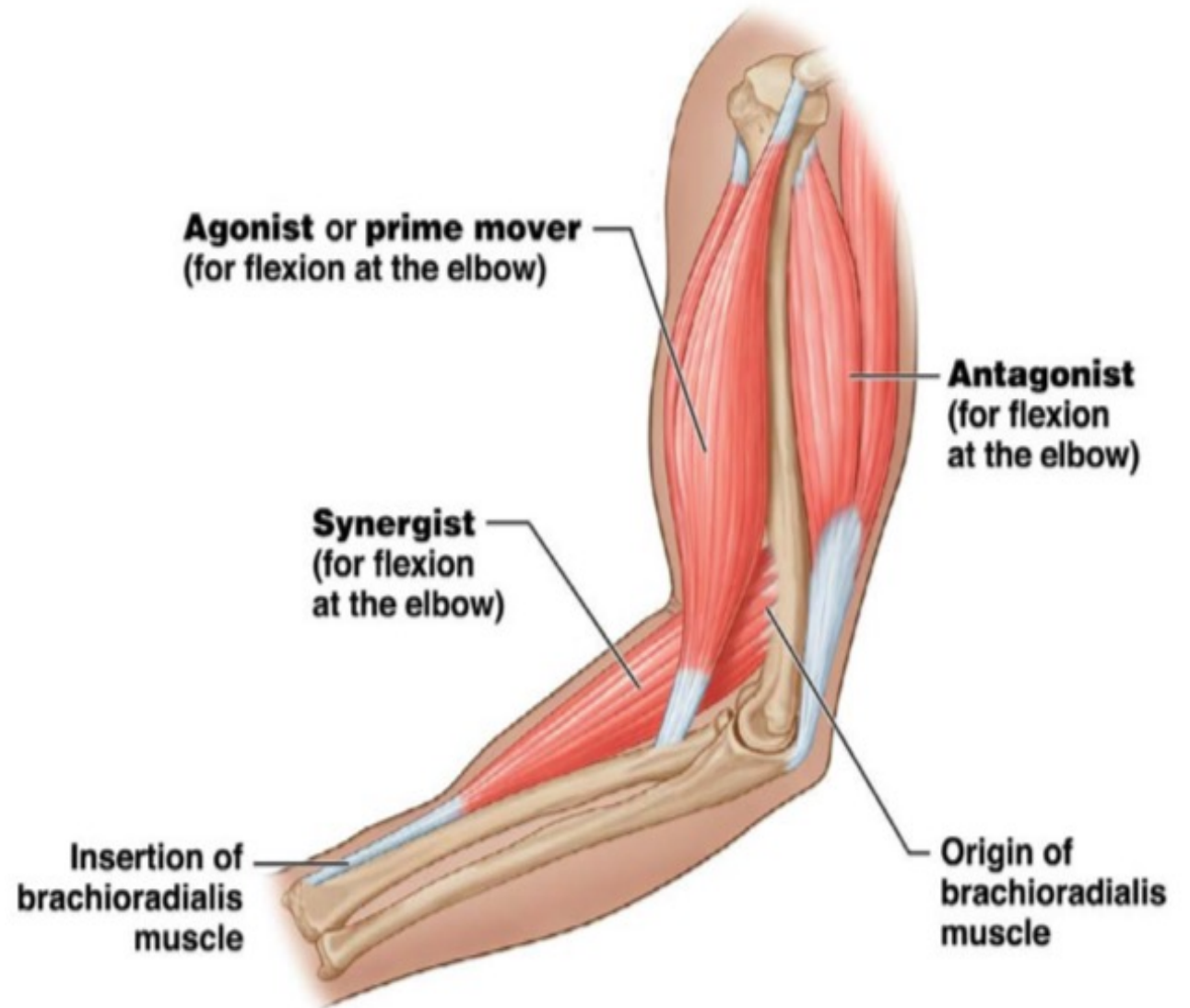
Function

Muscles usually work together in groups:

- Agonist, Synergist, and Antagonist.

1- Agonist or prime mover

- Mostly responsible for producing the movement

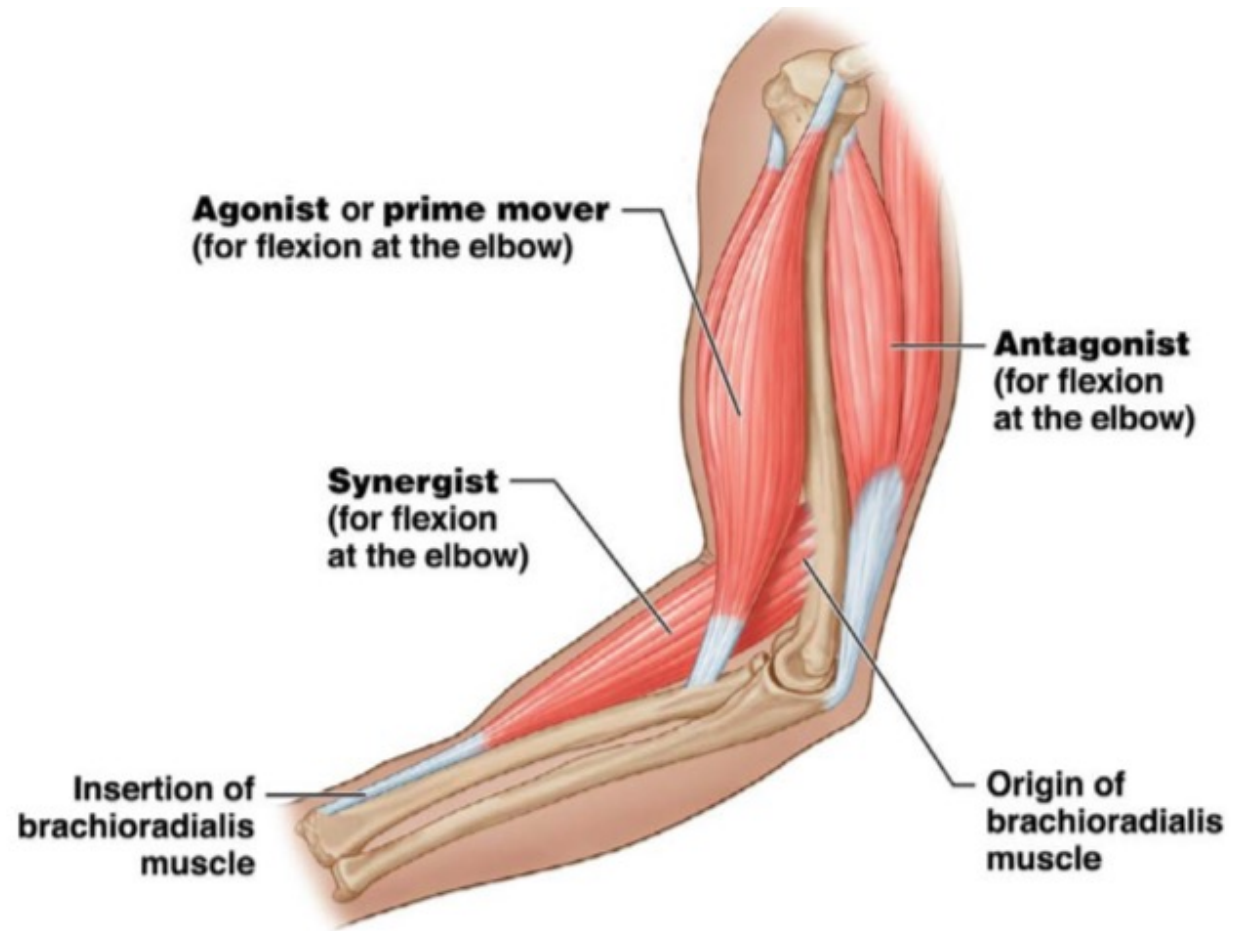


2- Synergist

- Helps larger agonist work efficiently
- Provide additional pull
- Stabilize origin

