

Muscular System

Location & Names of Skeletal Muscles

Actions & Interactions

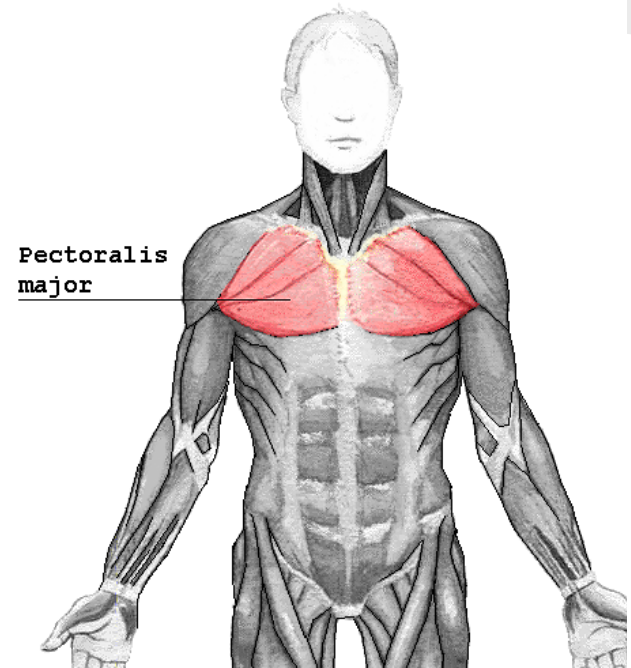
- Muscles can only pull, never push
- As a muscle shortens, its insertion (moveable bone) moves toward its origin (fixed point of attachment)

Four Functional Groups

1. Prime Mover (Agonist)
2. Antagonist
3. Fixator
4. Synergist

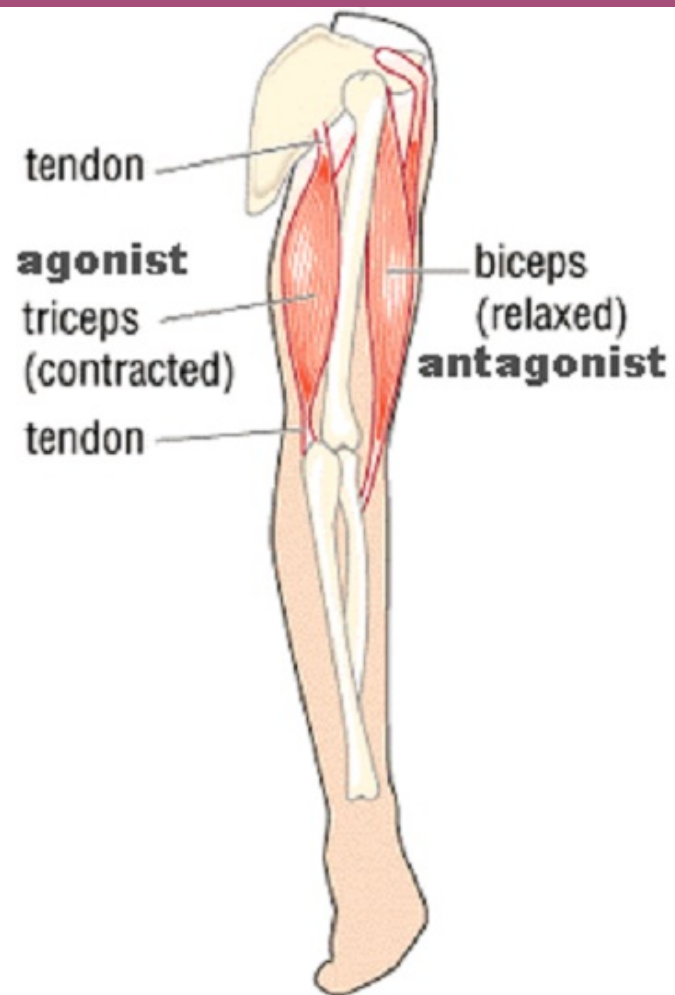
Prime Mover (Agonist)

- “Leader”
- Muscle that bears the major responsibility for effecting a particular movement.
 - Ex: pectoralis major = prime mover of arm flexion



Antagonist

- Muscle that reverses, or opposes, the action of another muscle.
- Helps regulate the action of agonists by contracting slightly to provide some resistance.
- The agonist & its antagonist are located on opposite sides of the joint of where they act



Fixators

- Muscle that immobilizes one or more bones, allowing other muscles to act from a stable base.

Synergists

- Muscle that aids the action of the agonist by effecting the same movement with a little extra force or by stabilizing joints across which the agonist acts, preventing undesirable movements.

Naming Skeletal Muscles

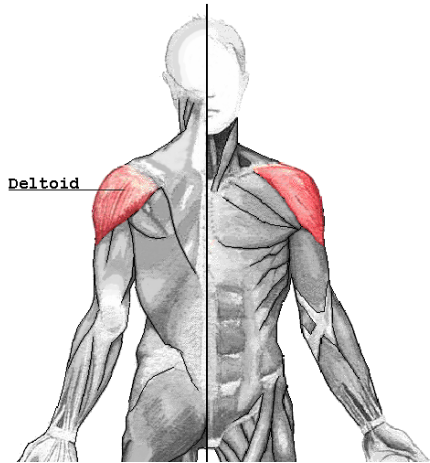
- Location
- Shape
- Size
- Direction of Muscle Fibers
- Number of Attachments
- Location of Attachment
- Action

Muscle Location

- Indicate the bone or body region with which the muscle is associated
- Examples
 - temporalis-overlies the temporal bone
 - intercostal-muscles that run between the ribs

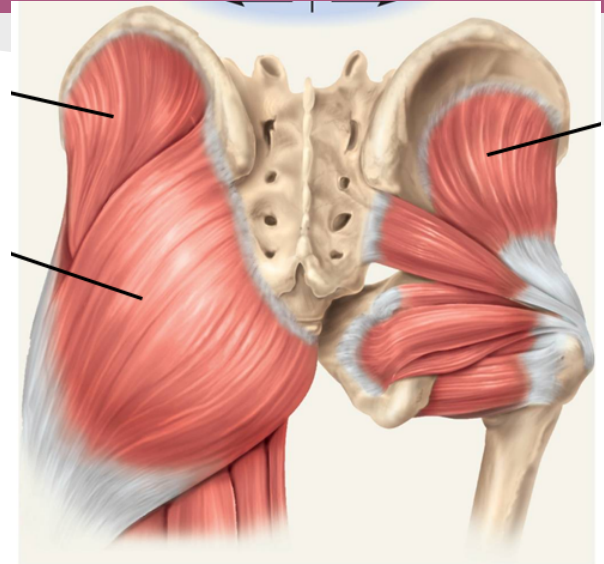
Muscle Shape

- Examples
 - Deltoid - roughly triangular
 - Right and left trapezius - form a trapezoid



Muscle Size

- maximus - largest
- minimus - smallest
- longus - long
- brevis - short
 - Example
 - gluteus maximus and gluteus minimus



