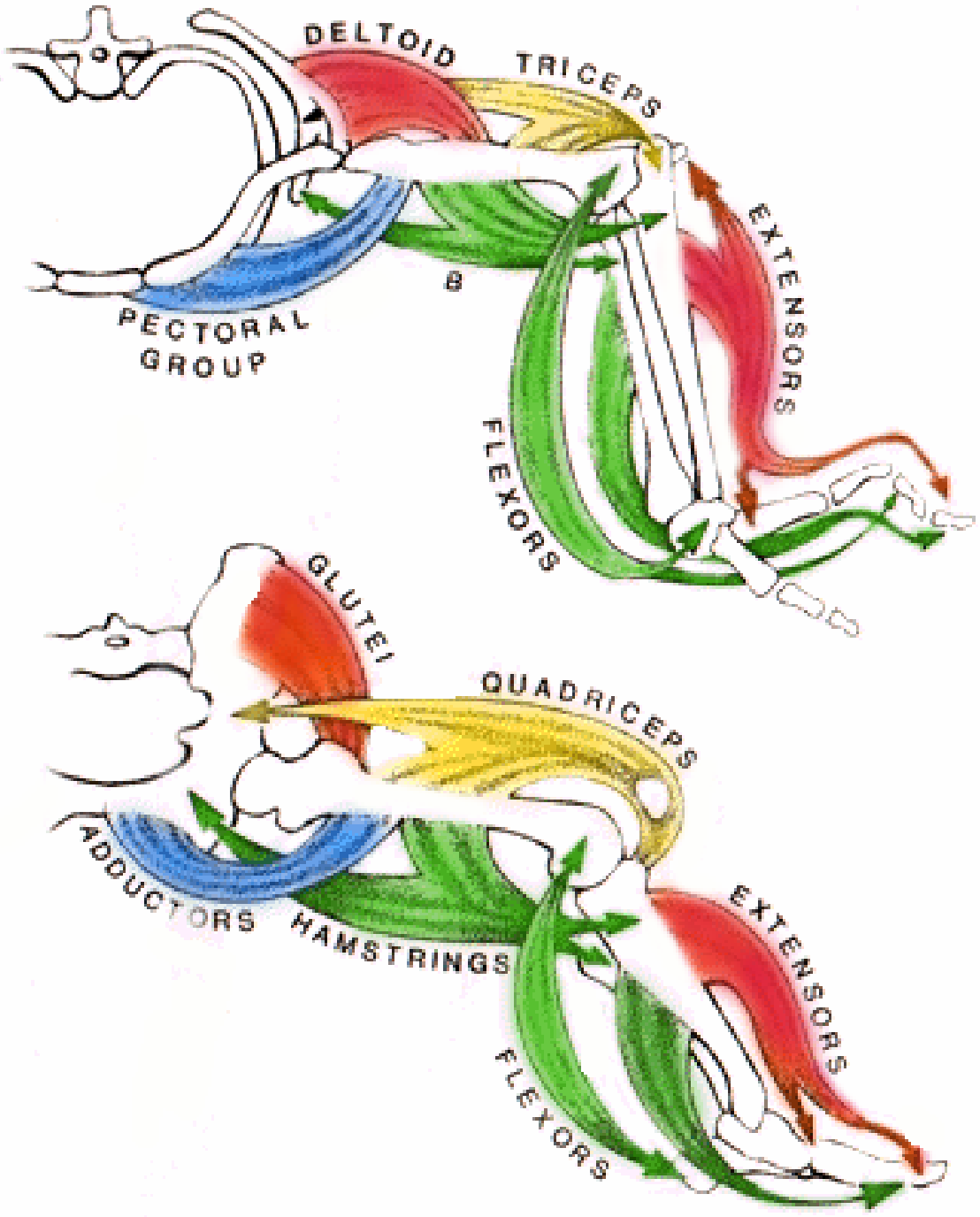
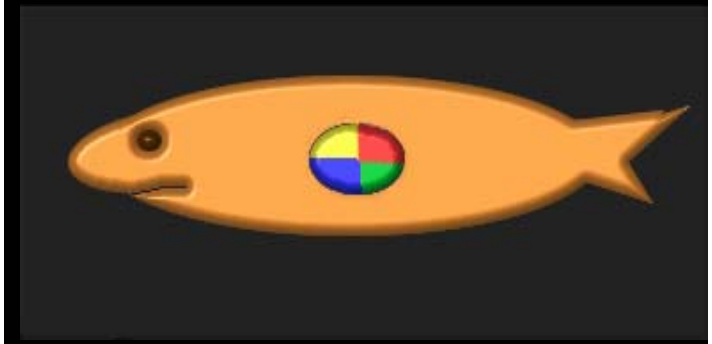
Biology 223
Human Anatomy and Physiology !
Week 6; Lecture 2; Wednesday
Dr. Stuart S. Sumida