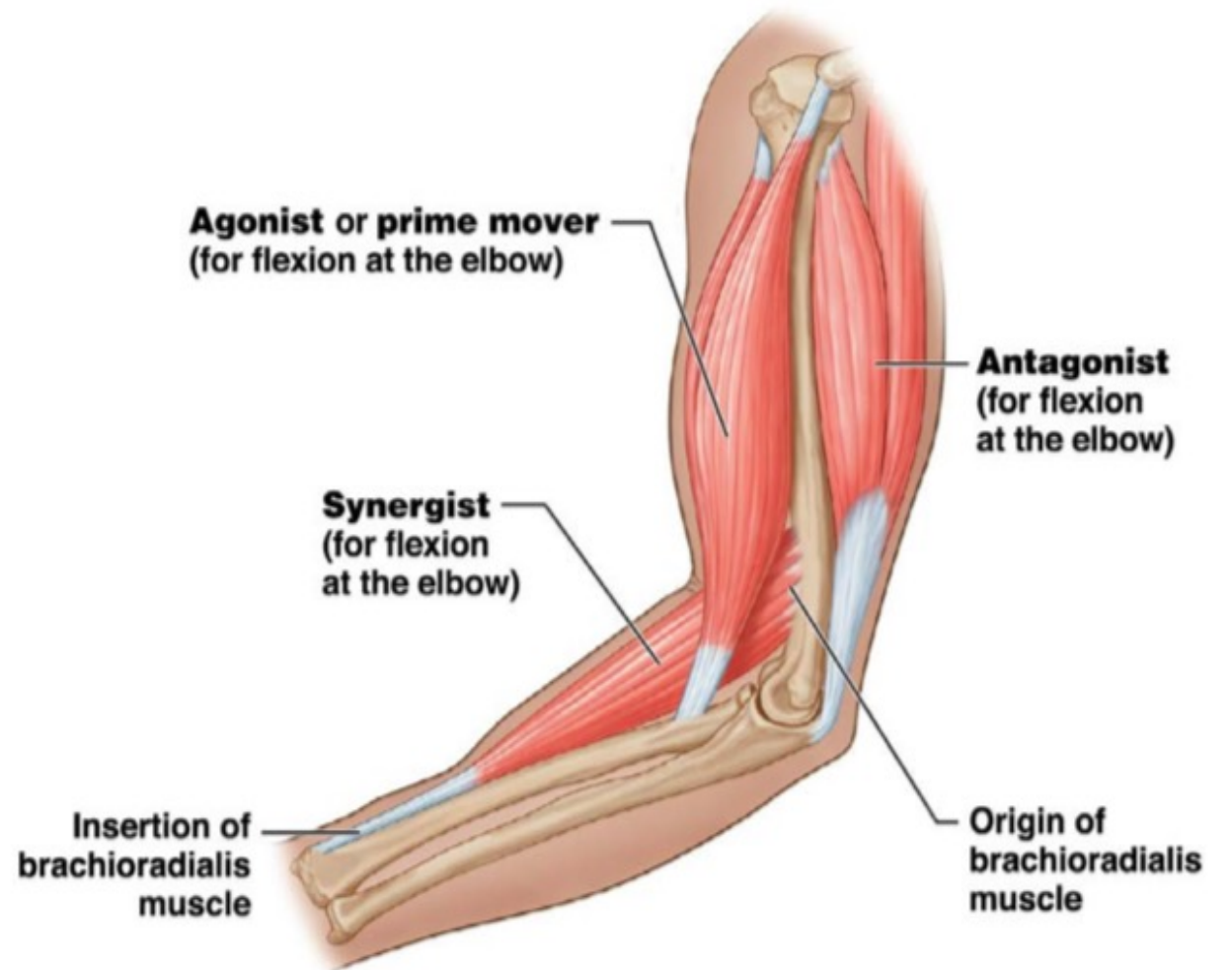
Fixators

- Synergists that assist by preventing movement at another joint



3- Antagonist

Action opposes a particular agonist



Axial muscles

- Arise on axial skeleton
- 60% of skeletal muscles in body
- Position head and spinal column
- Move rib cage; assist in breathing

Appendicular muscles

- Remaining 40% of all skeletal muscles
- Stabilize or move appendicular skeleton

Axial Muscles

- Temporalis
- Frontal belly of occipitofrontalis
- Sternocleidomastoid
- Rectus abdominis
- External oblique

Appendicular Muscles

- Trapezius
- Deltoid
- Pectoralis major
- Serratus anterior
- Latissimus dorsi
- Biceps brachii
- Triceps brachii
- Brachialis
- Pronator teres
- Brachioradialis
- Extensor carpi radialis longus
- Extensor carpi radialis brevis
- Palmaris longus
- Flexor carpi radialis
- Flexor digitorum superficialis
- Flexor carpi ulnaris
- Gluteus medius
- Tensor fasciae latae
- Iliopsoas
- Pectineus
- Adductor longus
- Gracilis
- Sartorius
- Rectus femoris
- Vastus lateralis
- Vastus medialis
- Gastrocnemius
- Fibularis longus
- Tibialis anterior
- Soleus
- Extensor digitorum longus