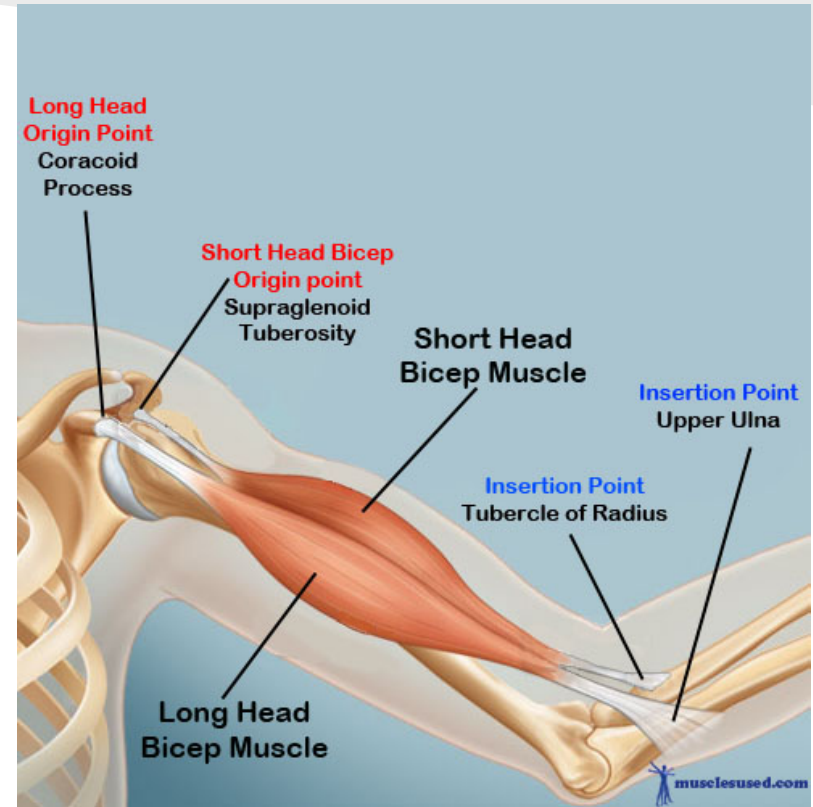
Direction of Muscle Fibers

- rectus (straight) = fibers run parallel to that imaginary line
- transversus = fibers run at right angles to the line
- oblique = fibers run obliquely
 - Examples
 - rectus femoris (straight muscle of the femur)
 - transversus abdominis (transverse muscle of the abdomen)

Number of Attachments

- **Examples**

- biceps - 2 origins
- triceps - 3 origins
- quadriceps - 4 origins



Location of Attachment

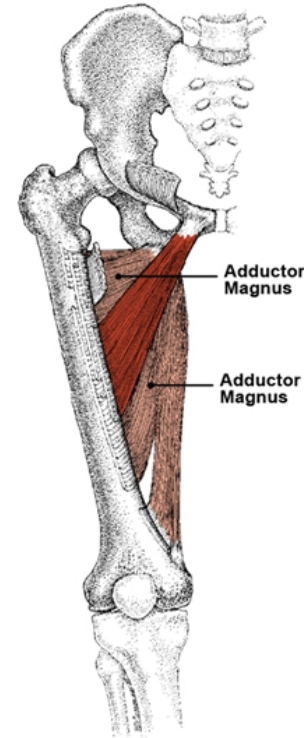
- Origin is always named first
 - Example
 - sternocleidomastoid muscle
 - Dual origin on sternum and clavicle
 - insertion on the



Muscle Action

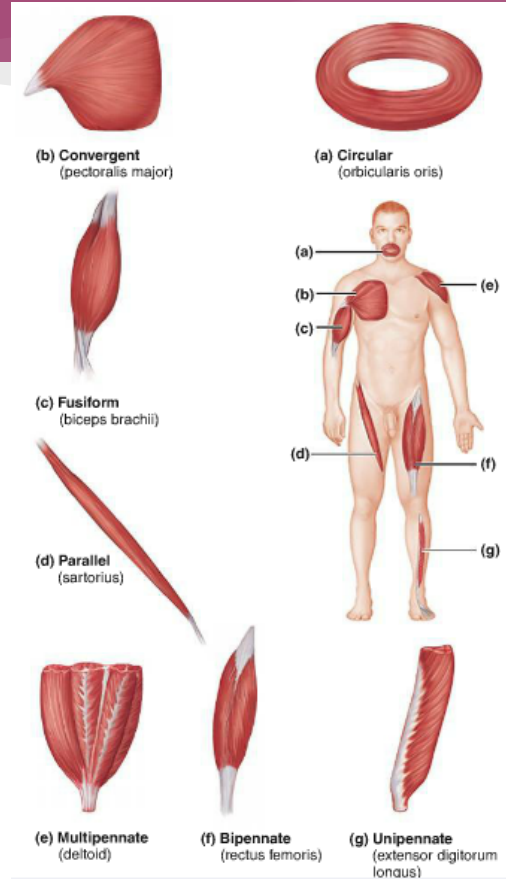
- Flexor, Extensor, Adductor
 - Example
 - adductor longus located on medial thigh bringing thigh adduction

Adductor Longus



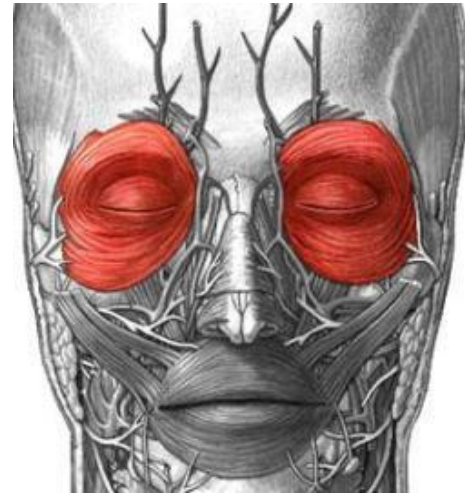
Arrangement of Fascicles

- Circular
- Convergent
- Parallel
- Pennate



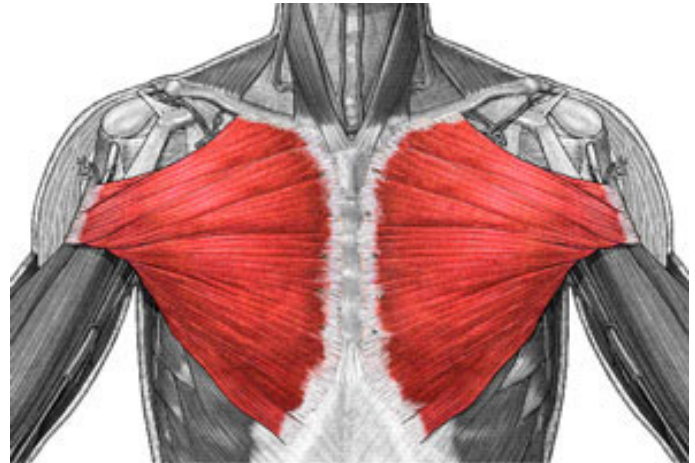
Circular

- fascicles are arranged in concentric rings
 - surround external body openings
 - close by contracting
 - aka sphincters



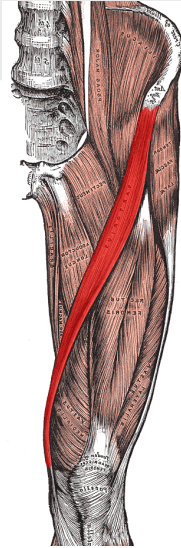
Convergent

- broad origin and its fascicles converge toward a single tendon of insertion
- triangular or fan shaped