Musculature and Innervation of Pectoral Limb

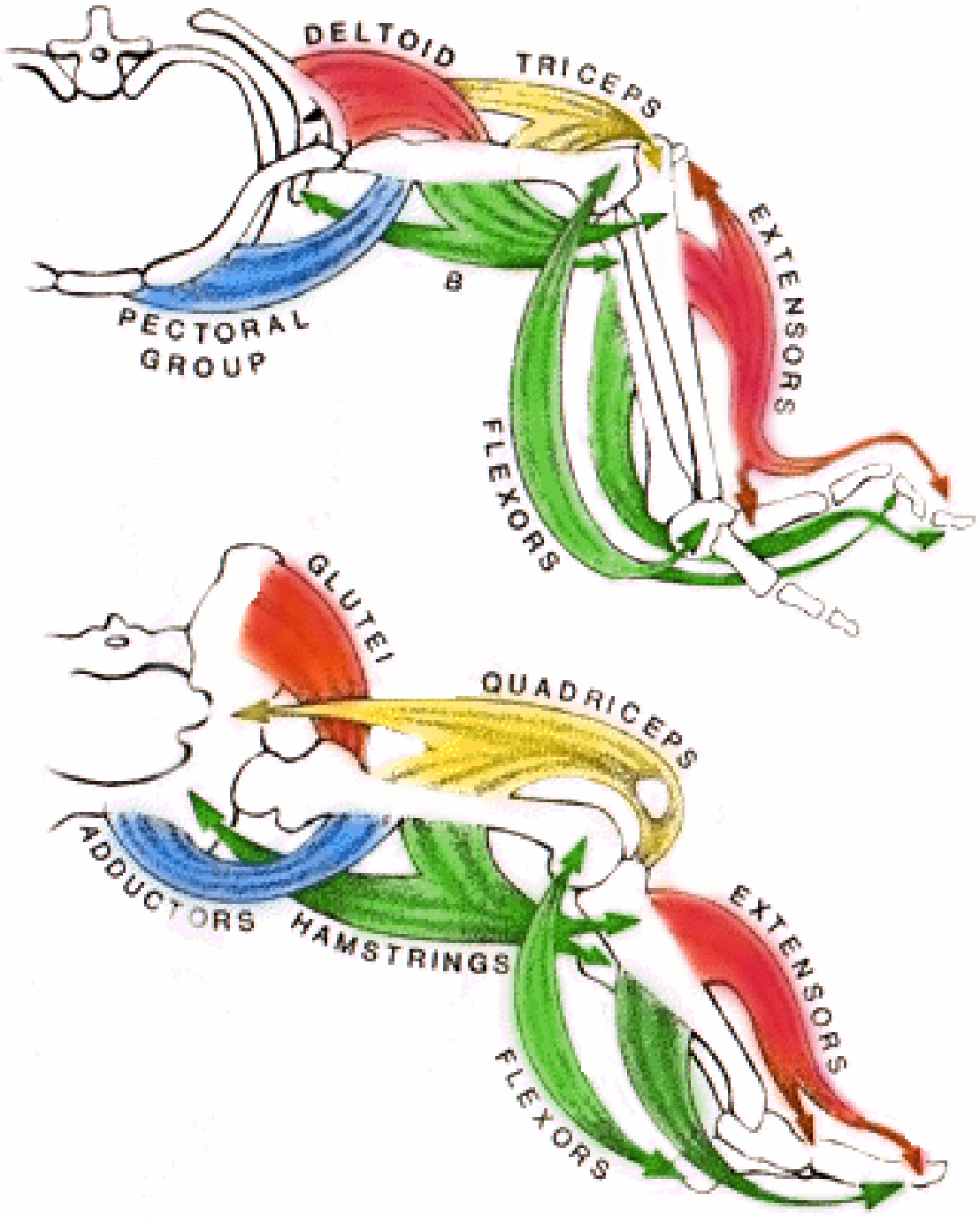


Cranial/dorsal

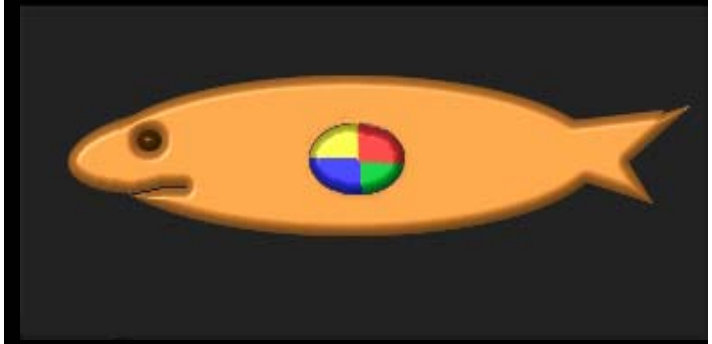


Triceps =

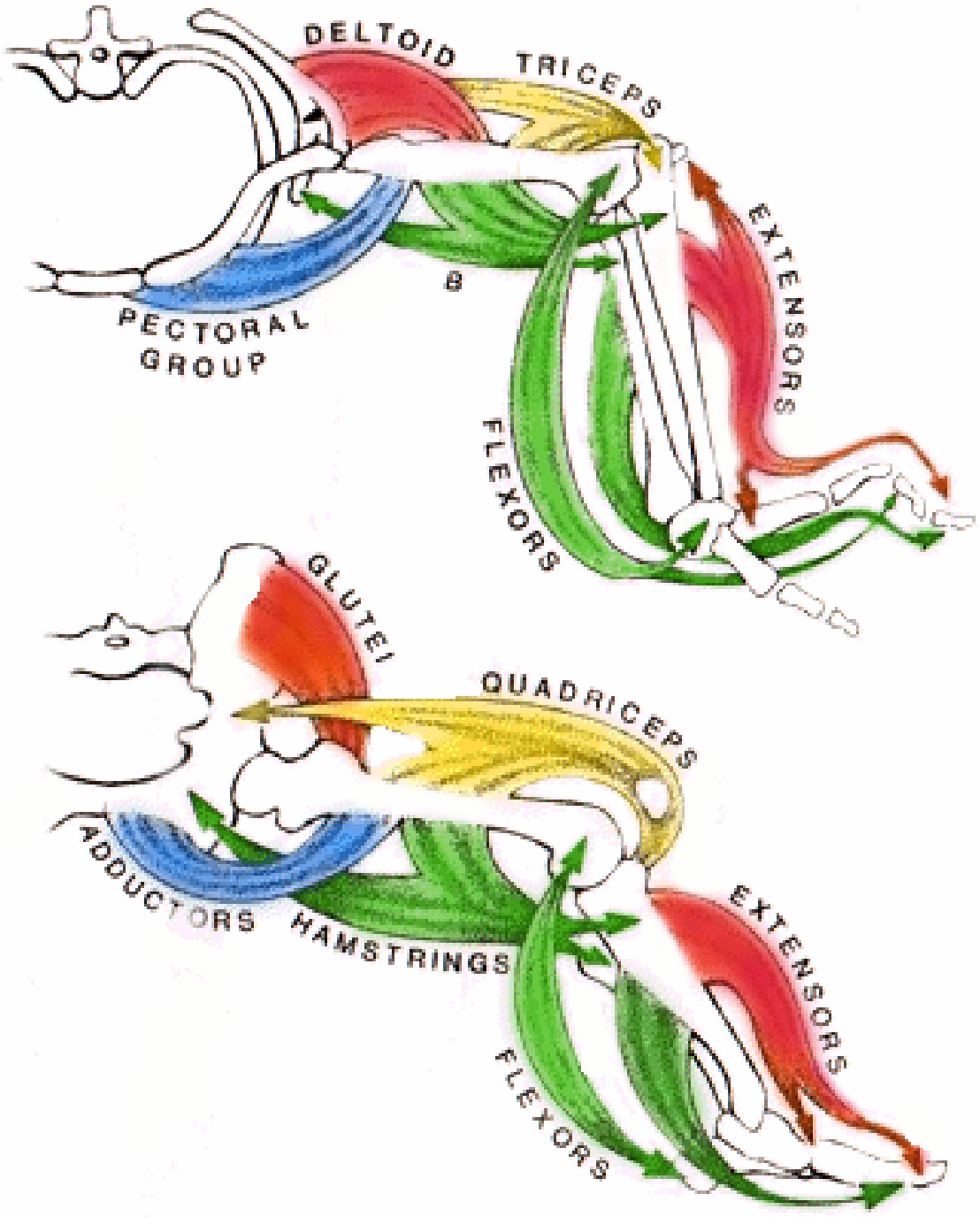
Quadriceps



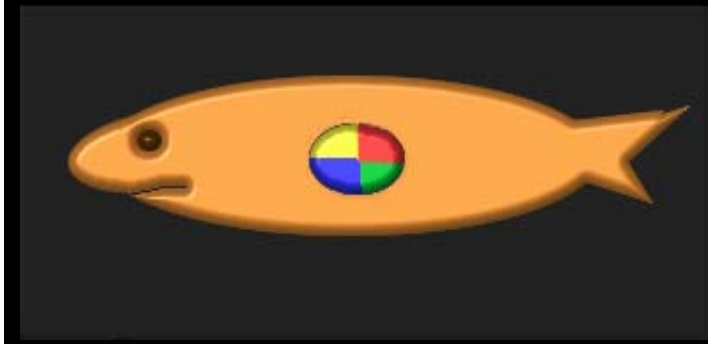
Cranial/ventral



Pectoral Group = Adductors

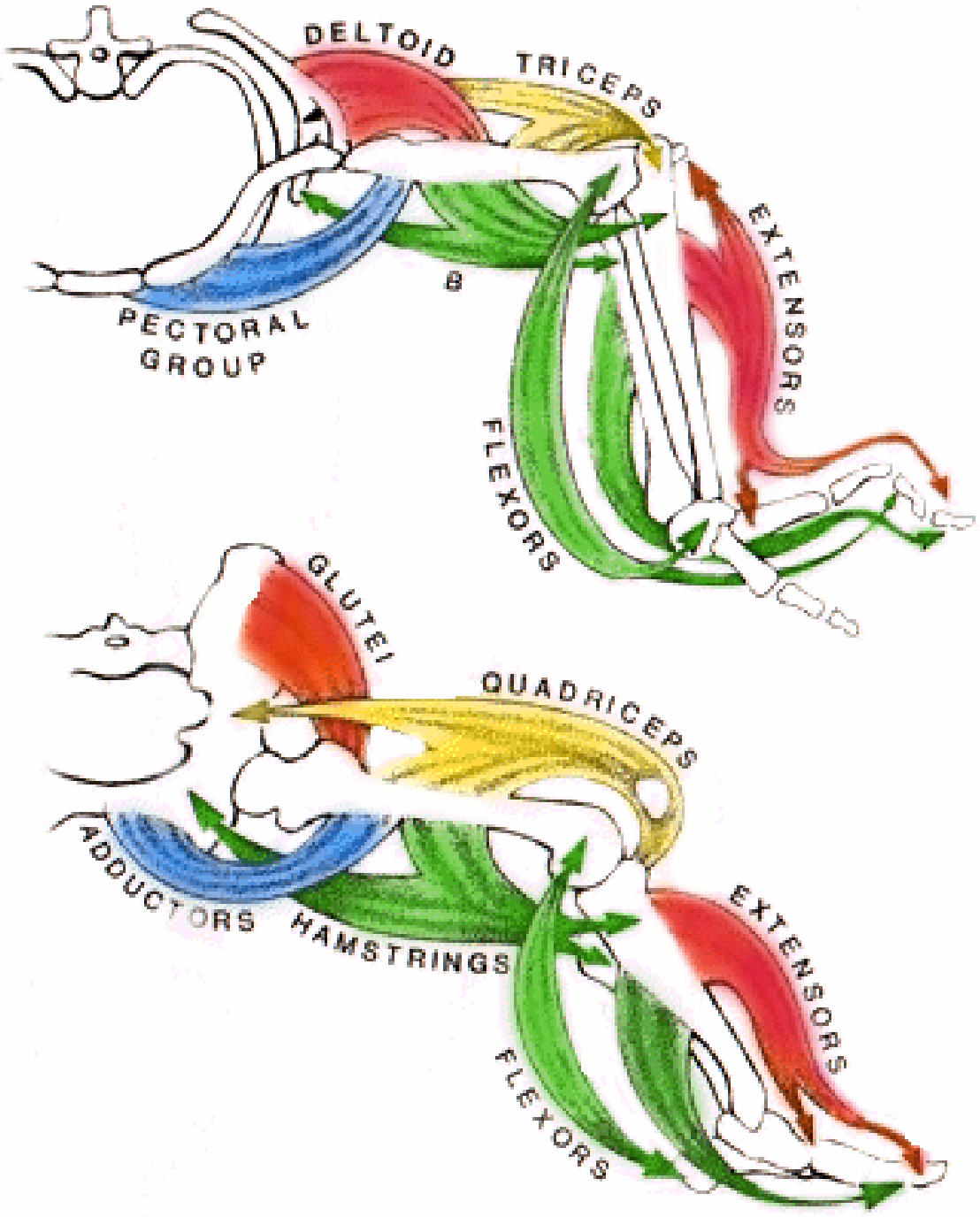


Caudal/dorsal

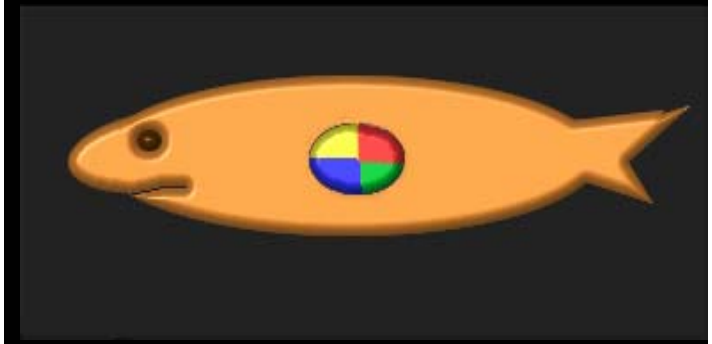


Glutei = Deltoid

Extensors = Extensors



Caudal/ventral



Hamstrings = brachii

Flexors = Flexors

Upper Limb Complications

1.

Upper limb is not as firmly attached, so has extra muscles to hold it in place

2.

There are several large, fan shaped muscles that do not exist in the lower limb

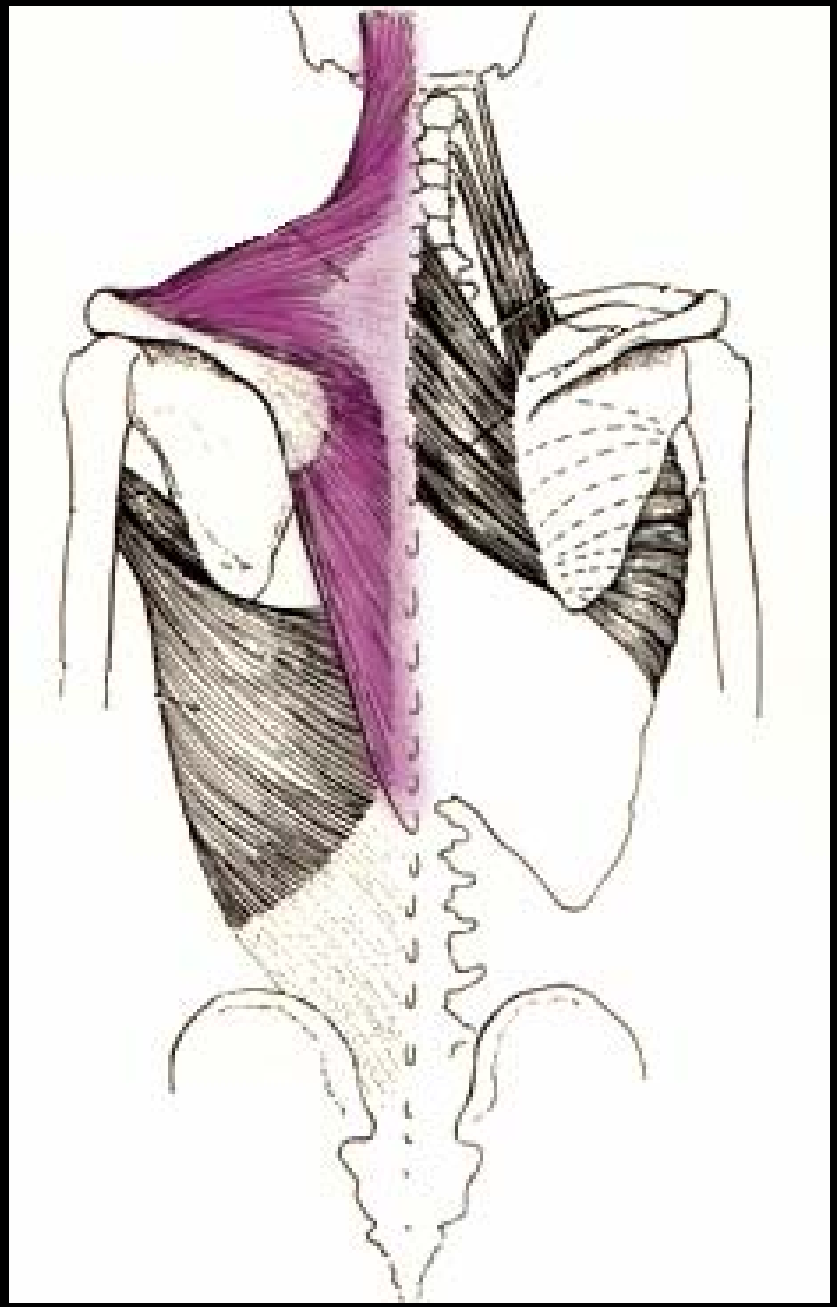
3

There is more migration of tissues during early development, making the 4 quadrants more complex

4.