Linea alba

Flexor retinaculum

Iliotibial tract

Patella

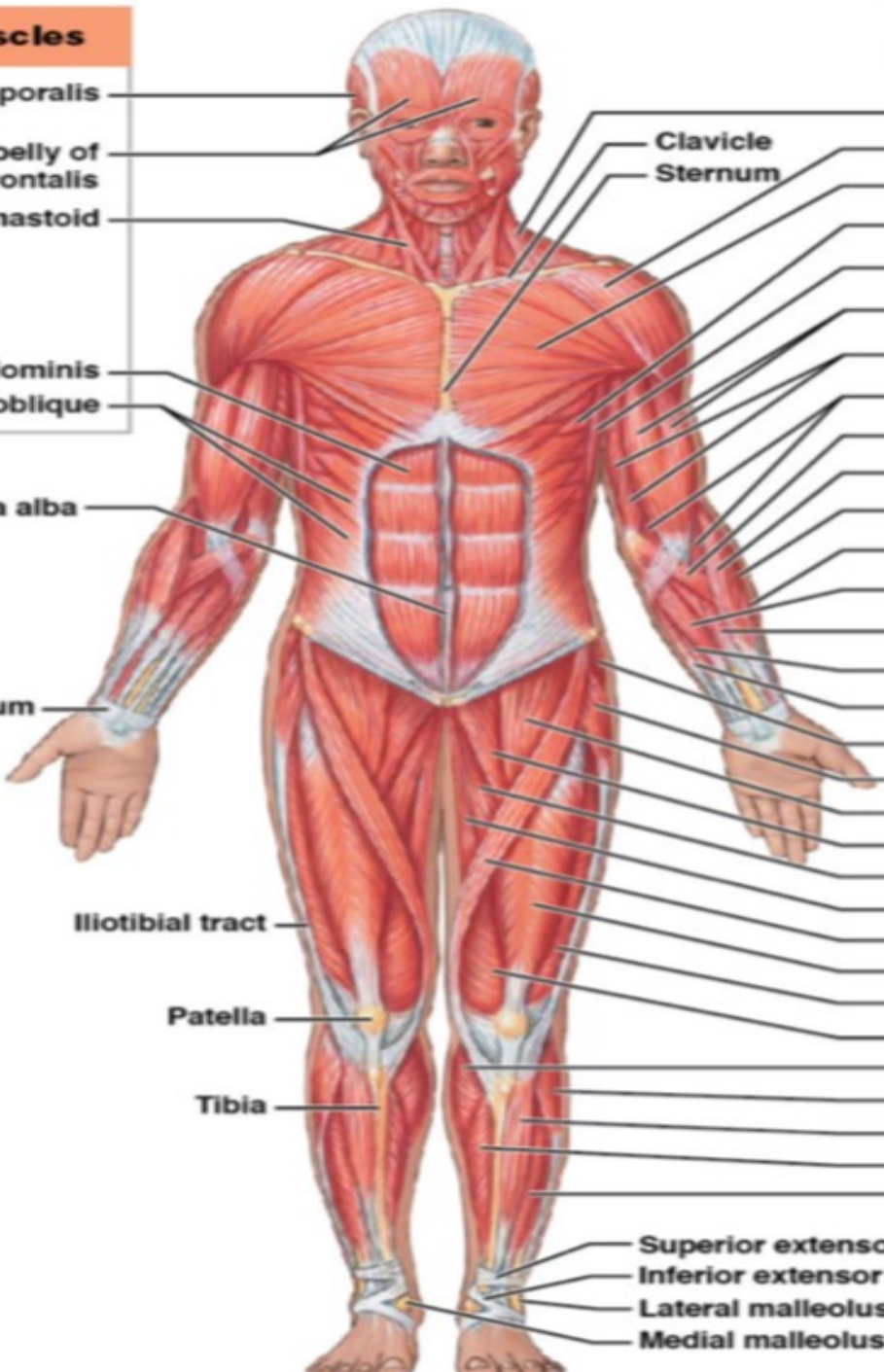
Tibia

Superior extensor retinaculum

Inferior extensor retinaculum

Lateral malleolus of fibula

Medial malleolus of tibia

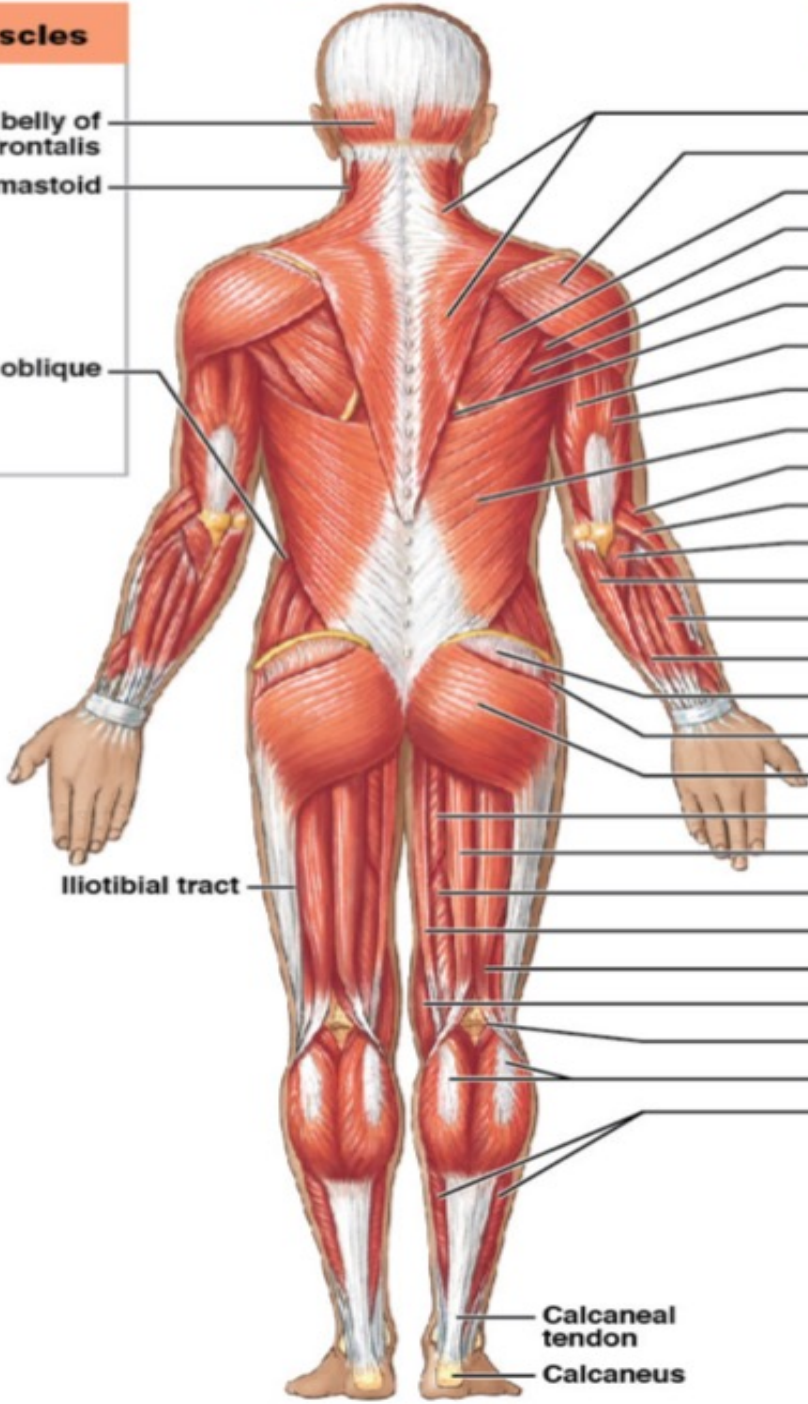


Axial Muscles

- Occipital belly of occipitofrontalis
- Sternocleidomastoid
- External oblique

Appendicular Muscles

- Trapezius
- Deltoid
- Infraspinatus
- Teres minor
- Teres major
- Rhomboid major
- Triceps brachii (long head)
- Triceps brachii (lateral head)
- Latissimus dorsi
- Brachioradialis
- Extensor carpi radialis longus
- Anconeus
- Flexor carpi ulnaris
- Extensor digitorum
- Extensor carpi ulnaris
- Gluteus medius
- Tensor fasciae latae
- Gluteus maximus
- Adductor magnus
- Semitendinosus
- Semimembranosus
- Gracilis
- Biceps femoris
- Sartorius
- Plantaris
- Gastrocnemius
- Soleus



Iliotibial tract

Calcaneal tendon
Calcaneus

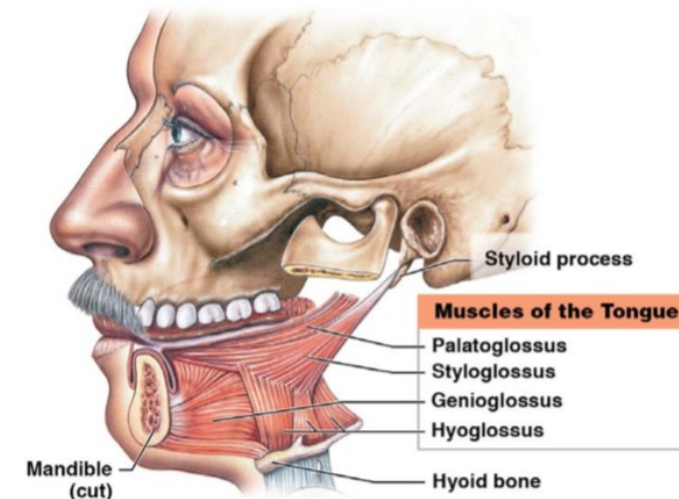
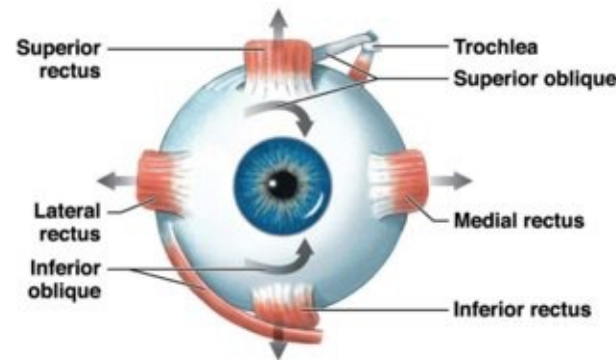
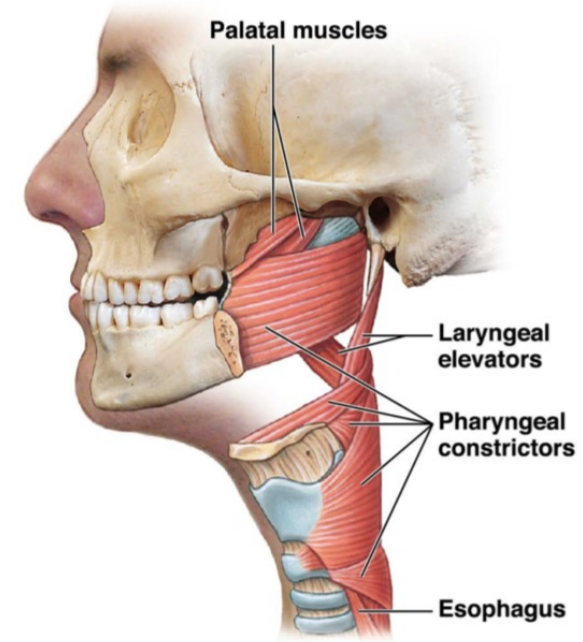
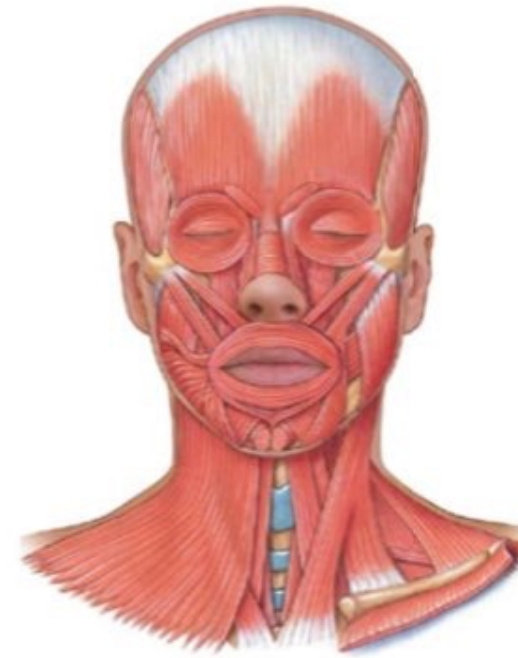
Axial muscles