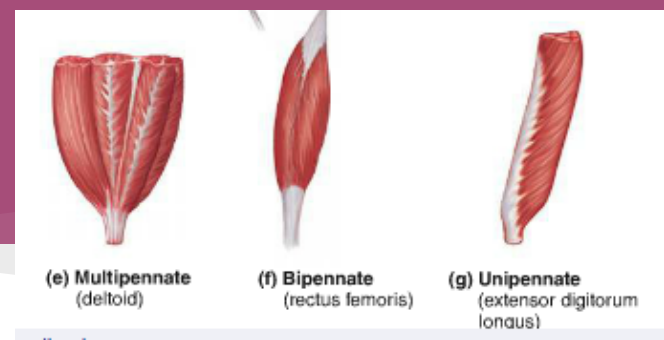


Parallel

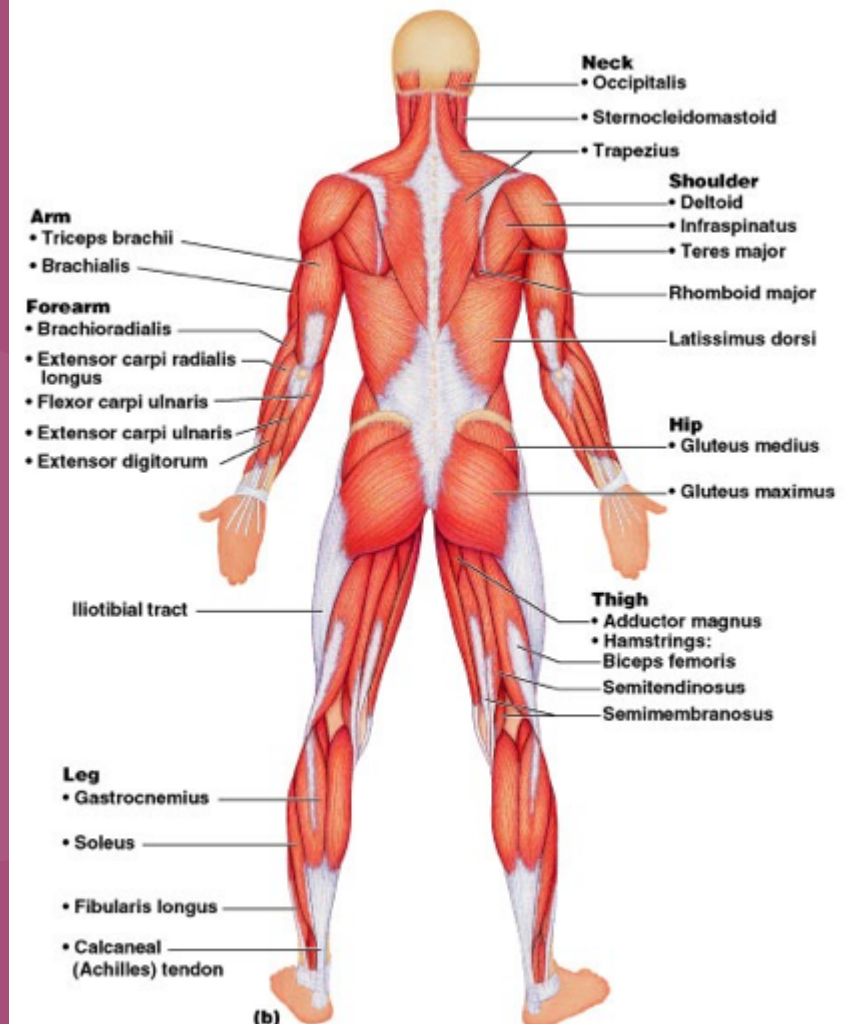
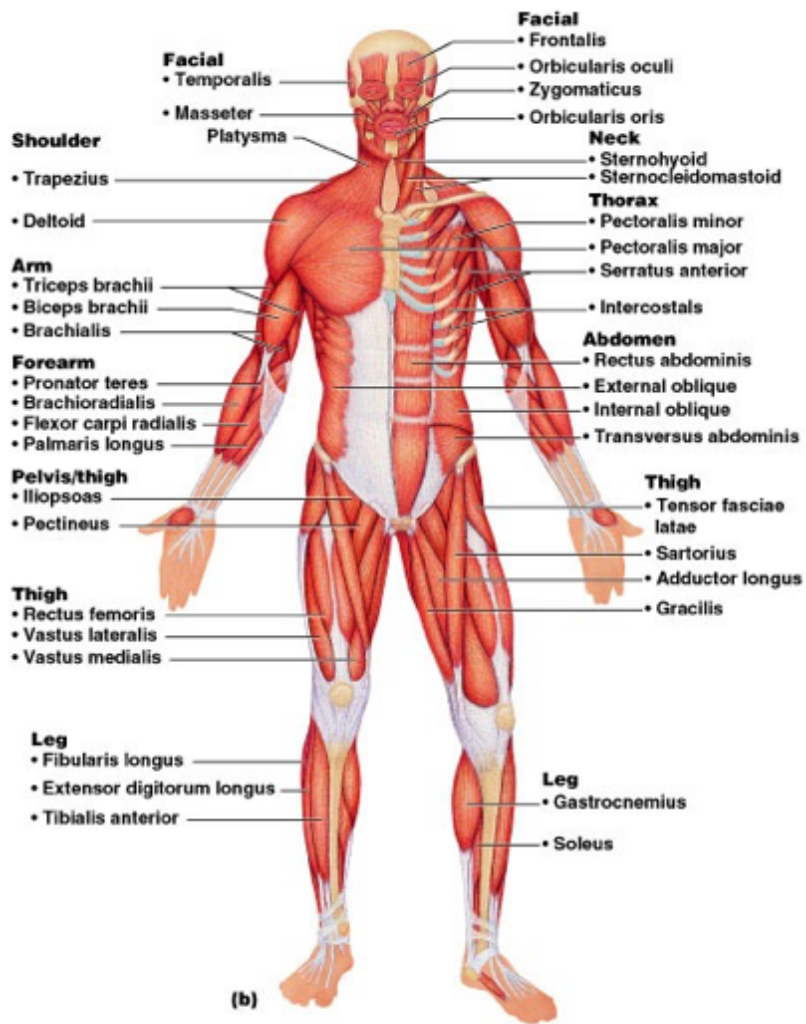
- length of fascicle runs parallel to the long axis of the muscle
- straplike
- spindle shaped - some classify this into a class as fusiform muscles