There is a large muscle that was not originally appendicular, so it has an unusual innervation and placement

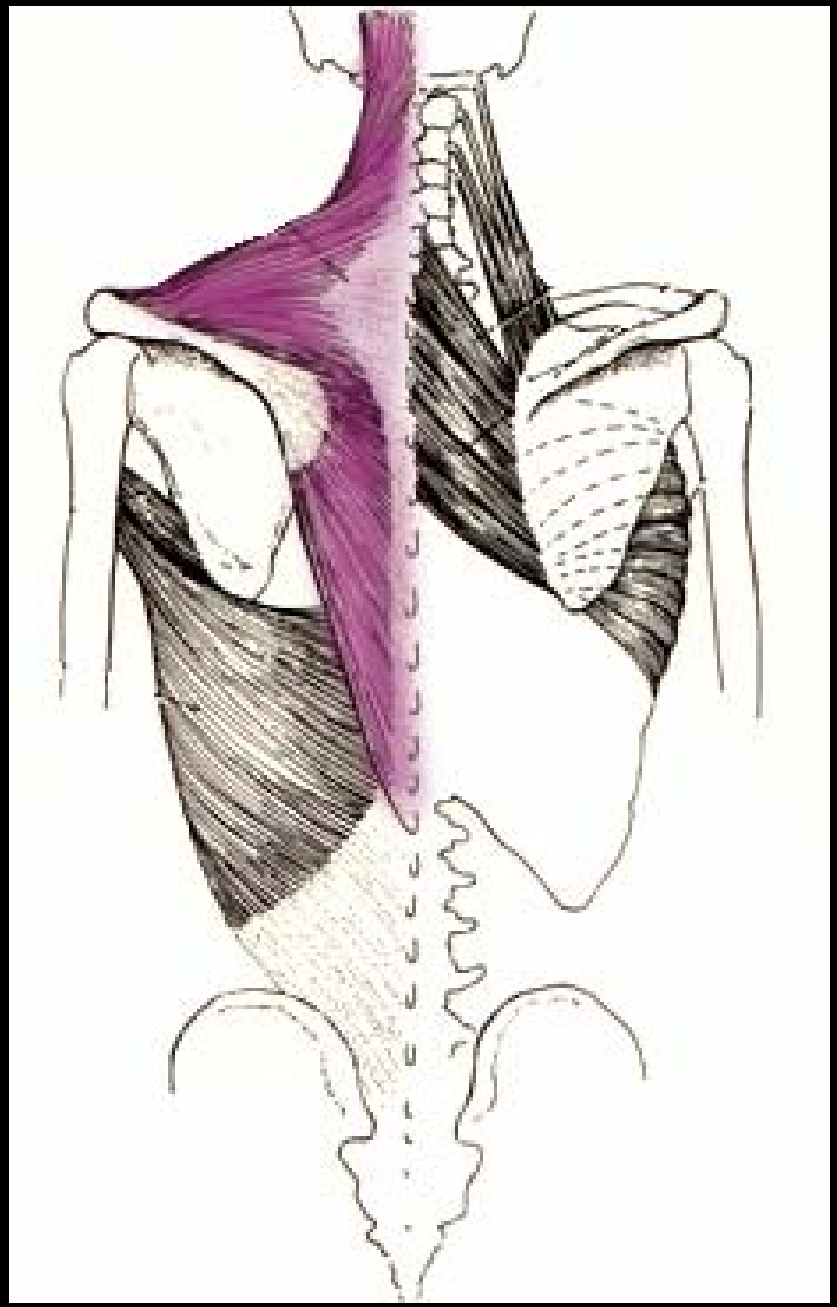
Branchial (Gill Slit) Muscles Attaching Scapula to Body Wall



Trapezius

In more primitive species used for opening and closing gills - a **BRANCHIAL** muscle.

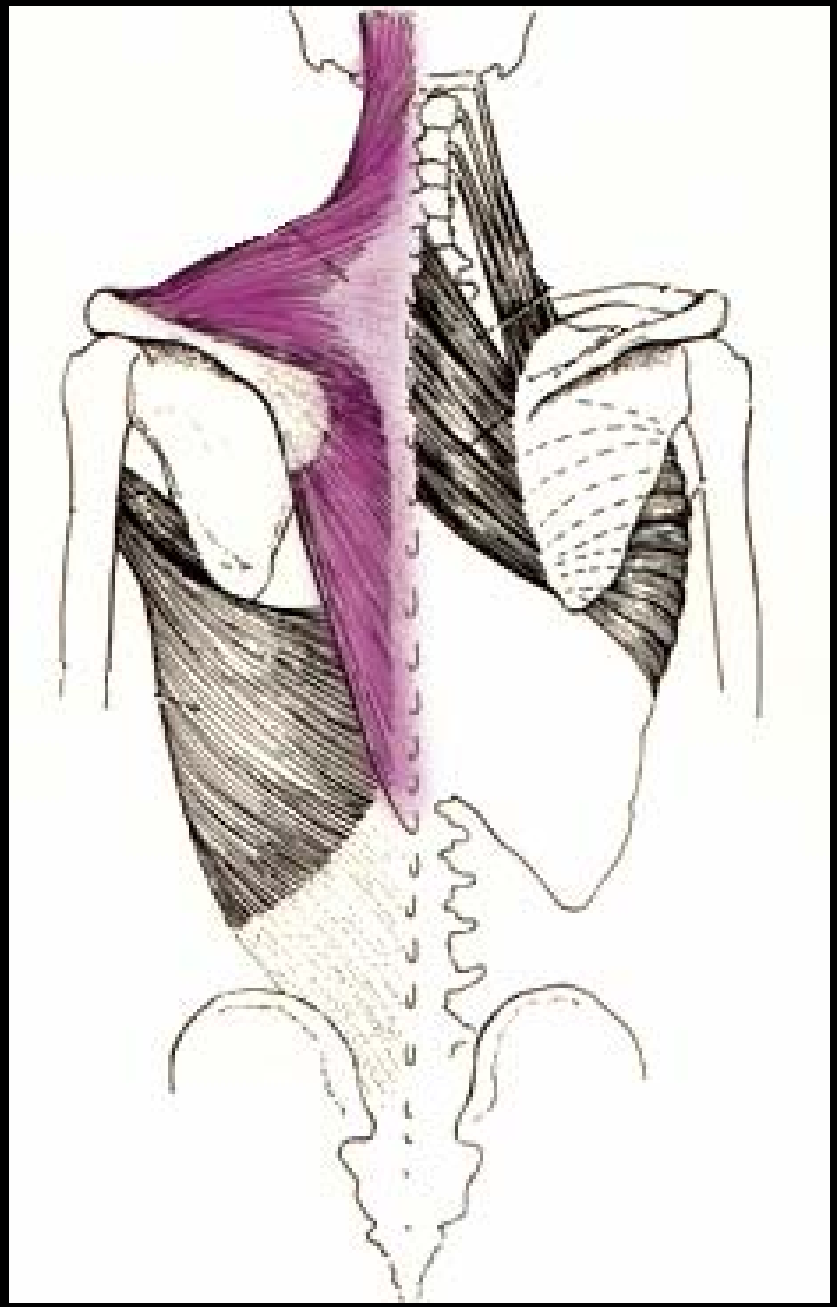
In humans, used to move scapula and keep head up



Trapezius

Origin:
Occipital bone,
Spines of C7 and T1-12

Insertion:
Acromion
Spine of scapula
Lateral 1/3 of clavicle

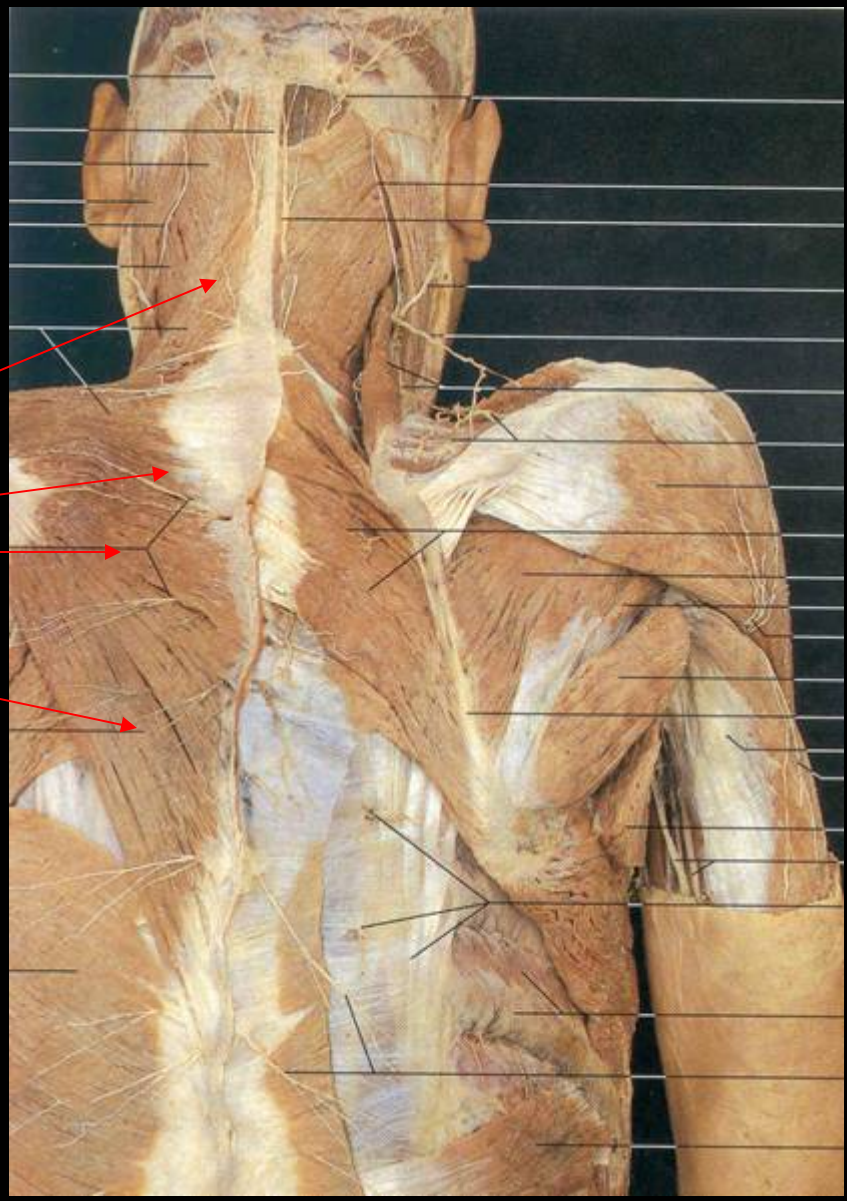


Trapezius

Innervation:
Accessory Nerve (Cranial Nerve XI)

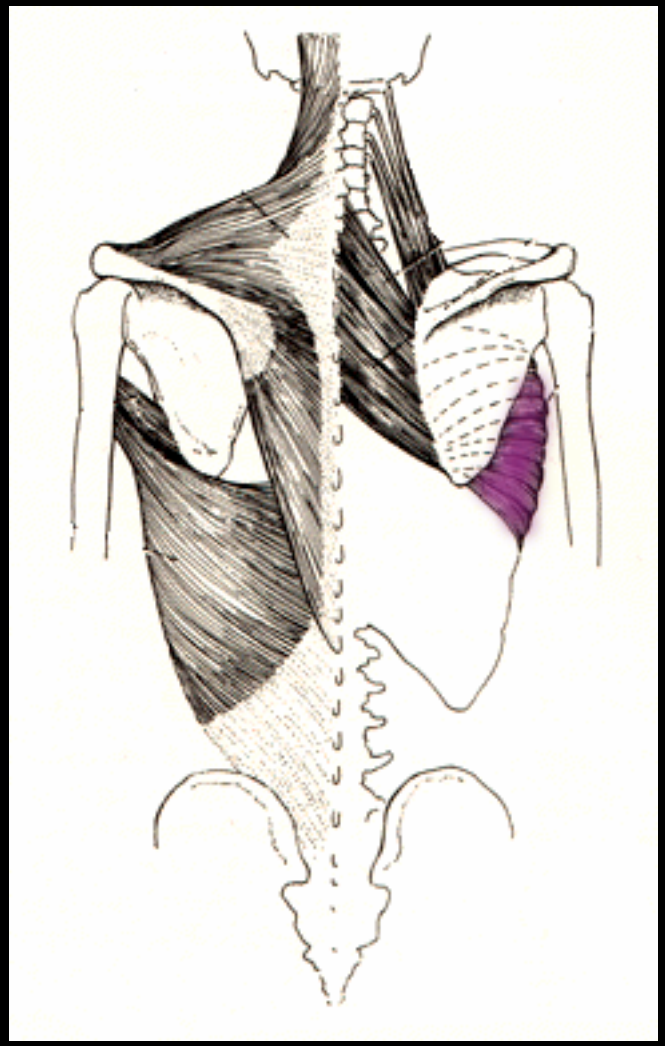
Action:
Extension of the head
Elevation and depression of scapula