Axial muscle groups:

Stabilize/ position head, neck, and trunk

1- Muscles of the head and neck:

- Muscles of facial expression.
- Extrinsic eye muscles.
- Tongue.
- Pharynx.
- Neck.

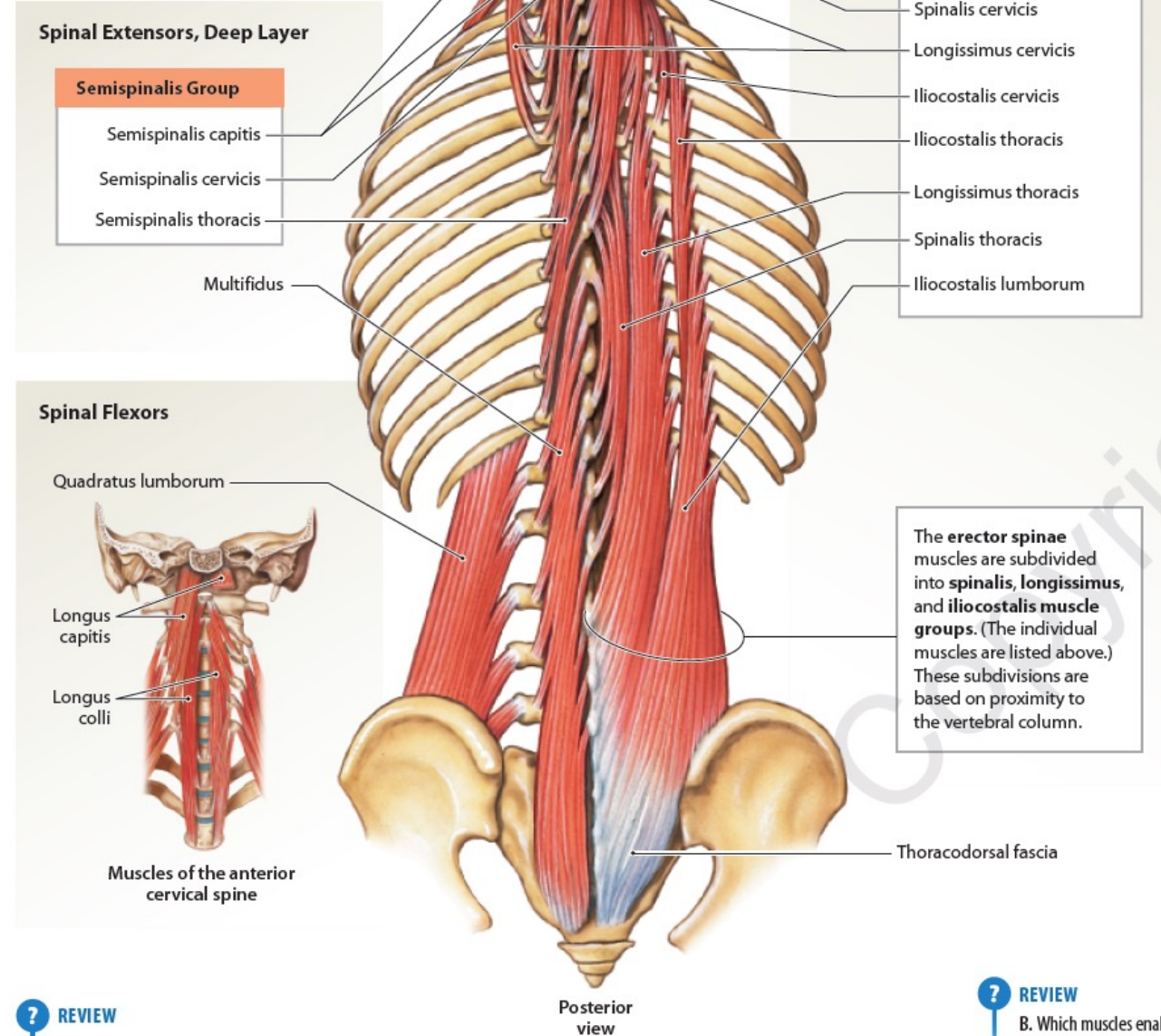


Axial muscles

2- Muscles of the vertebral column:

- Muscles that stabilize, flex, extend, rotate vertebral column
- Several layers

1 The muscles of the vertebral column are arranged in several layers. They include muscles originating or inserting on the ribs and the processes of the vertebrae. Although this mass of muscles extends from the sacrum to the skull, each muscle group is composed of numerous separate muscles of various lengths.



REVIEW

A. List the spinal flexor muscles.

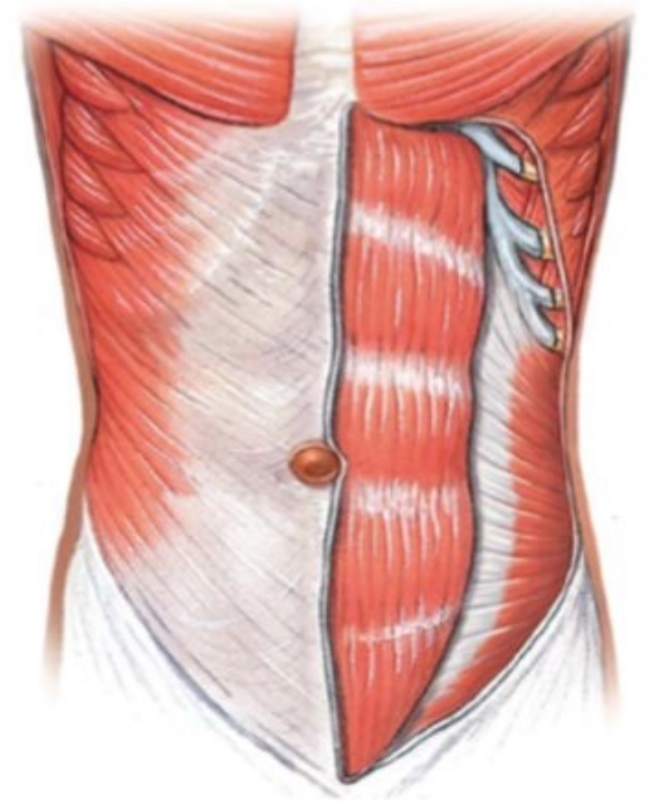
REVIEW

B. Which muscles enable you to extend your neck?

Axial muscles

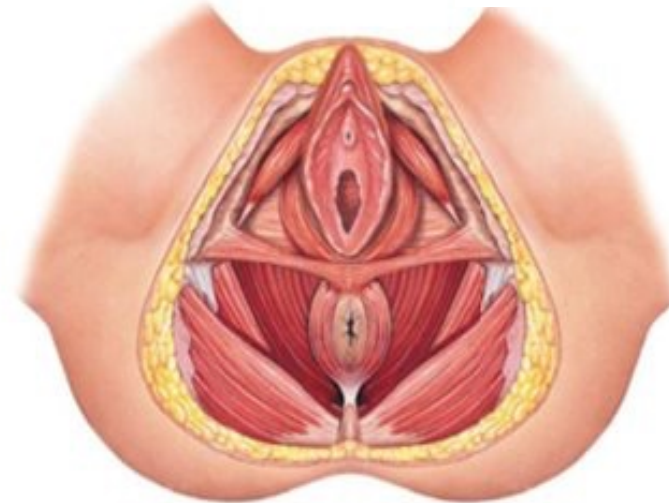
3- Oblique and rectus muscles of trunk

- Broad sheets/bands forming muscular walls of thoracic and abdominopelvic cavities