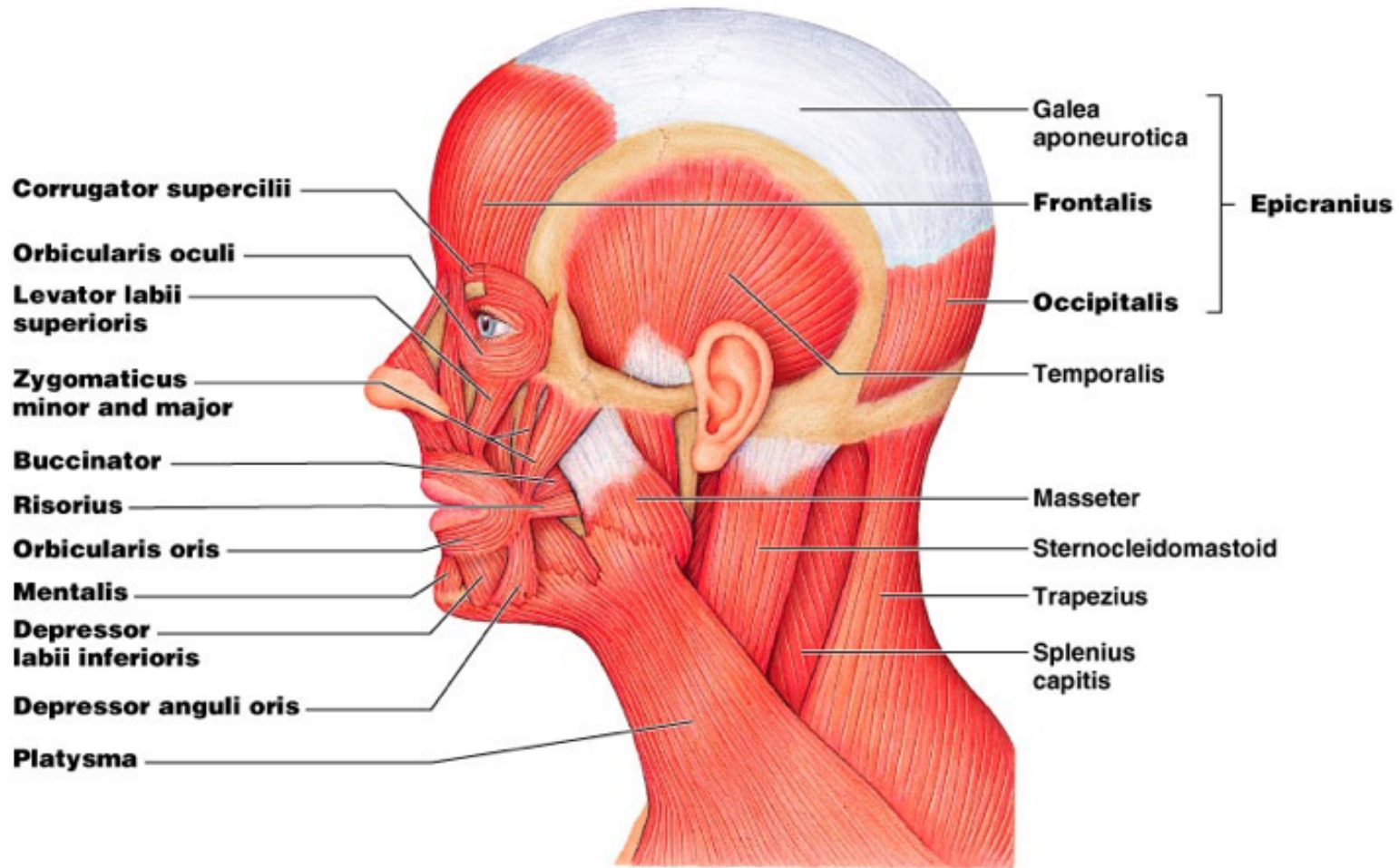


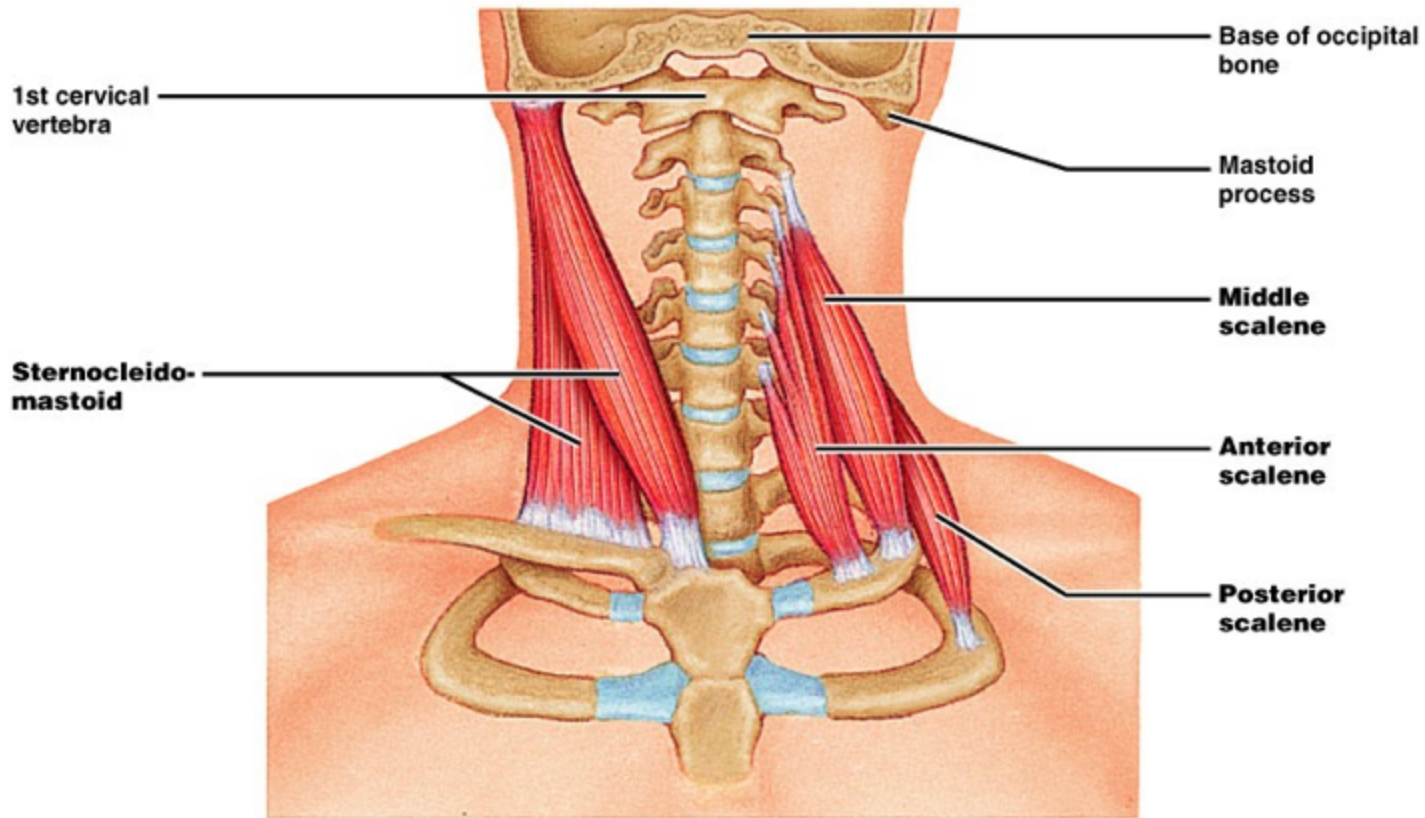
Pennate



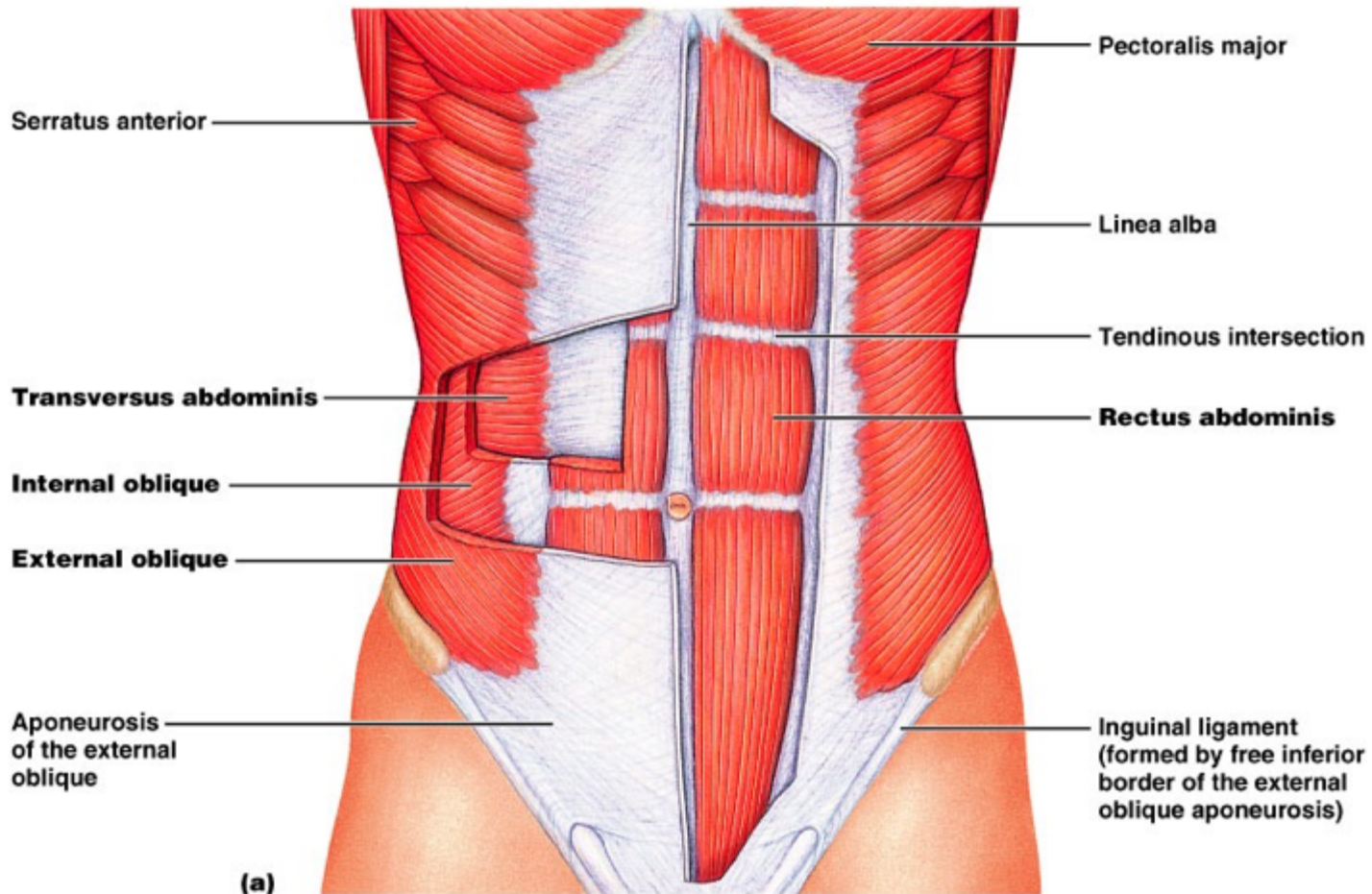
- fascicles are short and they attach obliquely to a central tendon that runs the length of the muscle
 - Unipennate: fascicles insert into only one side of the tendon
 - Bipennate: fascicles insert into the tendon from opposite sides so the muscle's grain resembles a feather