Trapezius



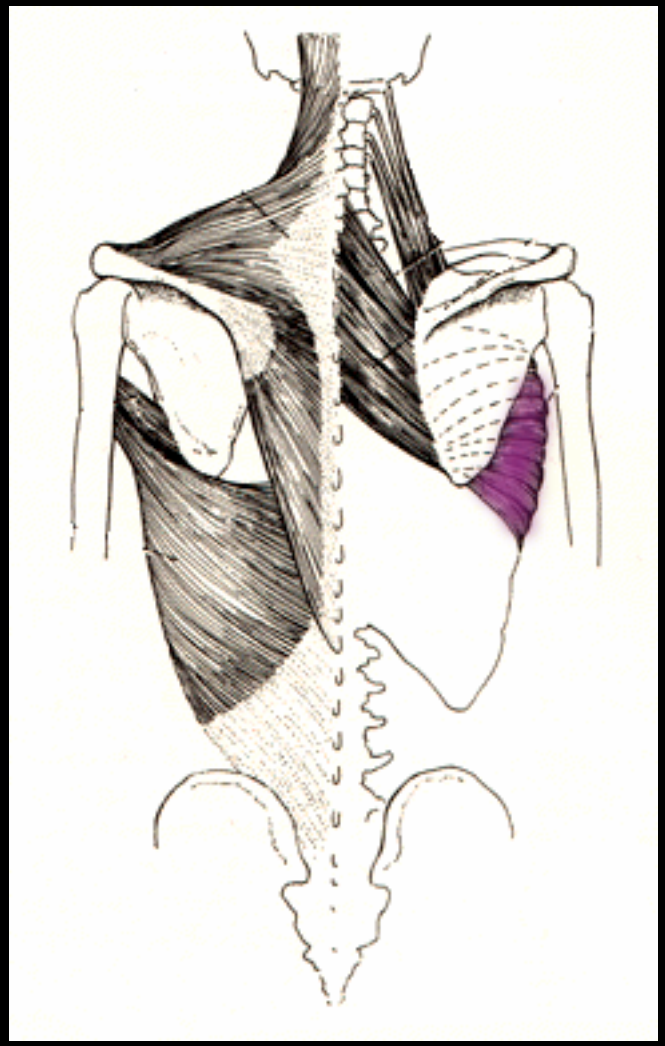
Axial Muscles Attaching Scapula to Body Wall