4- Muscles of the pelvic floor:

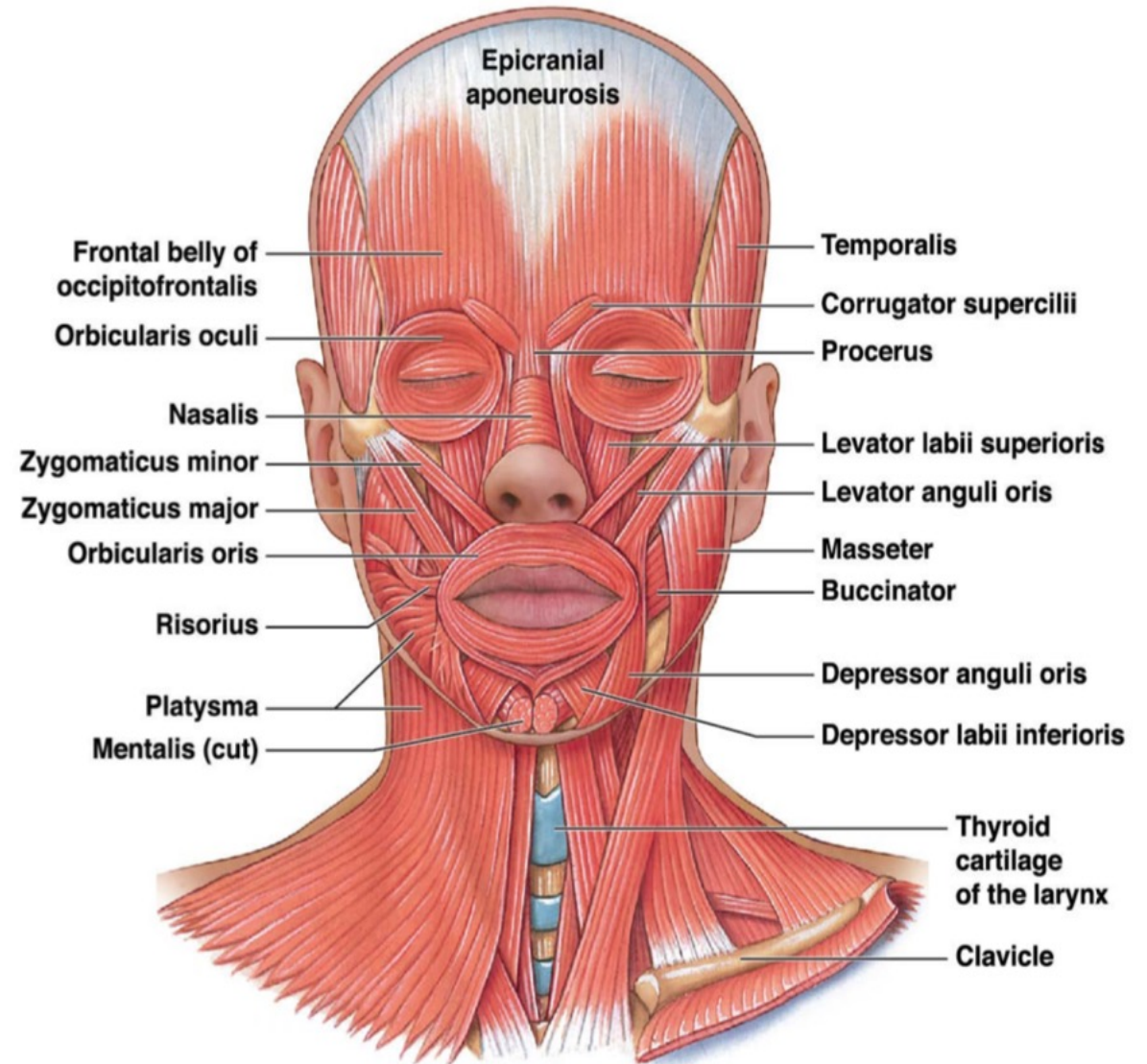
- Span the pelvic outlet.
- Support organs of the pelvis



Axial muscles

Muscles of facial expression

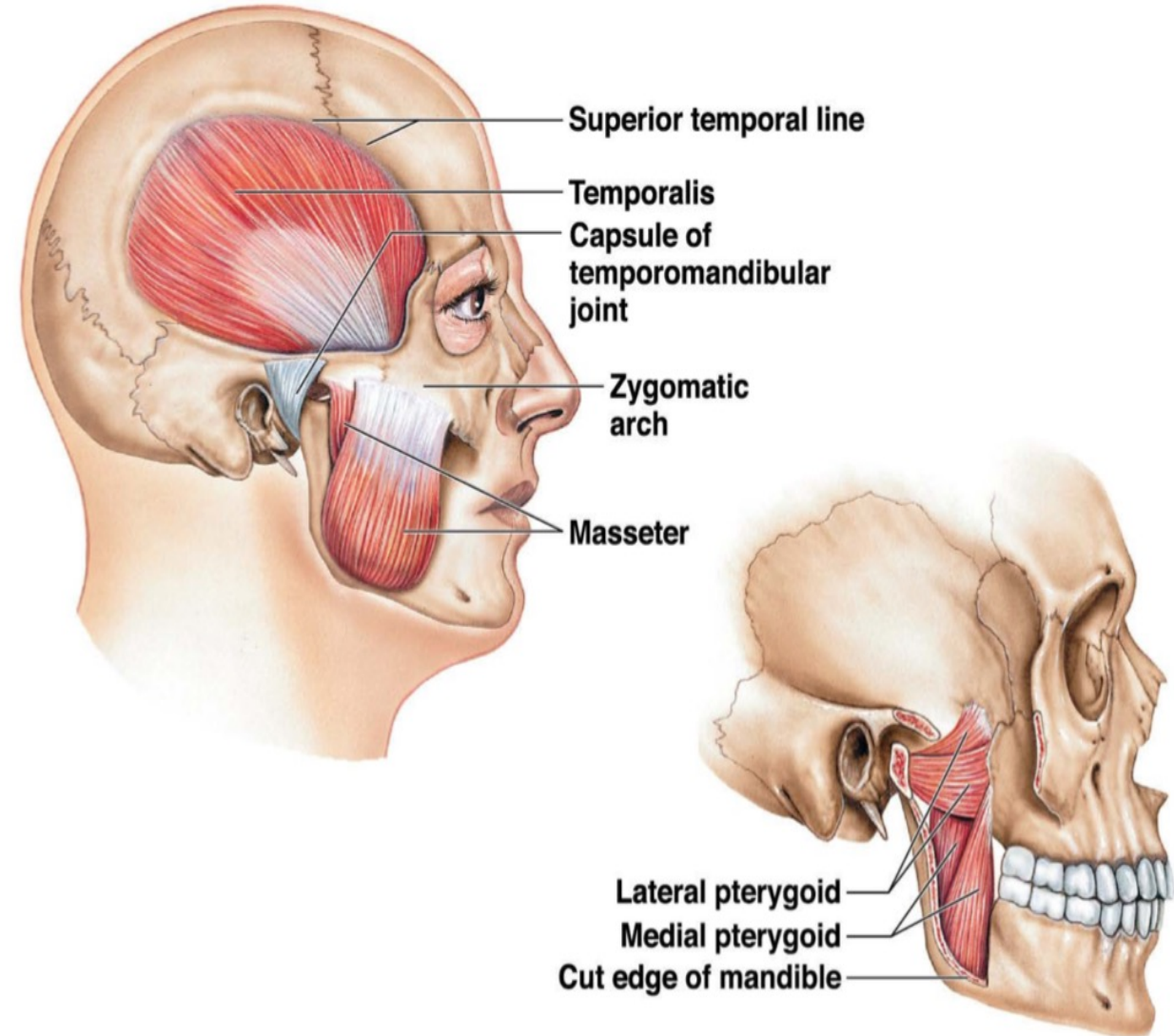
- Origins—surface of skull (except for platysma in neck)
- Insertions—superficial fascia and dermis of skin
- Actions—move skin, allowing facial expression