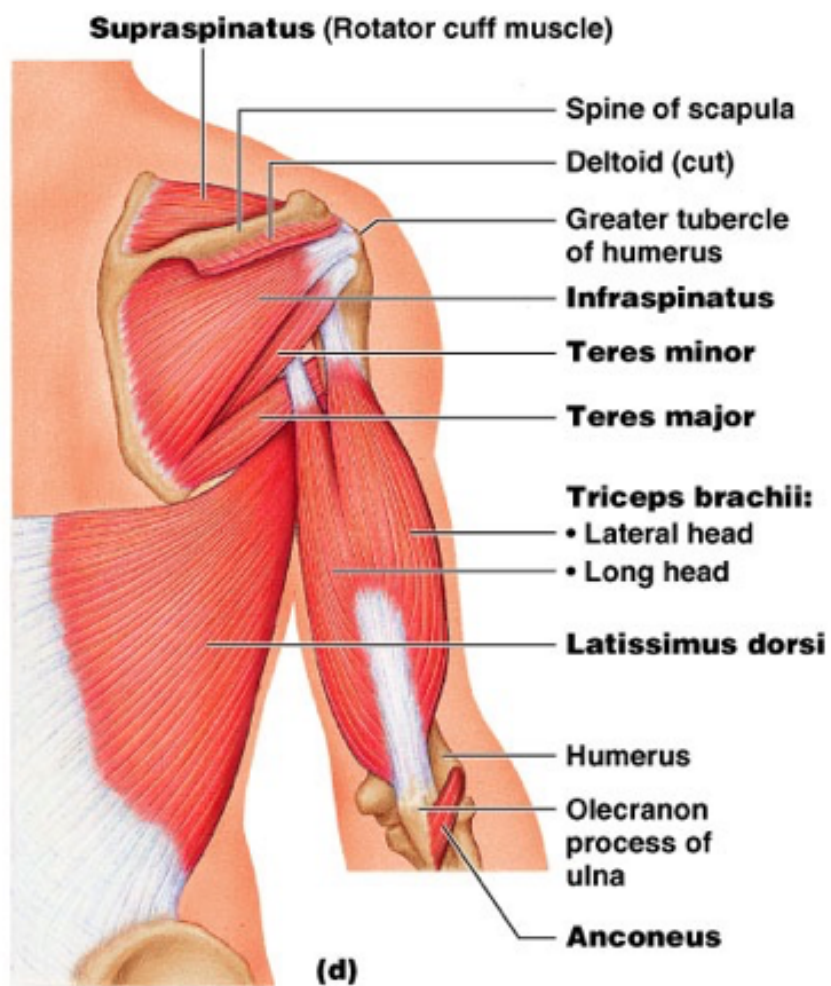
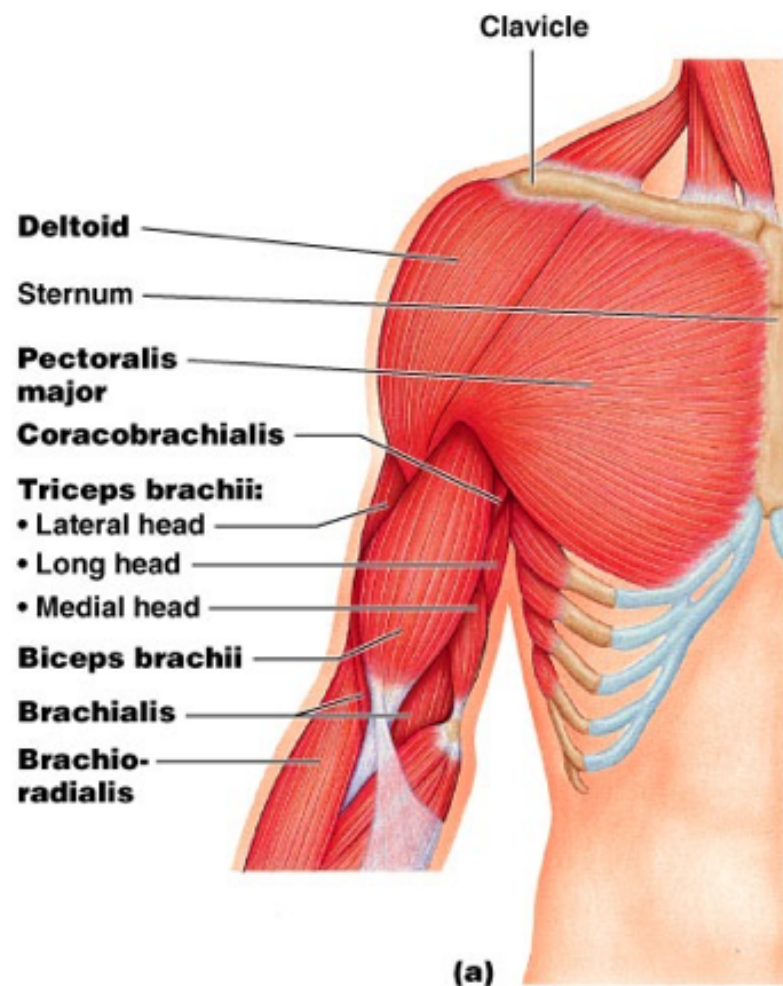