Serratus Anterior



Origin:
First 9 ribs

Insertion:
Medial edge of scapula's deep surface



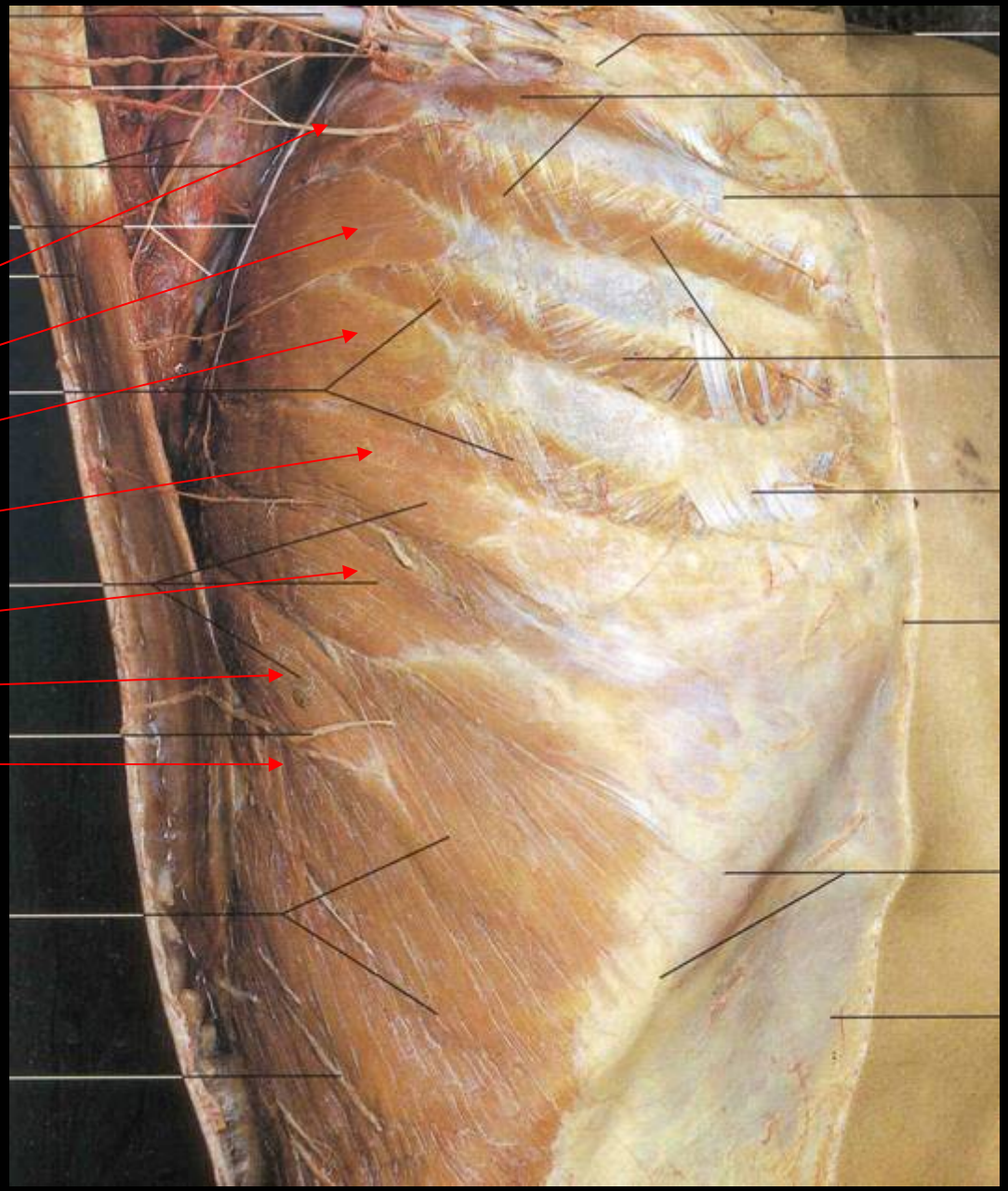
Serratus Anterior

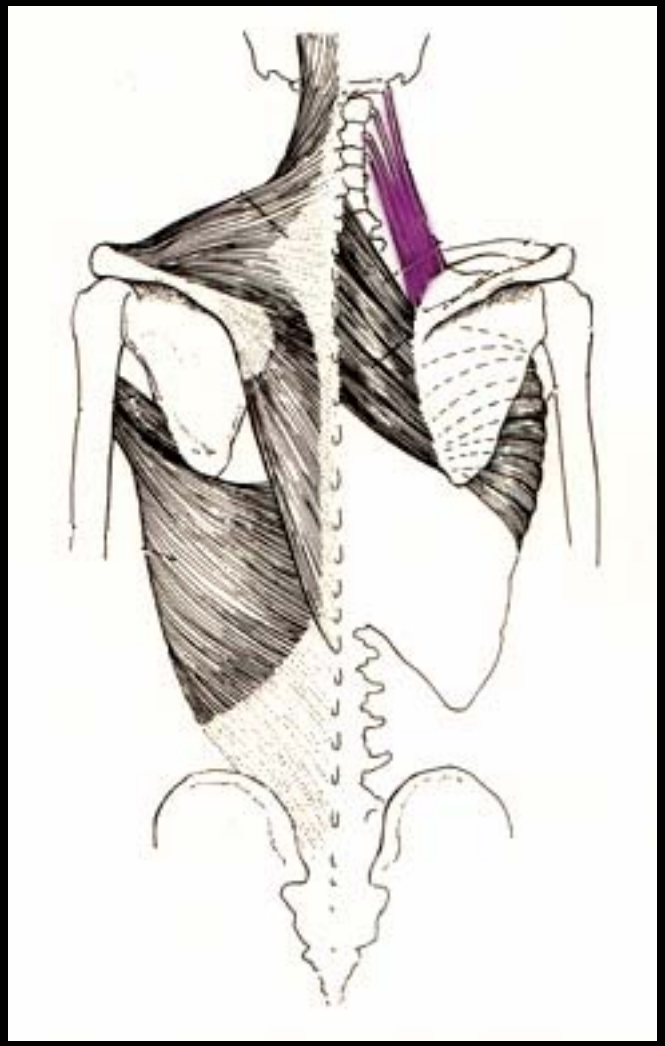
Innervation:
Long thoracic nerve

Action:
Rotates scapula

Primitively a BODY WALL MUSCLE

Serratus Anterior

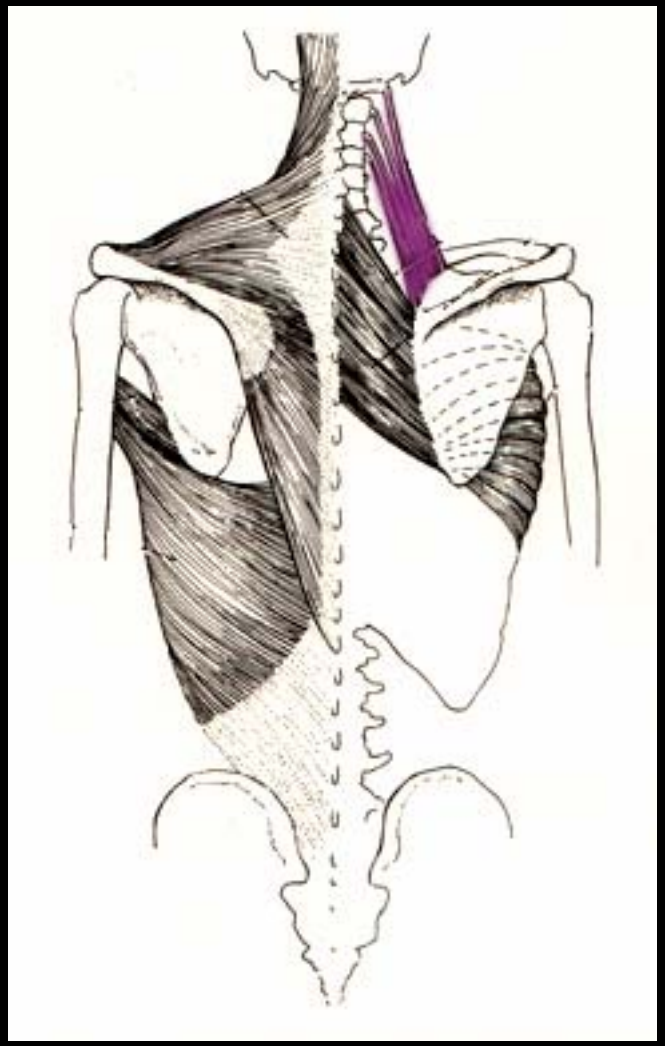




Levator Scapulae

Origin:
Transverse processes of C1-4

Insertion:
Medial edge of scapula

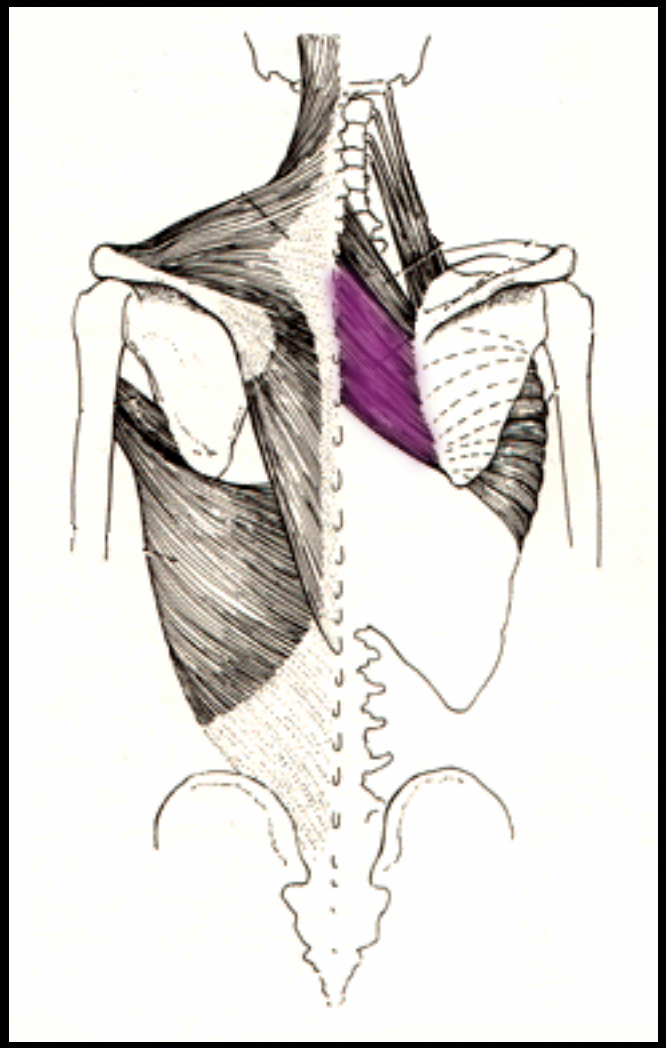


Levator Scapulae

Innervation:
Ventral Rami of C3 and C4

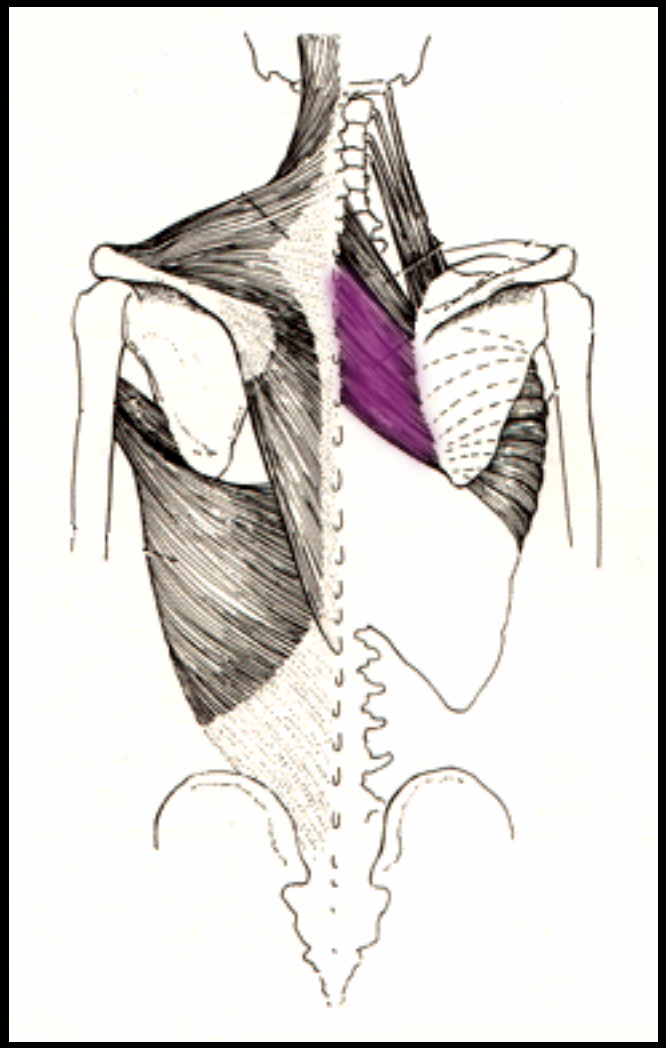
Action:
Retracts scapula
Depresses glenoid

Rhomdoidius Major



Origin:
Spines of T2-T5

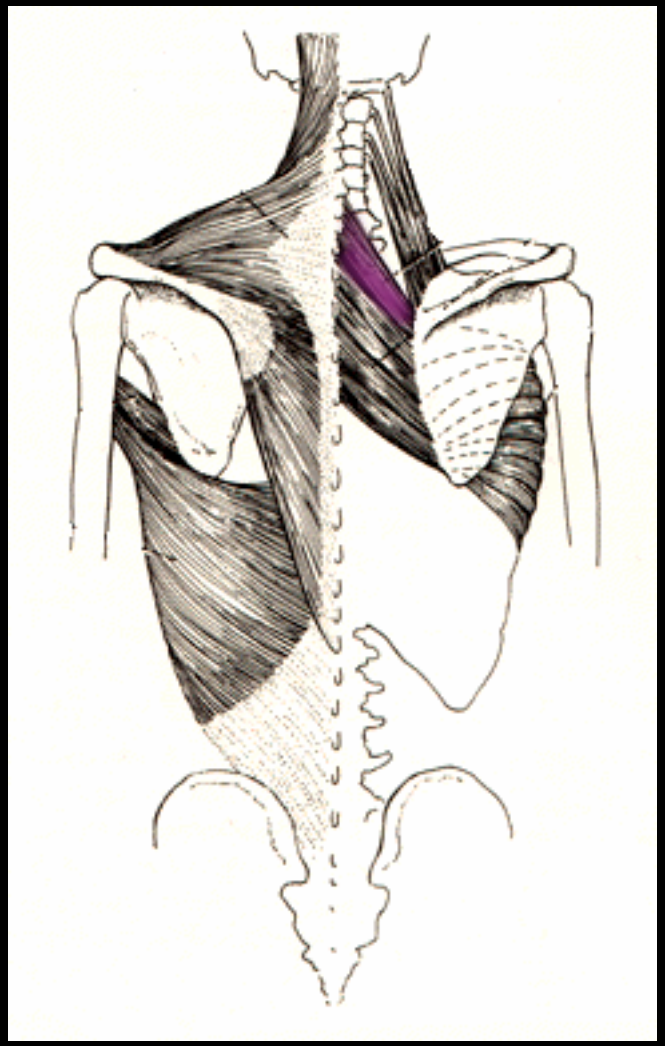
Insertion:
Medial edge of scapula



Rhomdoidius Major

Innervation:
Dorsal Scapula

Action:
Retracts scapula
Depresses glenoid

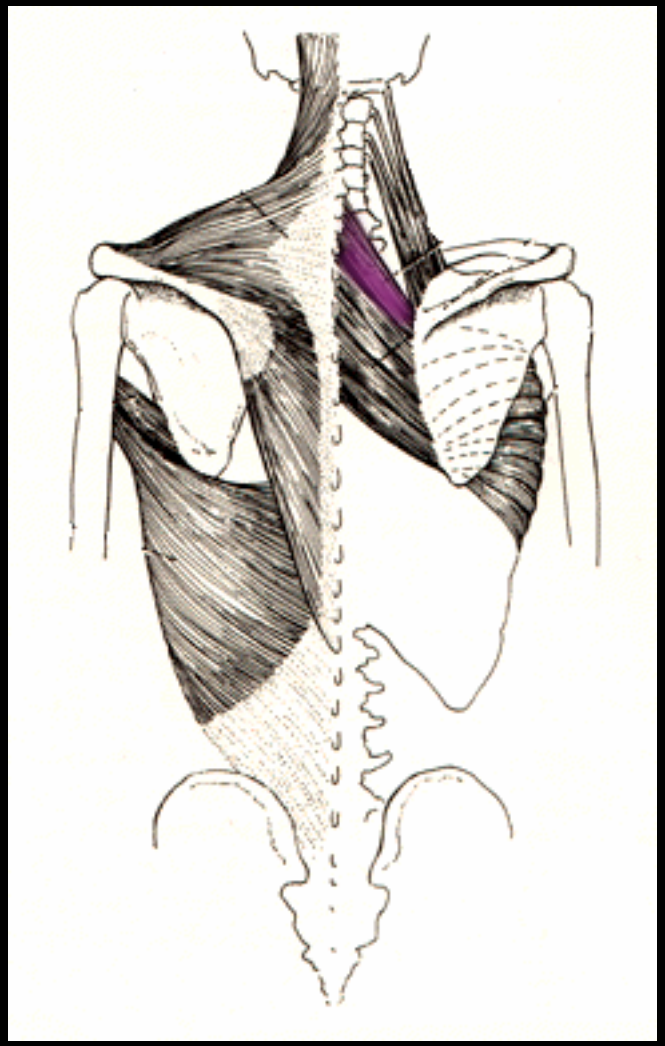


Rhomdoidius Minor

Origin:
Spines of C7 and T1

Insertion:
Medial edge of scapula

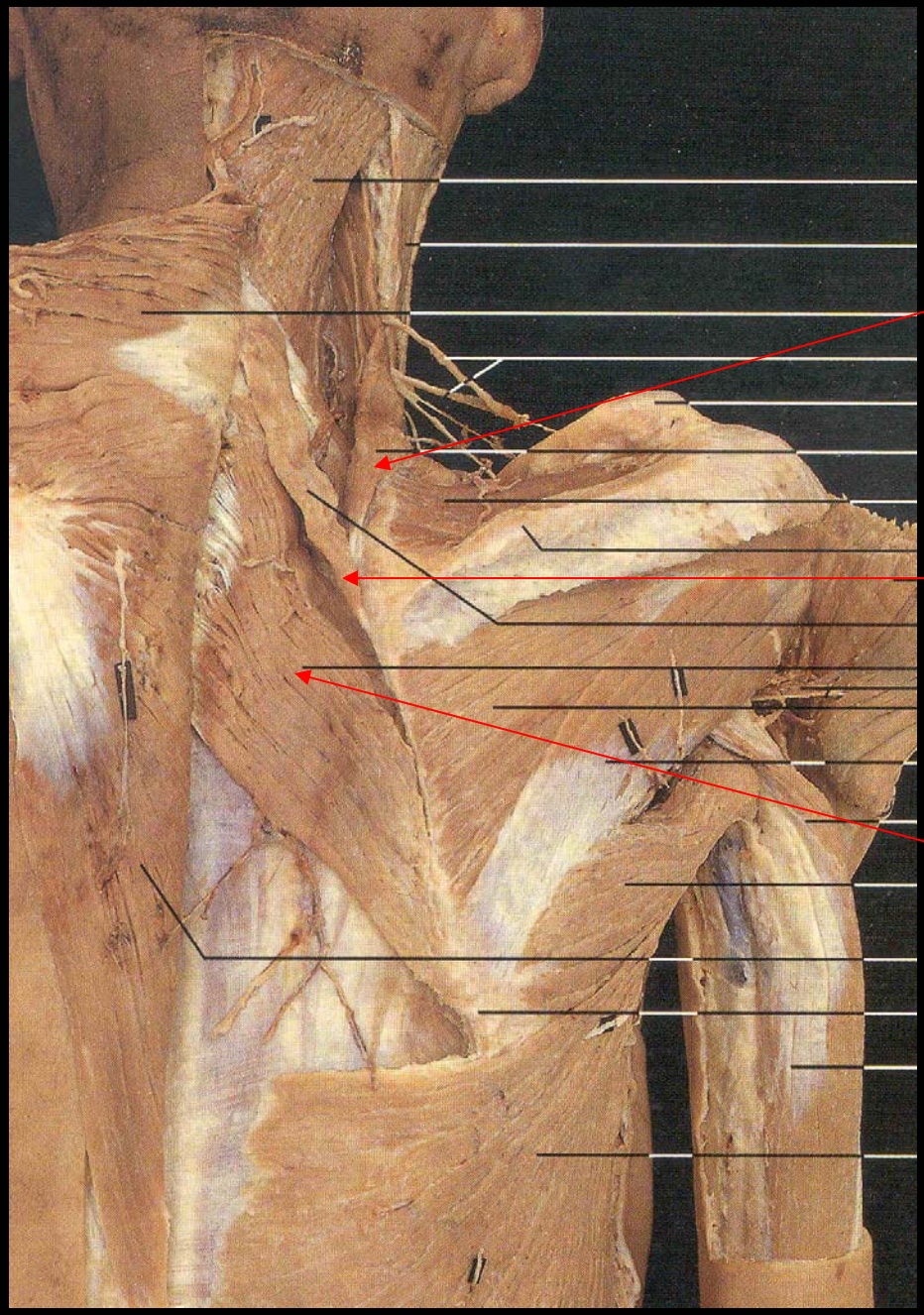
Note: minor is superior (cranial), but SMALLER