Axial muscles

Muscles of mastication

- Origins—zygomatic arch, temporal lines, lateral pterygoid plate
- Insertion—mandibular ramus and coronoid process
- Actions—elevating mandible, sliding mandible side to side, protruding mandible, opening jaw (lateral pterygoid)



Axial muscles

Closely associated muscles:

- **Muscles of the tongue**—involved in speaking and Chewing.
- **Muscles of the pharynx**—role in swallowing
- **Muscles of the neck**—involved in positioning mandible, hyoid, and larynx

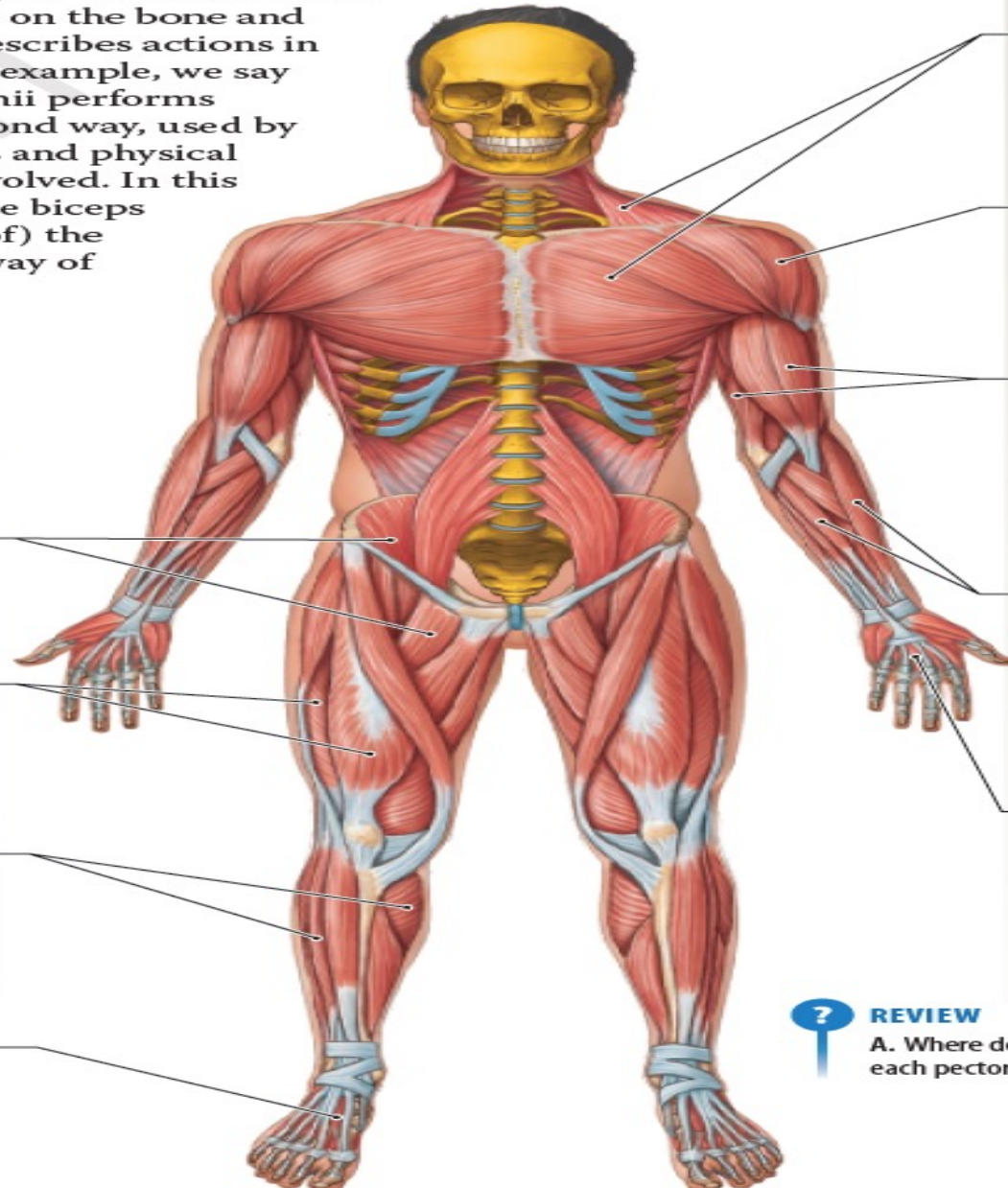
Appendicular muscles

The appendicular muscles stabilize, position, and support the limbs:

- Pectoral girdle muscle
- Muscles that move the arm/thigh
- Muscles that move the forearm/leg
- Extrinsic muscles of the hand and fingers/foot and toes
- Intrinsic muscles of the hand/foot

The appendicular muscles stabilize, position, and support the limbs

In the following modules, we will group the appendicular muscles by their actions and origins. We can describe actions in two ways, one focused on the bone and one on the joint. The first way describes actions in terms of the region affected. For example, we say a muscle such as the biceps brachii performs “flexion of the forearm.” The second way, used by specialists, such as kinesiologists and physical therapists, identifies the joint involved. In this approach, we say the action of the biceps brachii muscle is “flexion at (or of) the elbow.” We will use this second way of describing muscle actions.



Upper Limb

Muscles That Position the Pectoral Girdle

These muscles originate on the axial skeleton and insert on the clavicle and scapula.

Muscles That Move the Arm

These muscles originate on the pectoral girdle and the thoracic cage and insert on the humerus.

Muscles That Move the Forearm and Hand

These muscles primarily originate on the pectoral girdle and arm and insert on the radius, ulna, and/or carpals.

Extrinsic Muscles of the Hand and Fingers

These muscles primarily originate on the humerus, radius, and ulna and insert on the metacarpals and phalanges.

Intrinsic Muscles of the Hand

These are the muscles that perform fine movements. They originate primarily on the carpal and metacarpal bones and insert on the phalanges.

Lower Limb

Muscles That Move the Thigh

These muscles originate in the pelvic region and typically insert on the femur.

Muscles That Move the Leg

These muscles originate on the pelvis and femur and insert on the tibia and/or fibula.

Extrinsic Muscles That Move the Foot and Toes

These muscles originate on the tibia and fibula and insert on the tarsals, metatarsals, and/or phalanges.

Intrinsic Muscles of the Foot

These muscles originate primarily on the tarsal and metatarsal bones and insert on the phalanges.