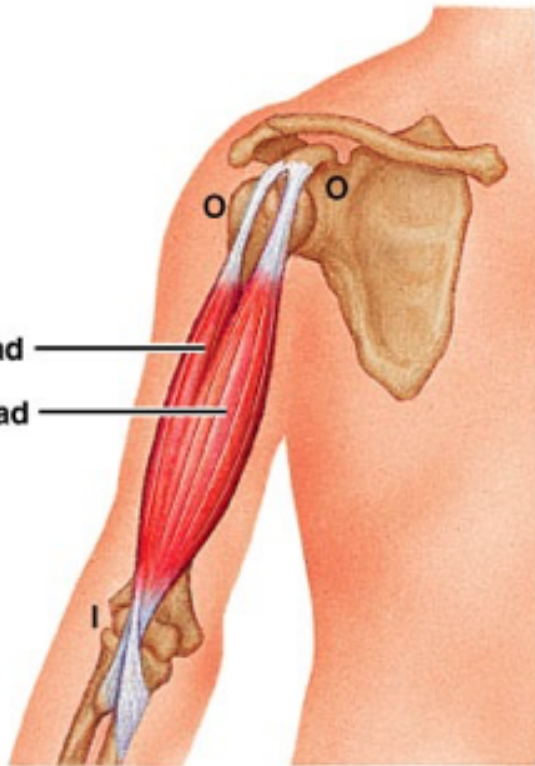
(a) Anterior





**Biceps
brachii**

Long head
Short head



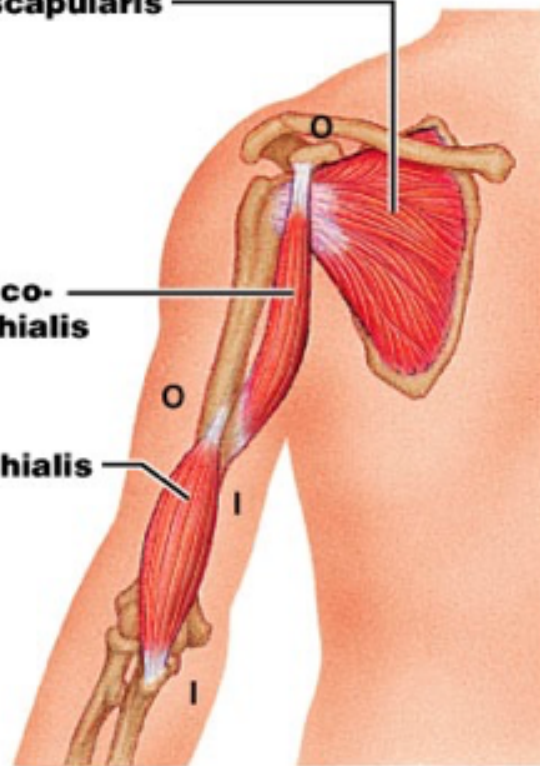
O = origin
I = insertion

(b)

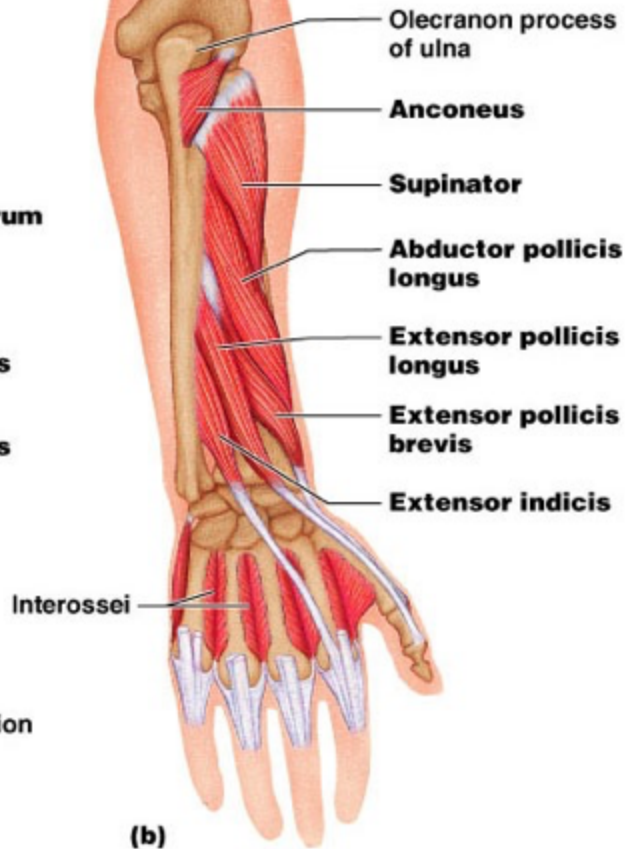
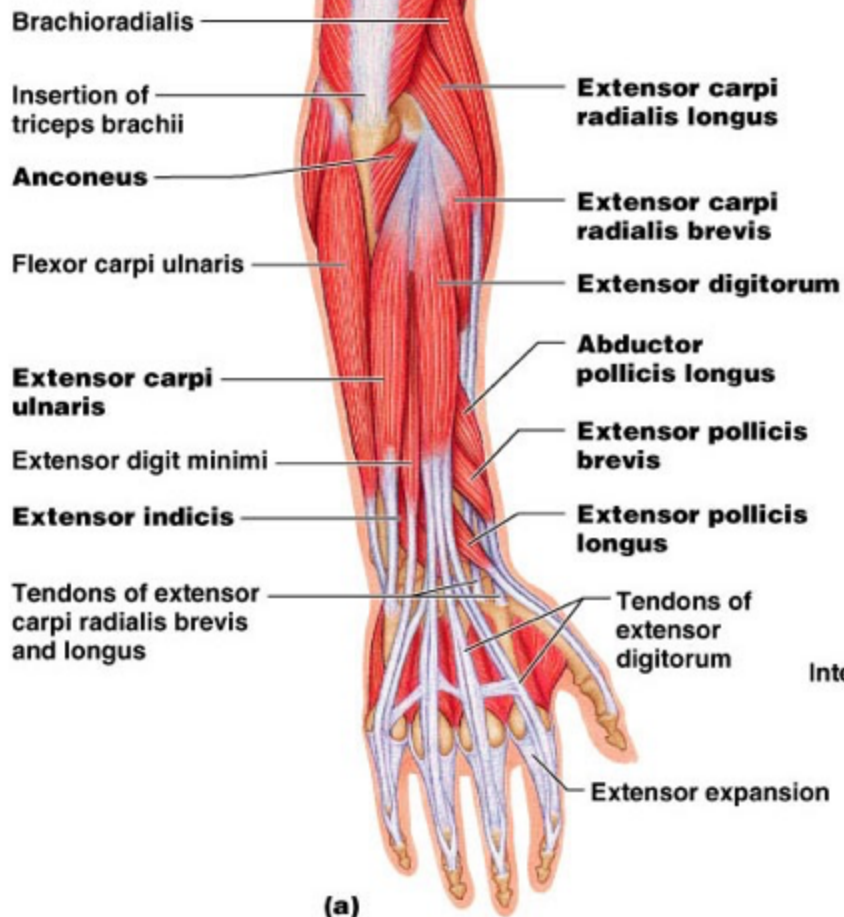
Subscapularis