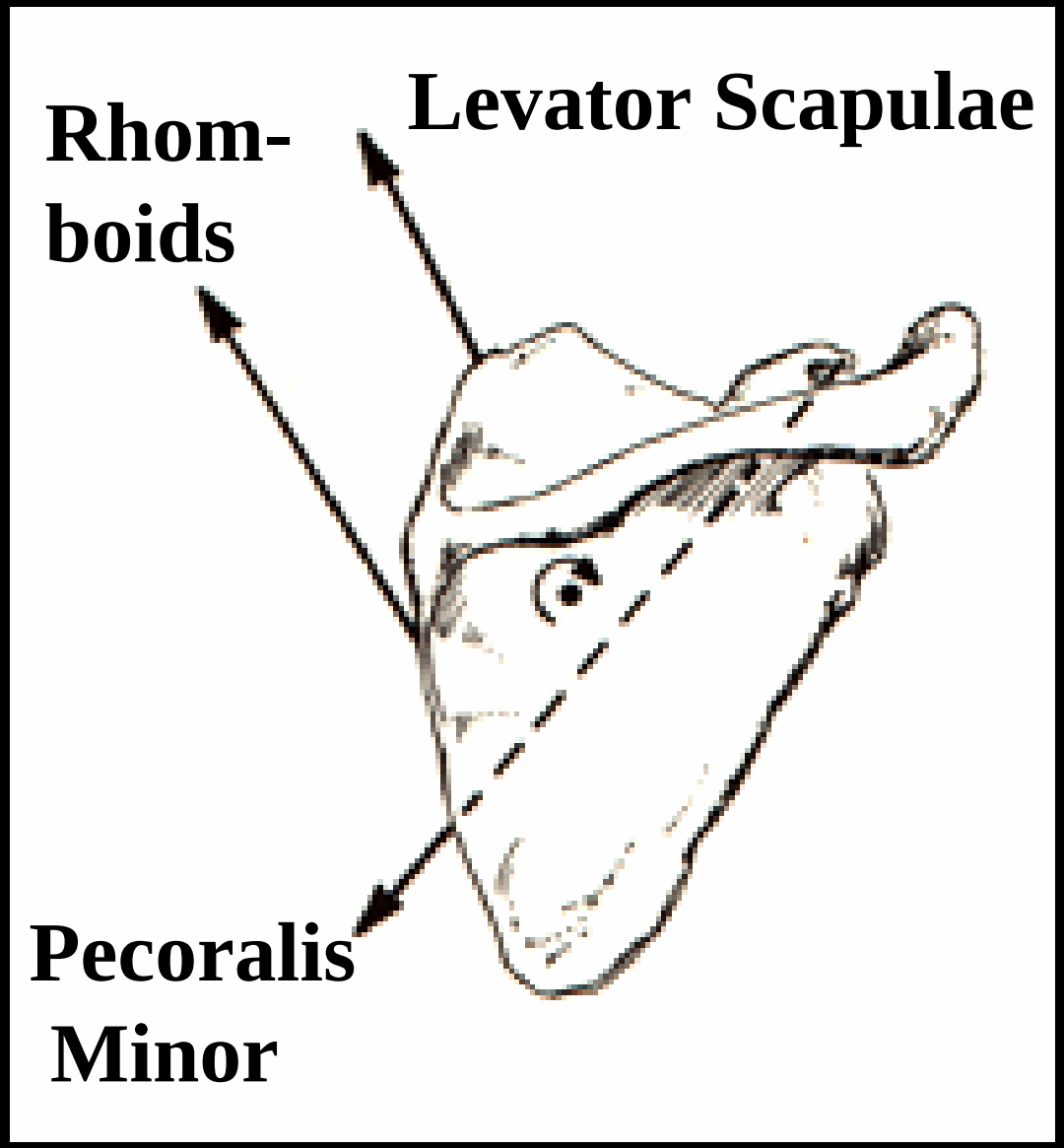
Rhomdoidius Minor

Innervation:
Dorsal Scapula

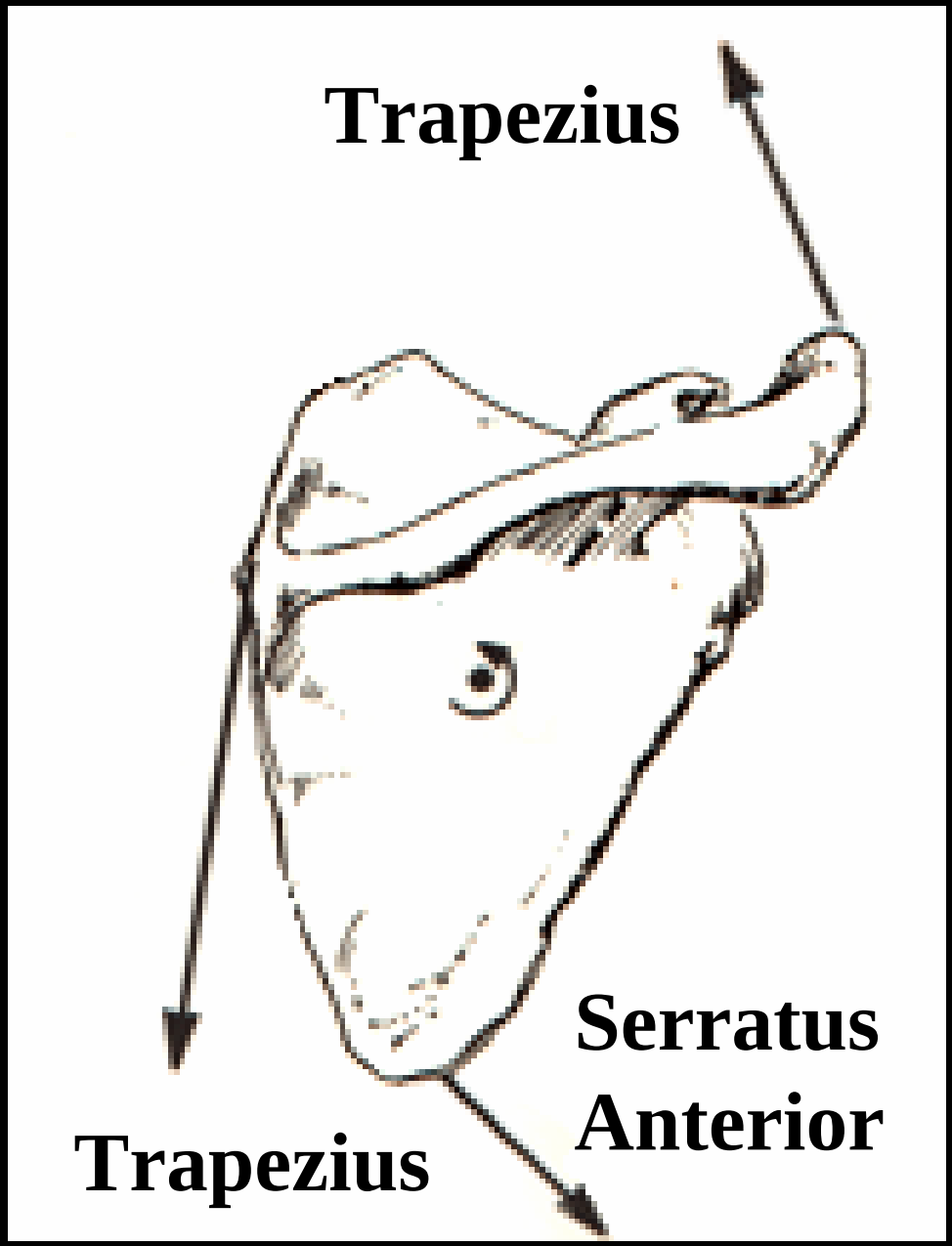
Action:
Retracts scapula
Depresses glenoid