? REVIEW

A. Where do the muscles that position each pectoral girdle originate?

Lo LEARNING OUTCOME

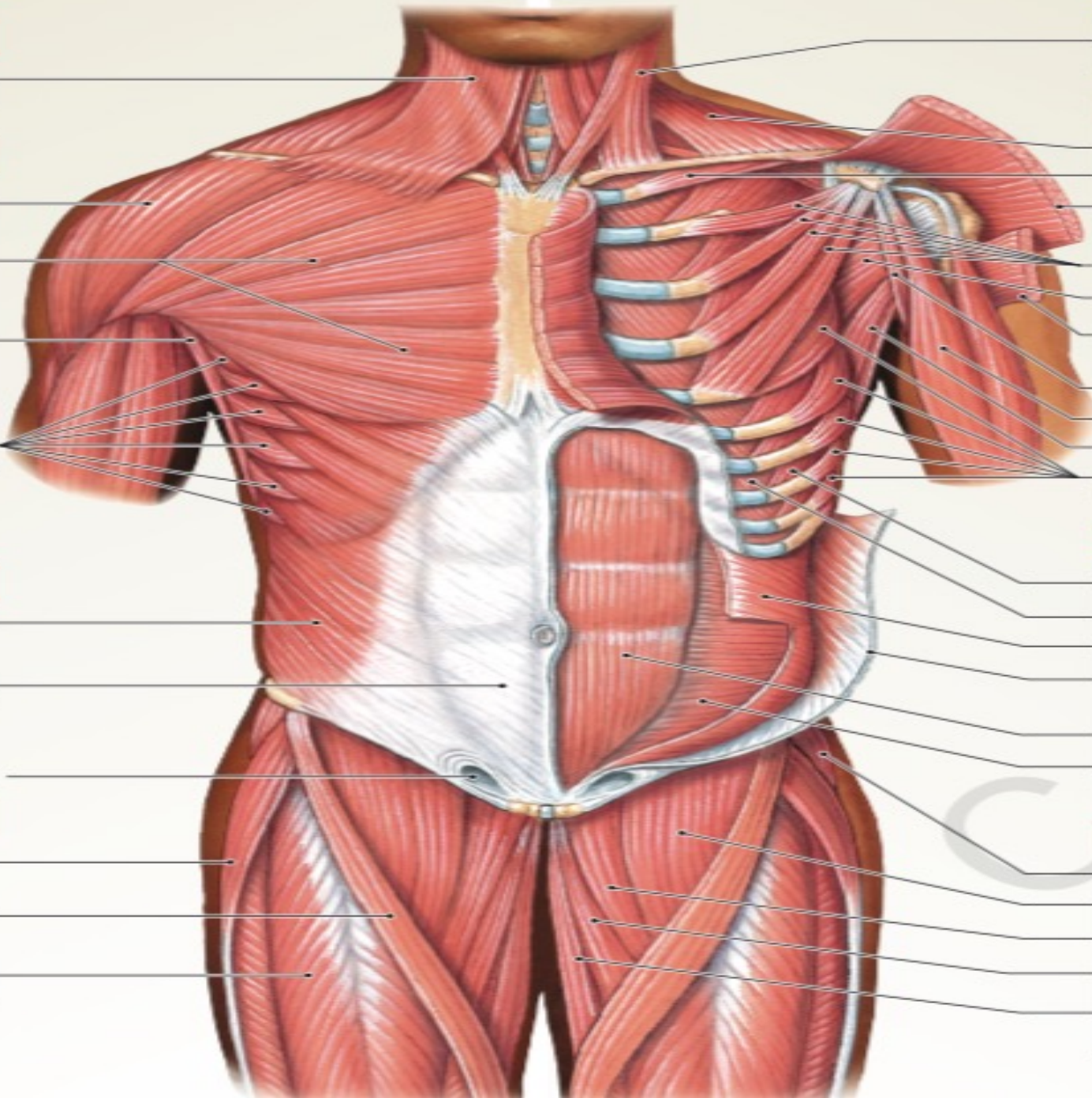
Describe the general functions of the muscles of the upper and lower limbs.

Axial Muscles
Platysma

Appendicular Muscles
Deltoid
Pectoralis major
Latissimus dorsi
Serratus anterior

Axial Muscles
External oblique
Rectus sheath

Superficial inguinal ring
Appendicular Muscles
Tensor fasciae latae
Sartorius
Rectus femoris



Axial Muscles
Sternocleidomastoid

Appendicular Muscles
Trapezius
Subclavius
Deltoid (cut and reflected)
Pectoralis minor
Subscapularis
Pectoralis major (cut and reflected)
Coracobrachialis
Biceps brachii
Teres major
Serratus anterior

Axial Muscles
External intercostal
Internal intercostal
Internal oblique (cut)
External oblique (cut and reflected)
Rectus abdominis
Transversus abdominis

Appendicular Muscles
Gluteus medius
Iliopsoas
Pectineus
Adductor longus
Gracilis

Superficial Dissection

Axial Muscles

Sternocleidomastoid

Appendicular Muscles

Trapezius

Deltoid

Infraspinatus

Teres minor

Teres major

Triceps
brachii

Latissimus dorsi
(right side cut
and reflected)

Thoracolumbar
fascia

Iliac crest

Gluteus medius

Gluteus maximus

Deep Dissection

Axial Muscles

Semispinalis capitis

Splenius capitis

Appendicular Muscles

Levator scapulae

Supraspinatus

Rhomboid minor (cut
and reflected)

Serratus posterior
superior

Rhomboid major (cut
and reflected)

Serratus anterior

Latissimus dorsi
(cut and reflected)