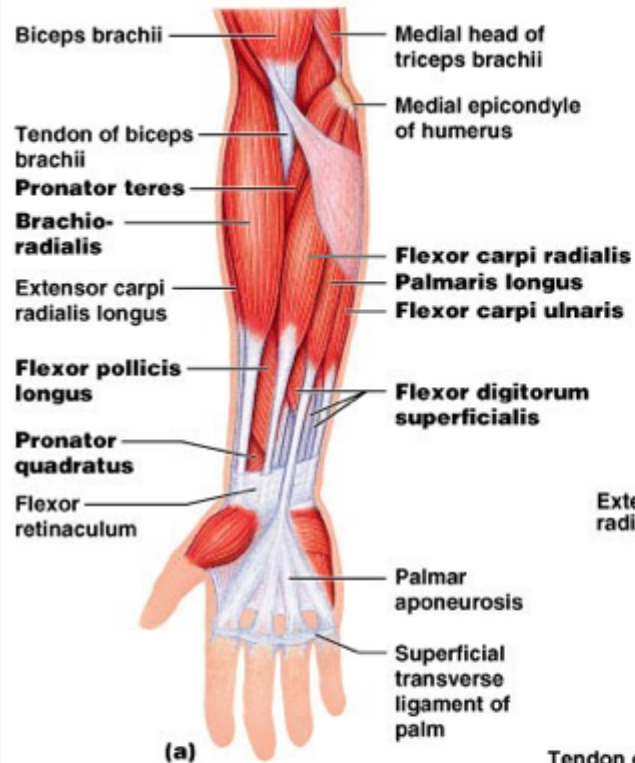
**Coraco-
brachialis**

Brachialis

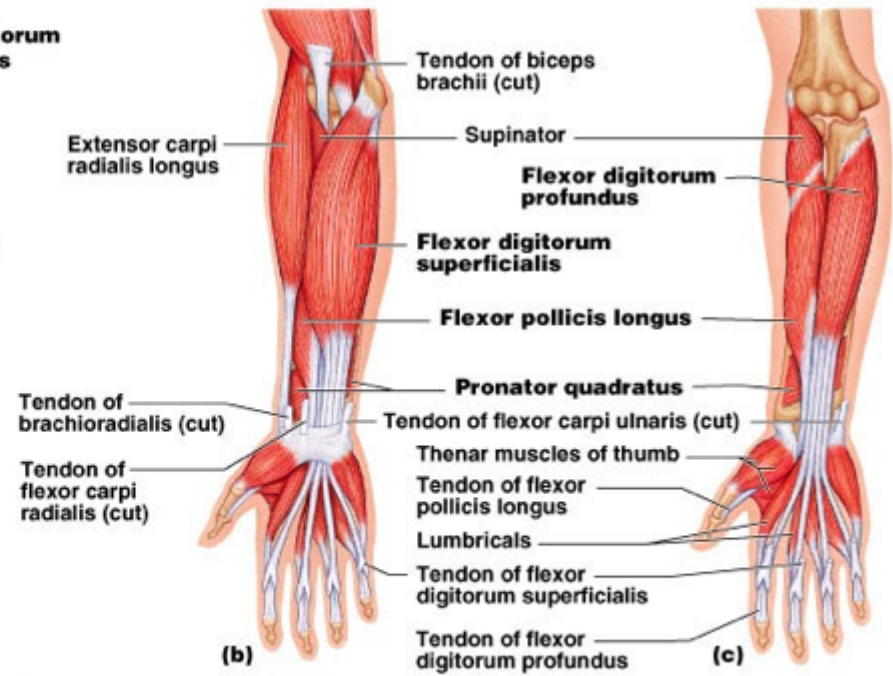


(c)



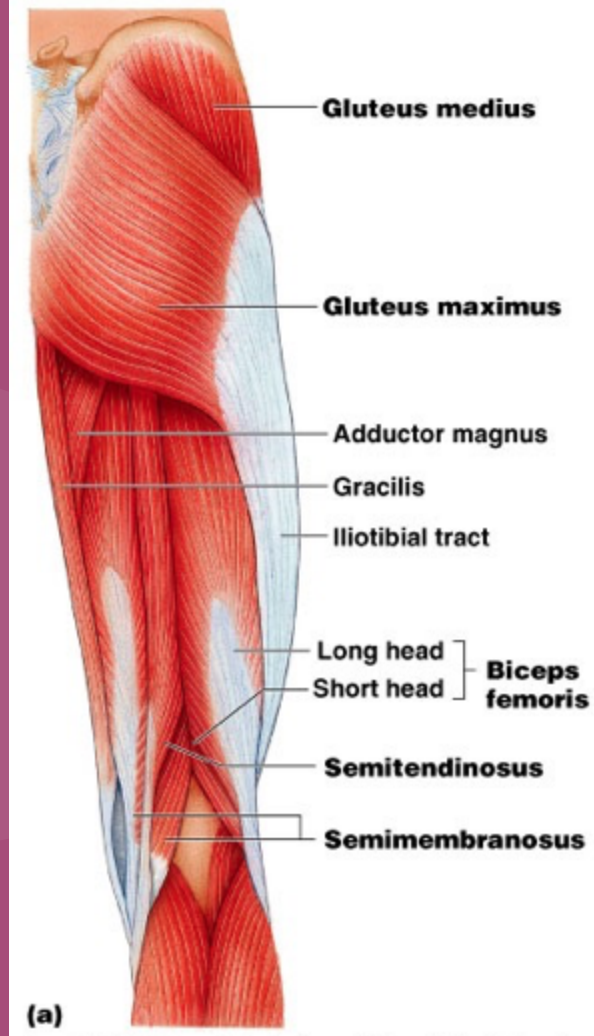
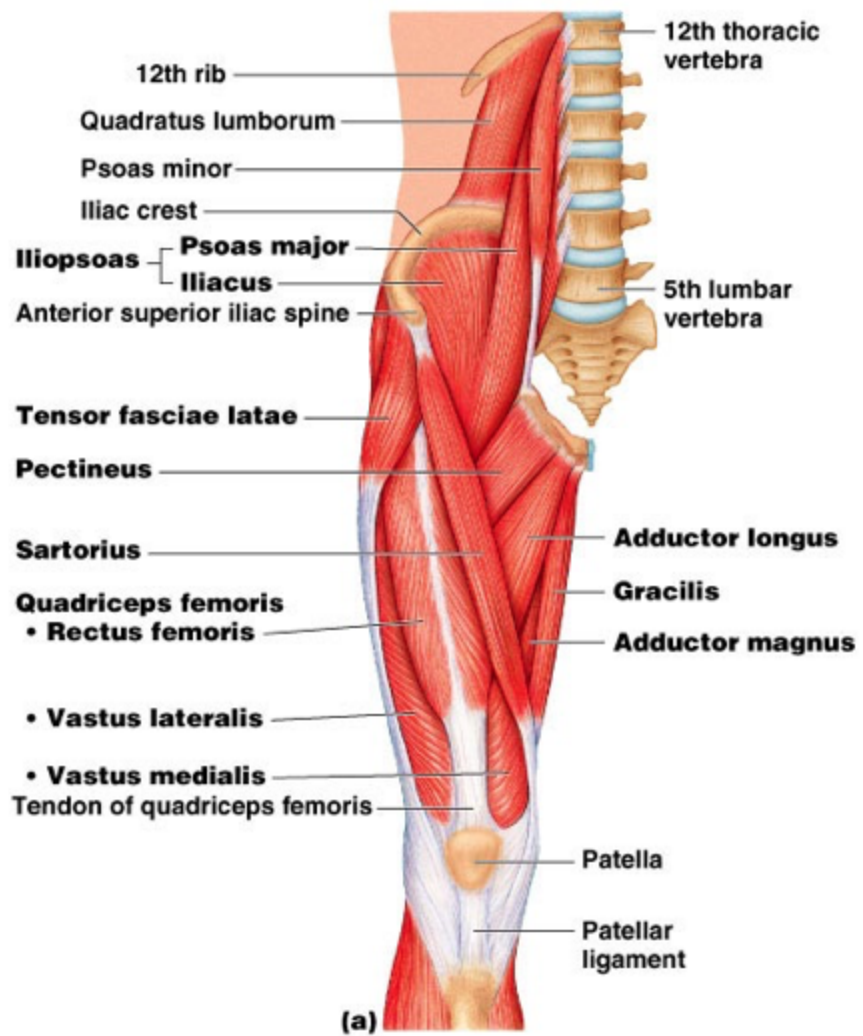


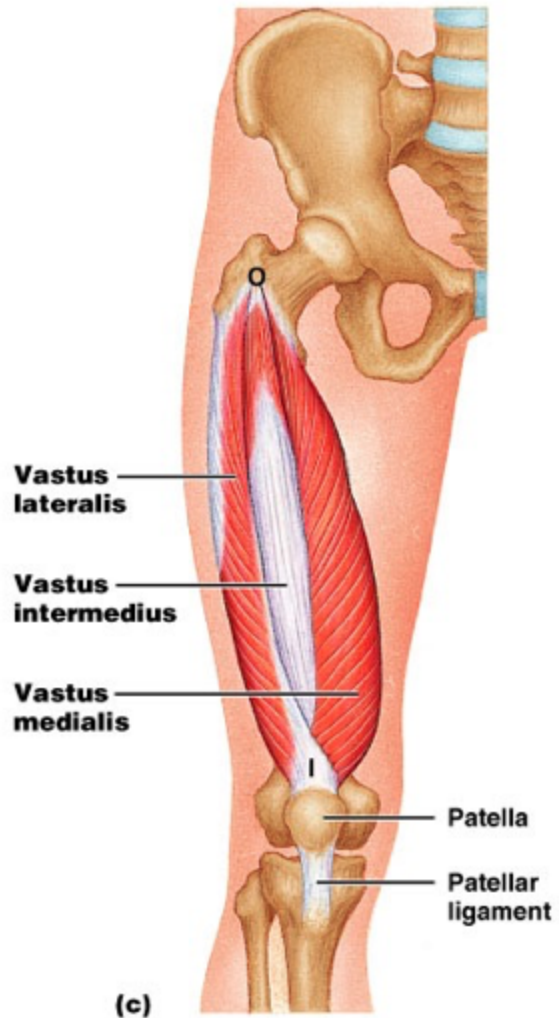
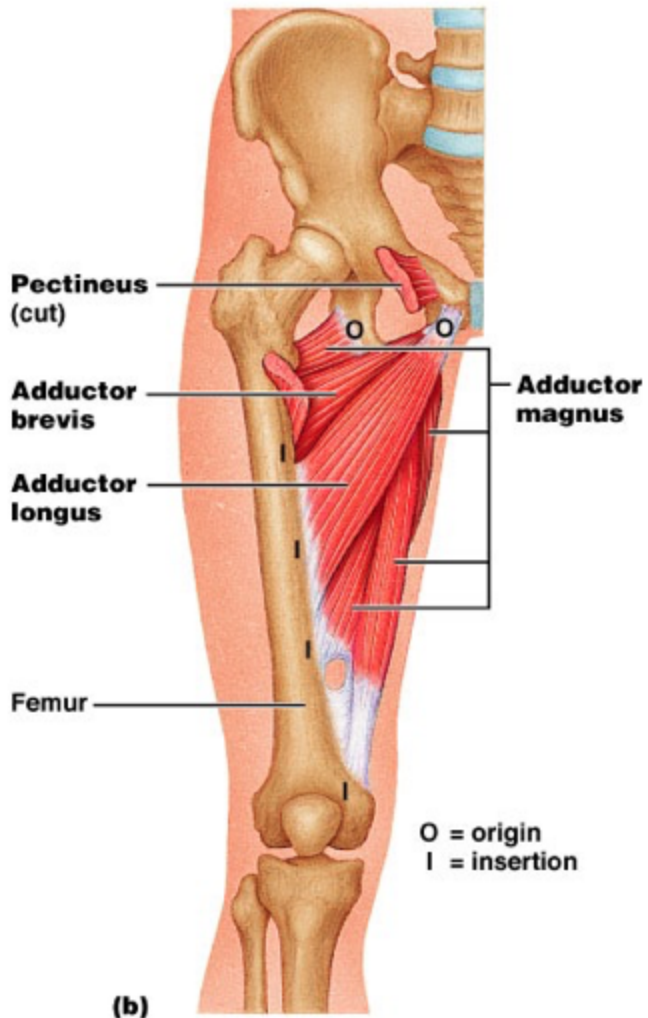
(a)

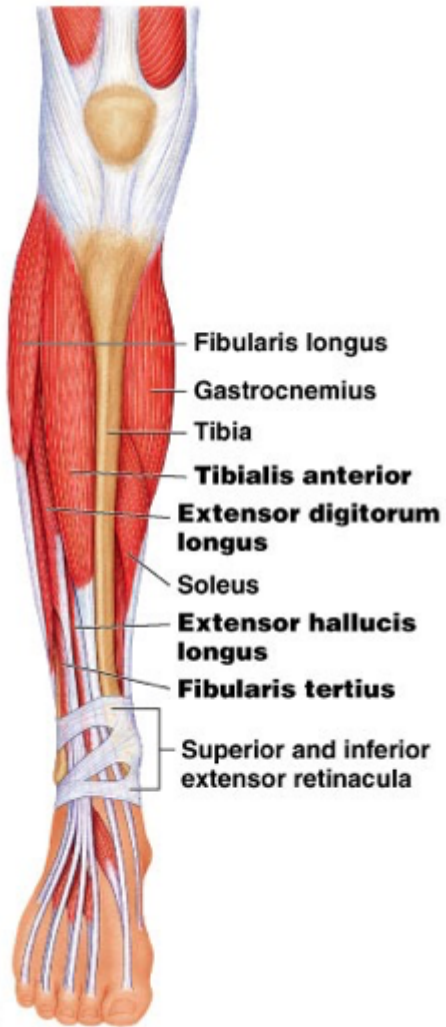


(b)

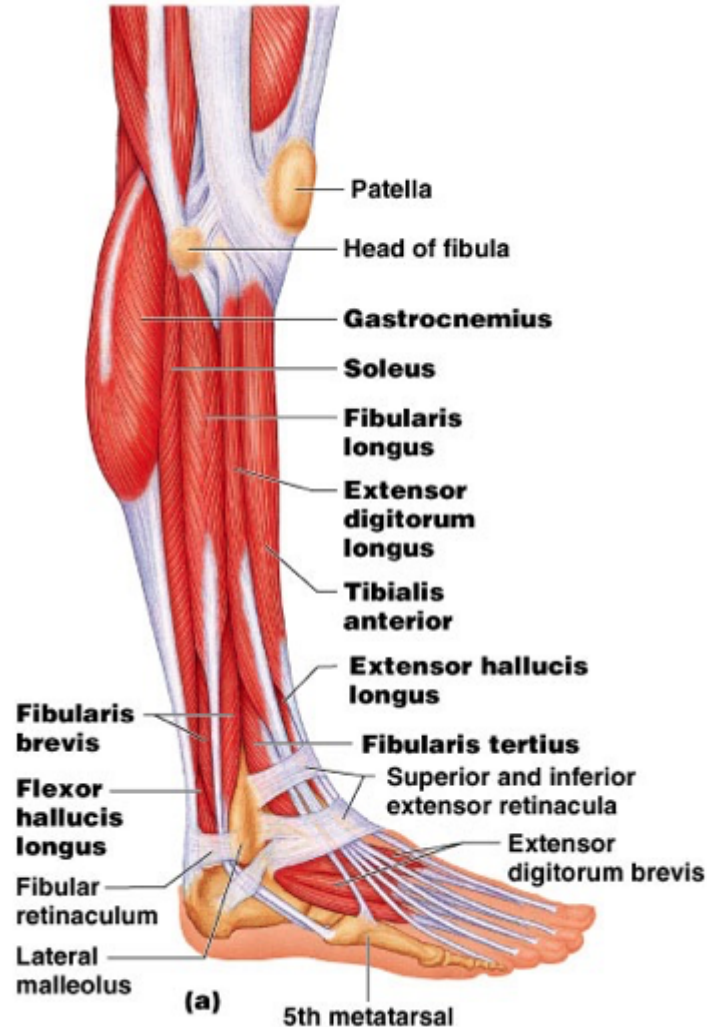
(c)







(a)



(a)