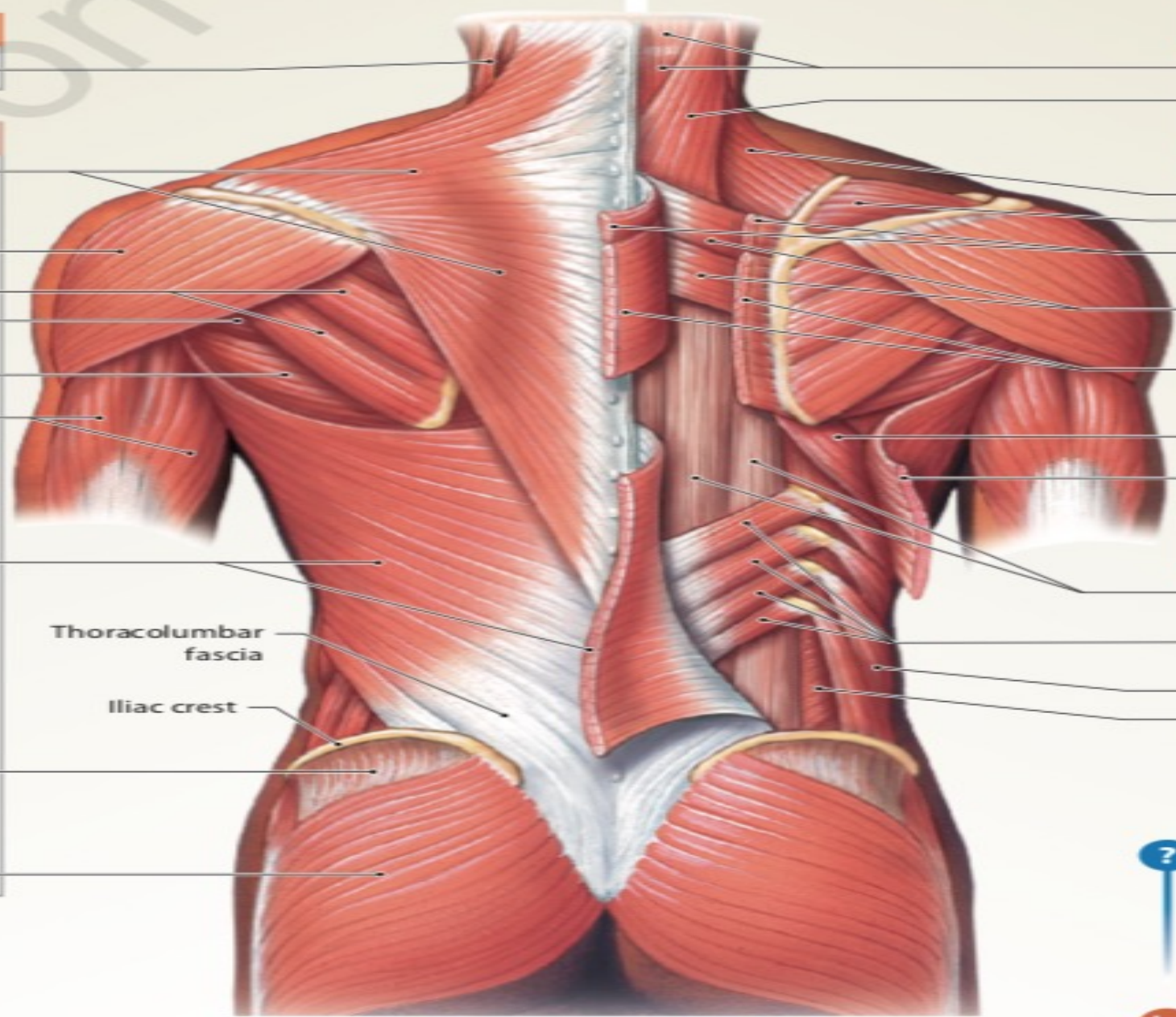
Axial Muscles

Erector spinae
muscle group

Serratus posterior
inferior

External oblique

Internal oblique



Posterior view

REVIEW

B. Describe the appearance of the appendicular muscles as you move proximally to distally.



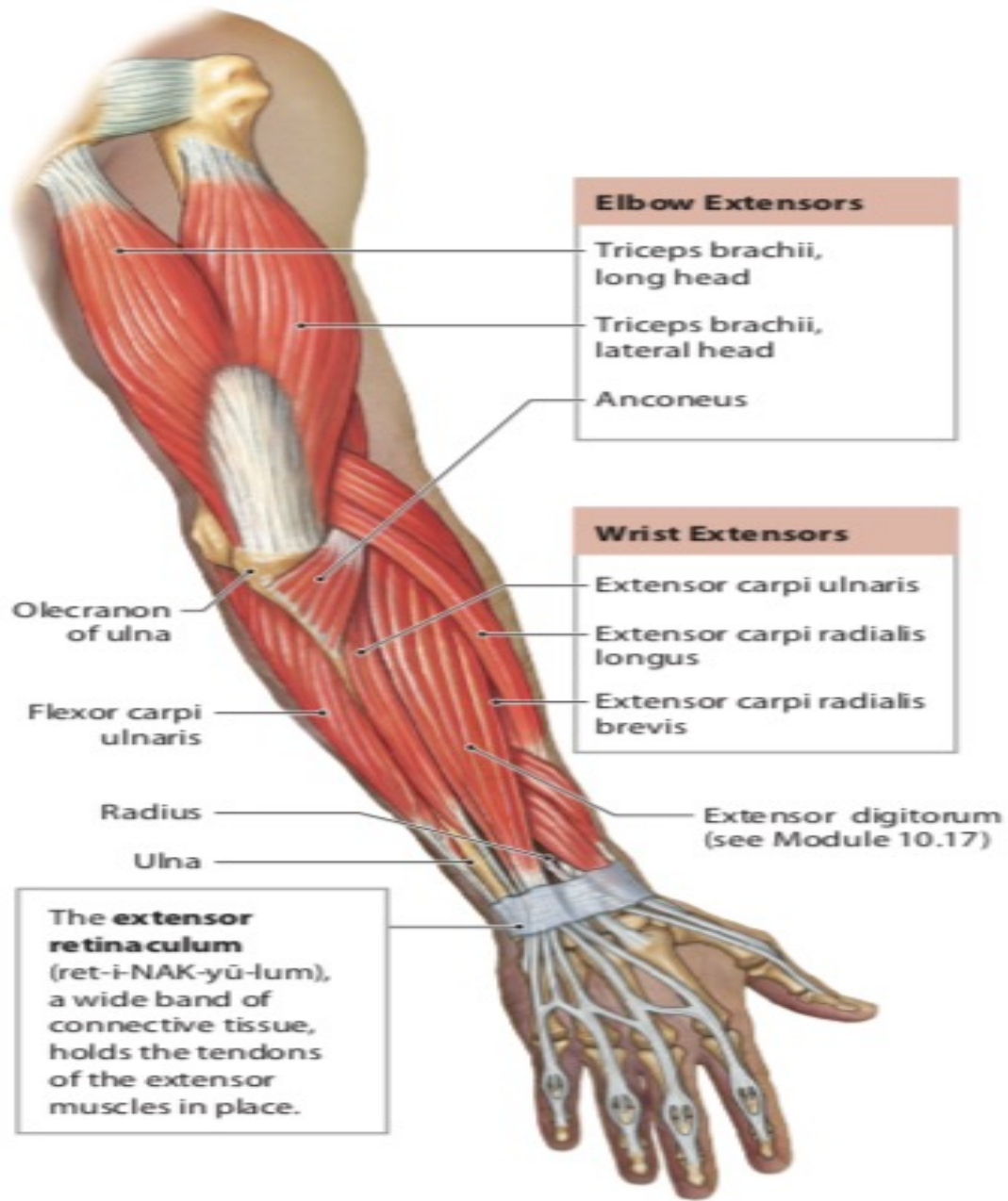
INTEGRATION

C. Identify to which division, axial or appendicular, the following muscles belong: deltoid, external oblique, gluteus maximus, pectoralis major, platysma, and rectus femoris.

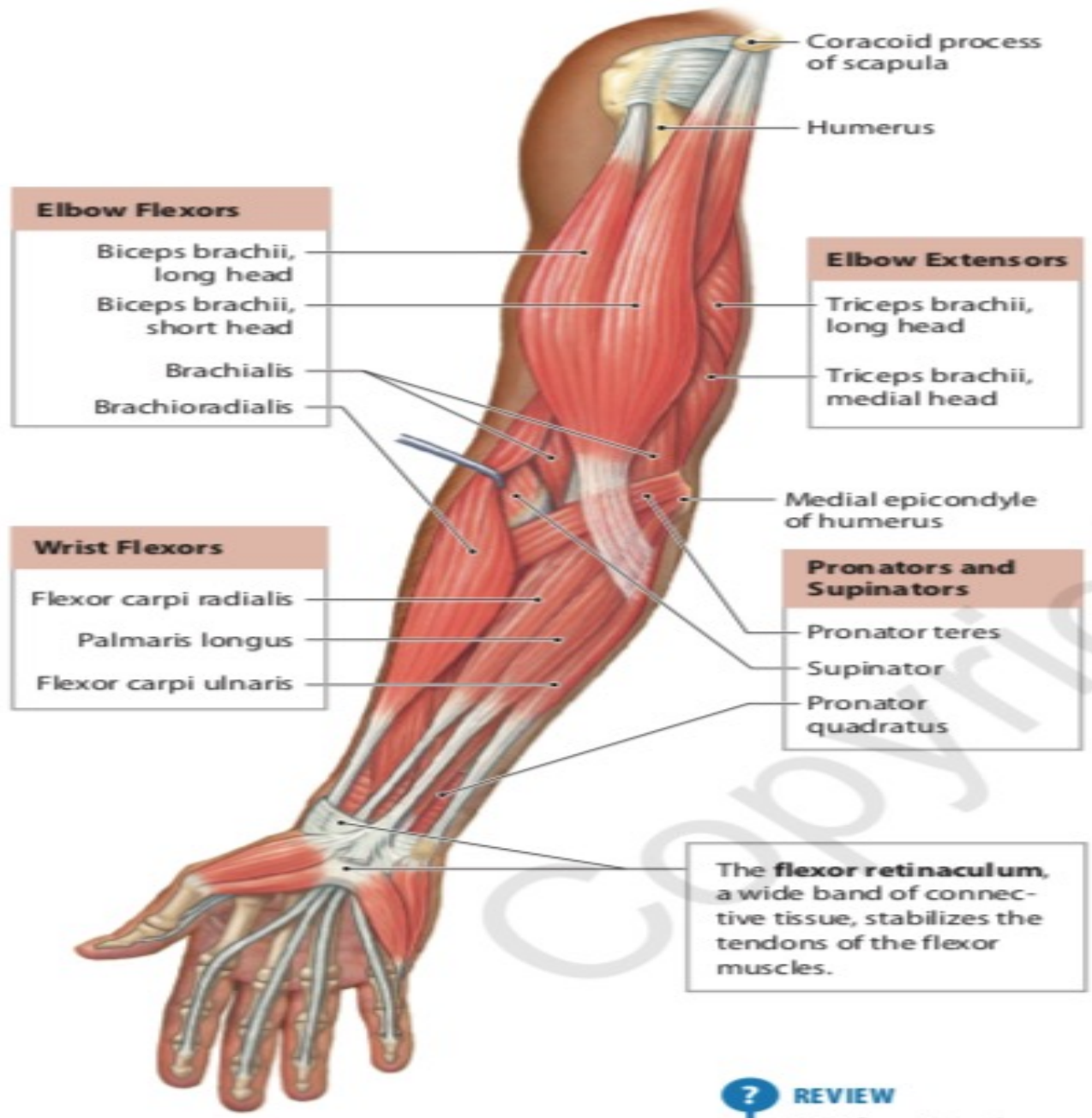


LEARNING OUTCOME

Identify the principal appendicular muscles.



Posterior view



Anterior view

REVIEW

- Define *retinaculum*.
- Are the wrist extensors located on the anterior surface or the posterior