Levator Scapulae
Rhomboid Minor
Rhomboid Major

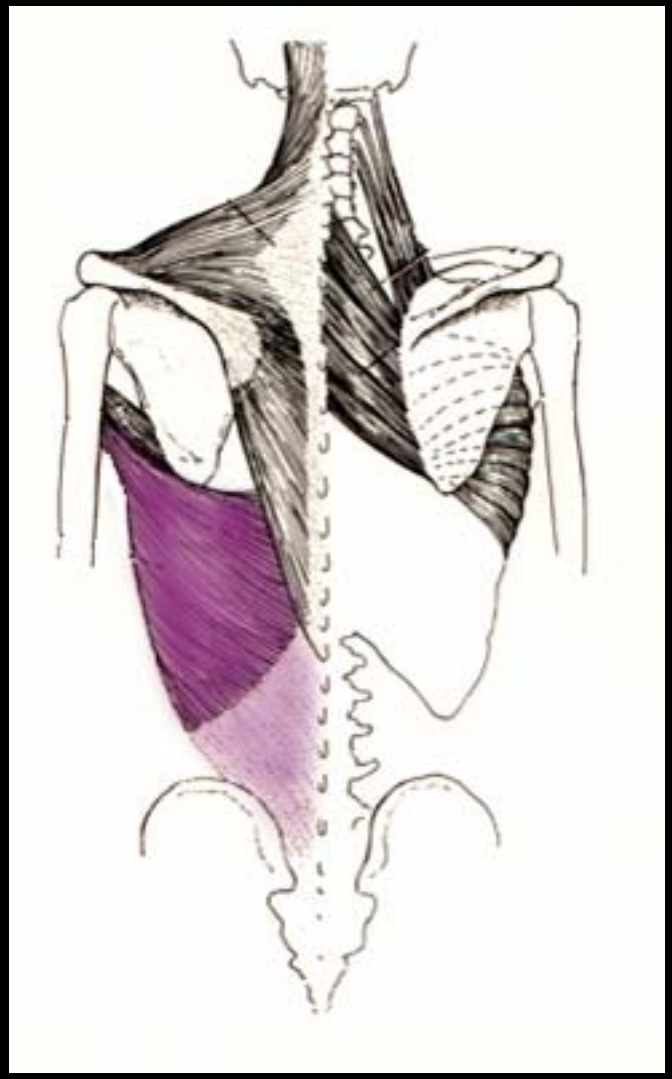
Depression



Elevation



Dorsal Appendicular Muscles

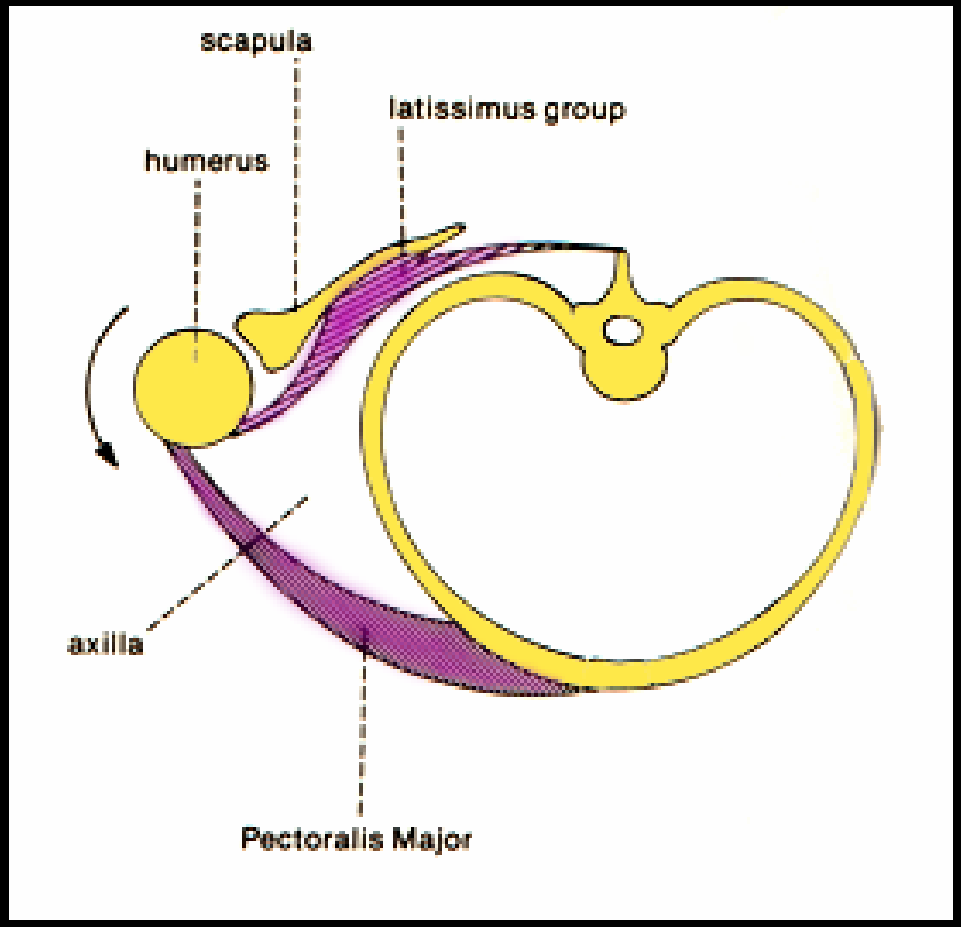


Latissimus Dorsi

Origin:
Spines of T7-T12
Thoracolumbar fascia

Insertion:
Humerus: Inertubecular groove
And lesser tubecular crest

Innervation:
Thoracodorsal Nerve



Latissiumus: Extends, adducts and medially rotates humerus

Pectoralis: is large, fan-shaped muscle opposing it ventrally

Ventral Musculature

The Pectoralis Group is a large, fan-shaped group that SPANS cranial-ventral and caudal-ventral regions.

Pectoralis Major:

Clavicular Head:

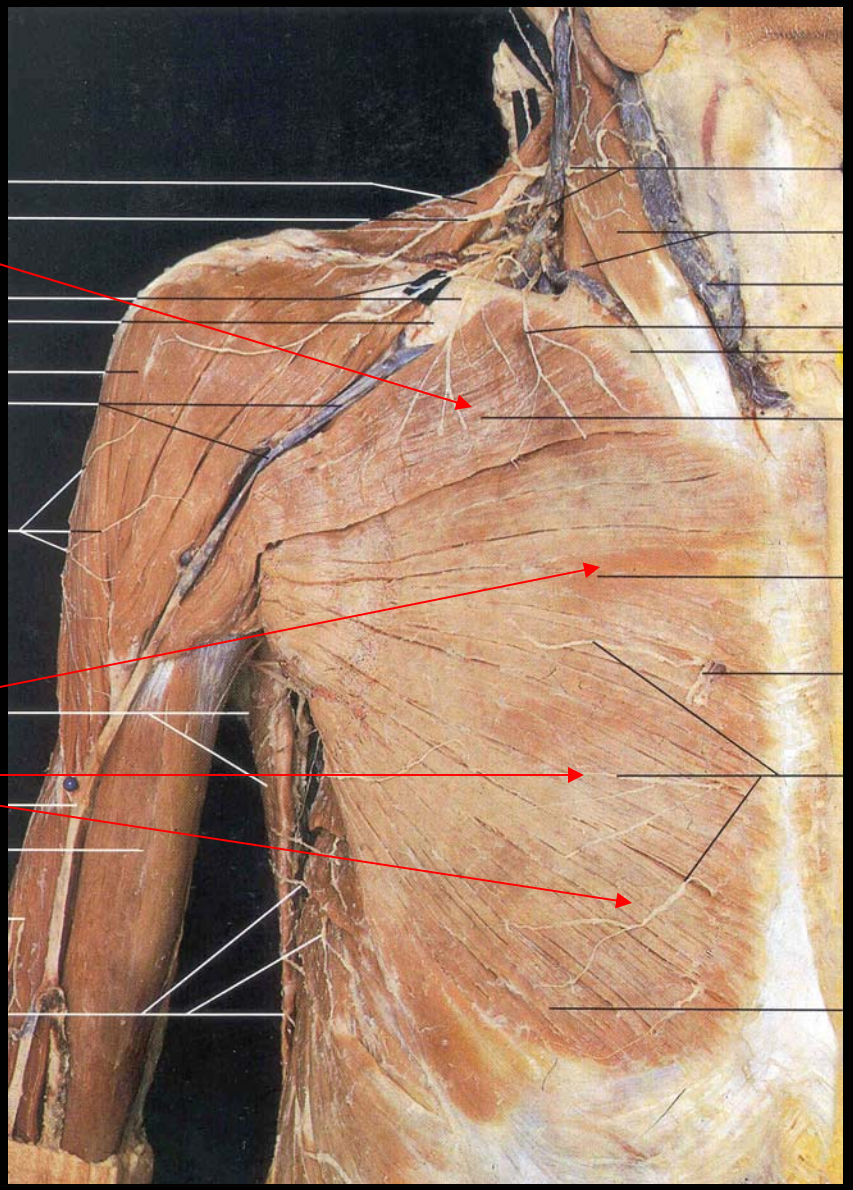
Origin: inferior margin of clavicle

Insertion: Delto-pectoral crest of HUMERUS

Sternal Head:

Origin: Ventro-lateral margin of sternum

Insertion: Delto-pectoral crest of HUMERUS



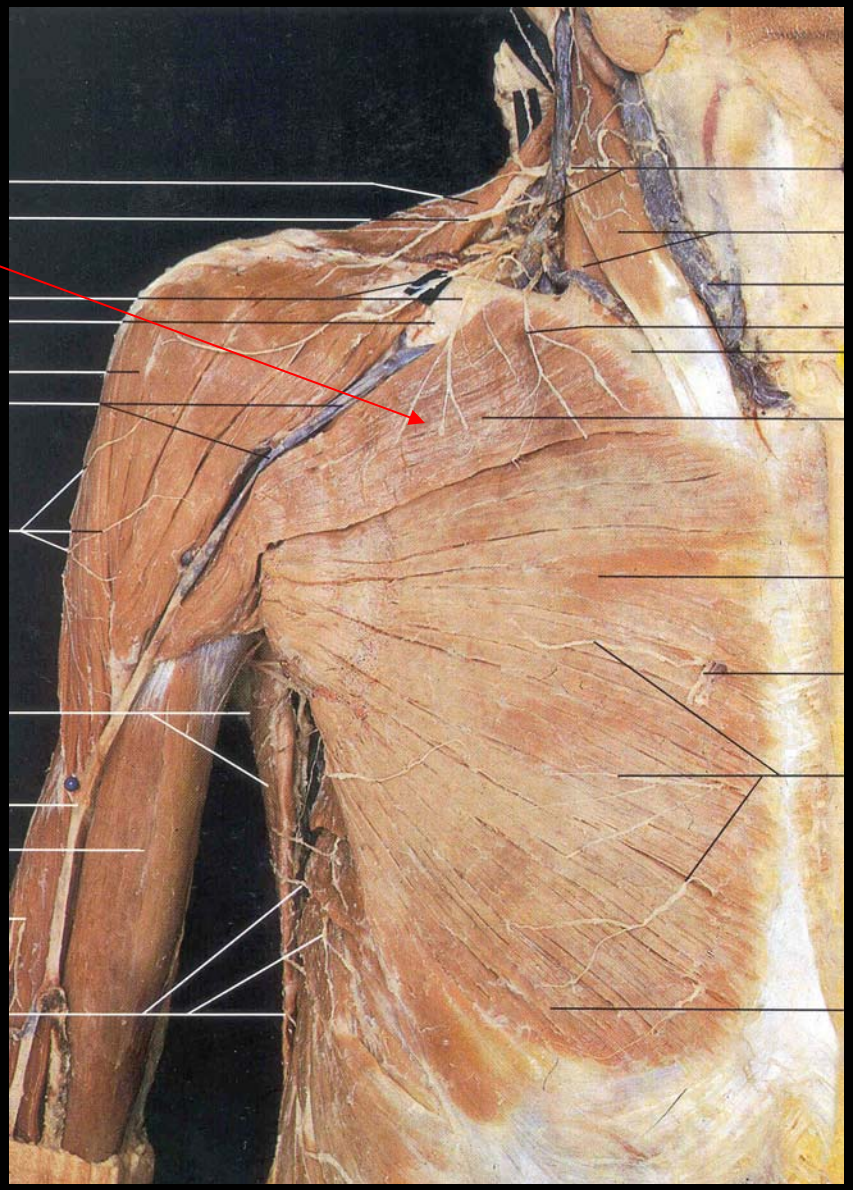
Pectoralis Major:

Clavicular Head:

Origin: inferior margin of clavicle

Insertion: Greater tubercular crest of HUMERUS

Innervation: Medial and lateral pectoral nerves



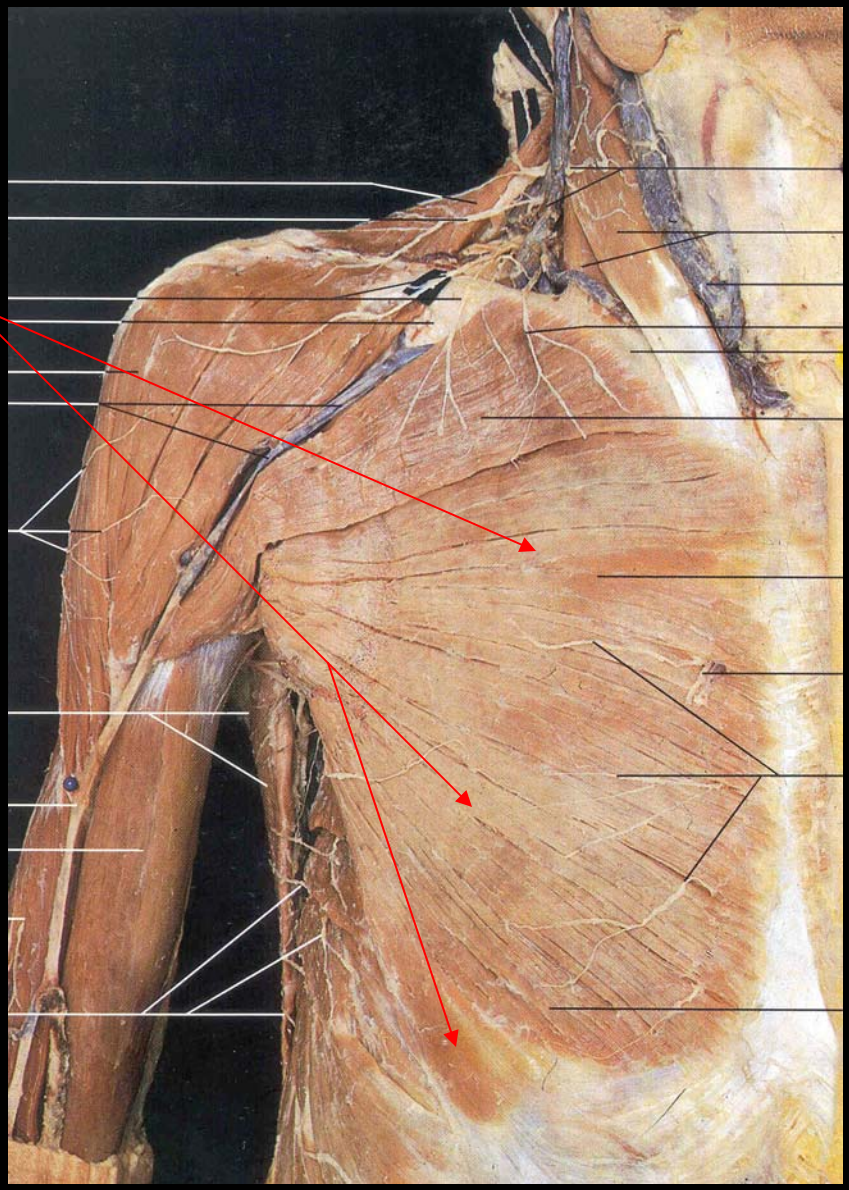
Pectoralis Major:

Sternal Head: DEPRESSOR, ADDUCTOR of humerus

Origin: Ventro-lateral margin of sternum; costal cartilages 1-6

Insertion: Greater tubercular crest of HUMERUS

Innervation: Medial and lateral pectoral nerves



Pectoralis MINOR: Deep to Pec. Major

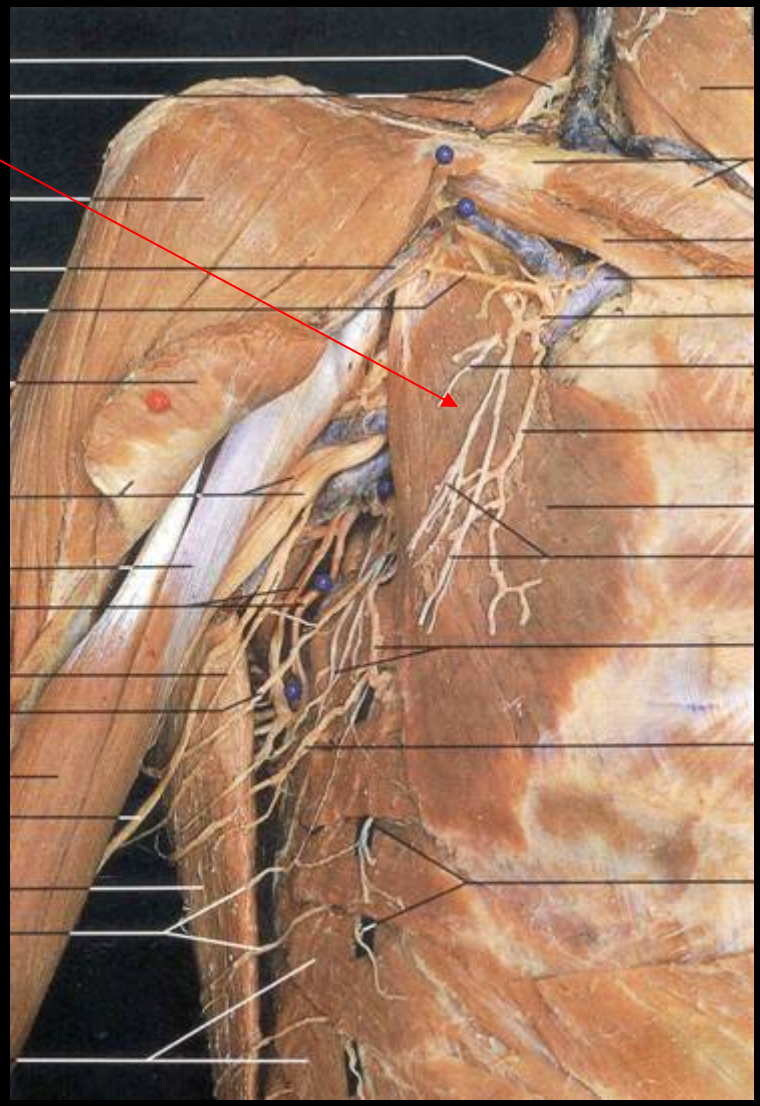
Origin:Ribs 3-6.

Insertion: Coracoid Process of Scapula

Innervation:

Function: Stabilization of scapula

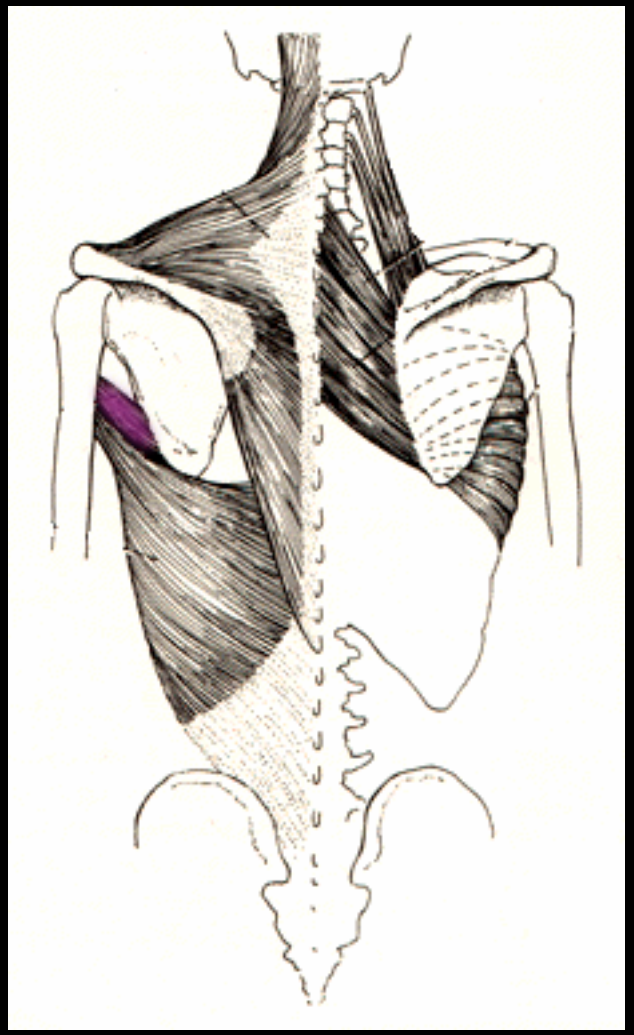
Positionally important for understanding location of other structures.

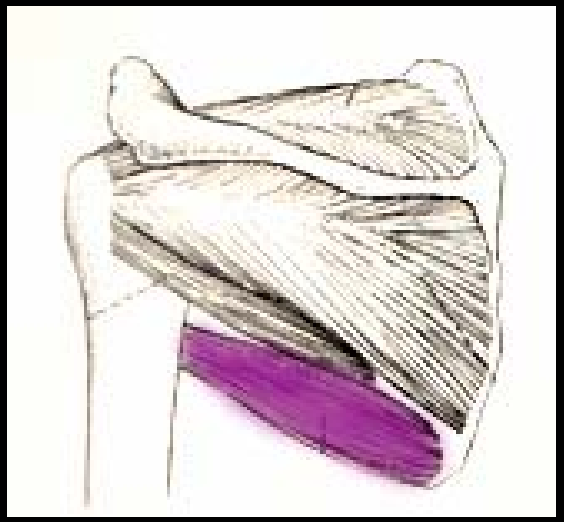


Musculature of the Shoulder:

Muscles Connecting Scapula to Humerus

Elevators

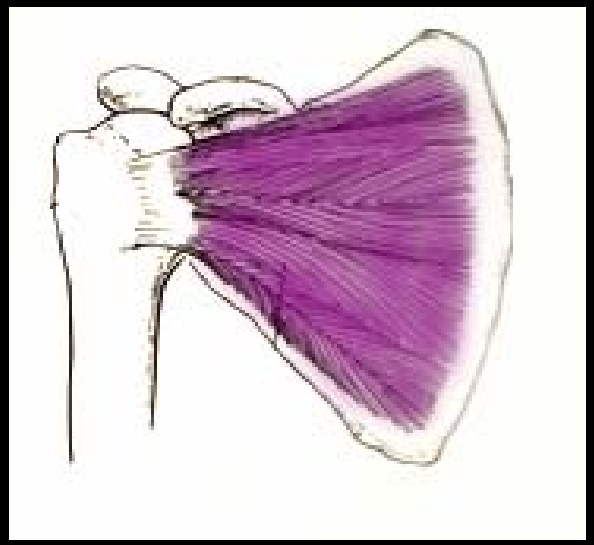




Teres Major

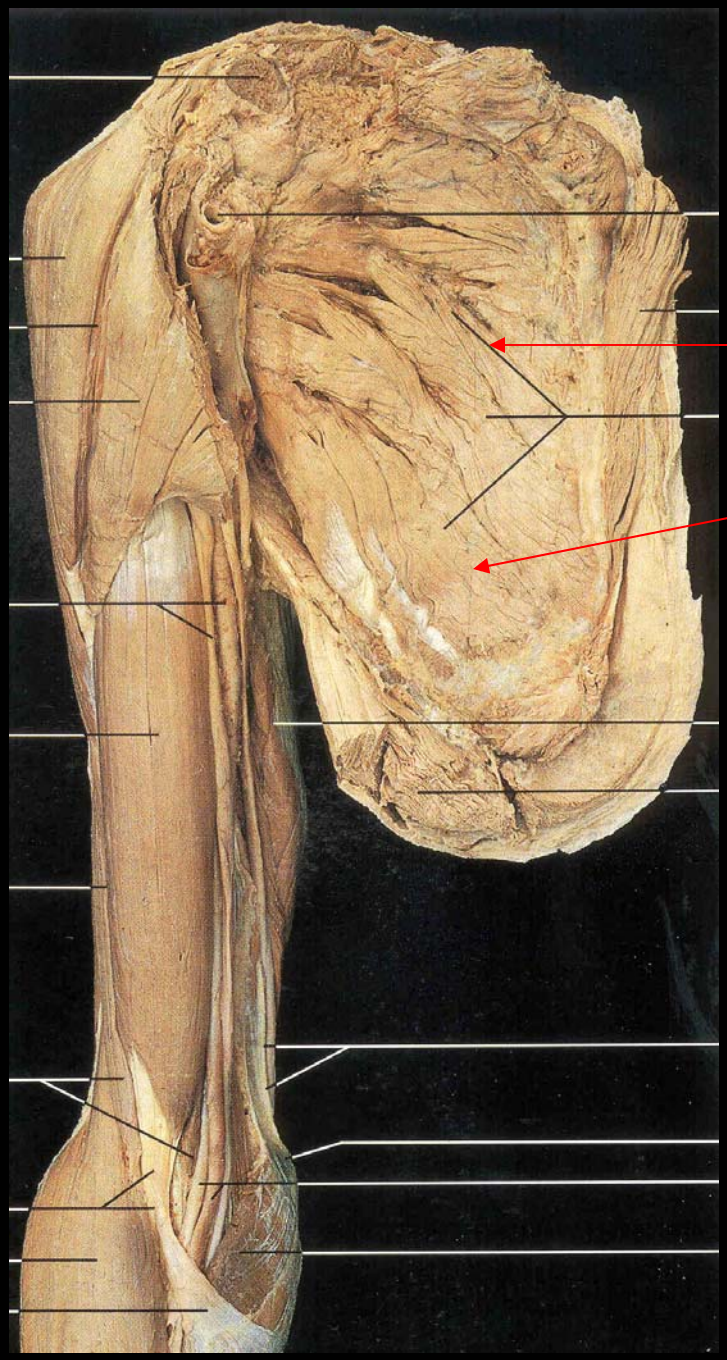
Origin: Lower edge of scapula
Insertion: Lesser tubercular crest
Action: Extends, Adducts & Medially rotates humerus
Innervation: Lower scapular

Elevators



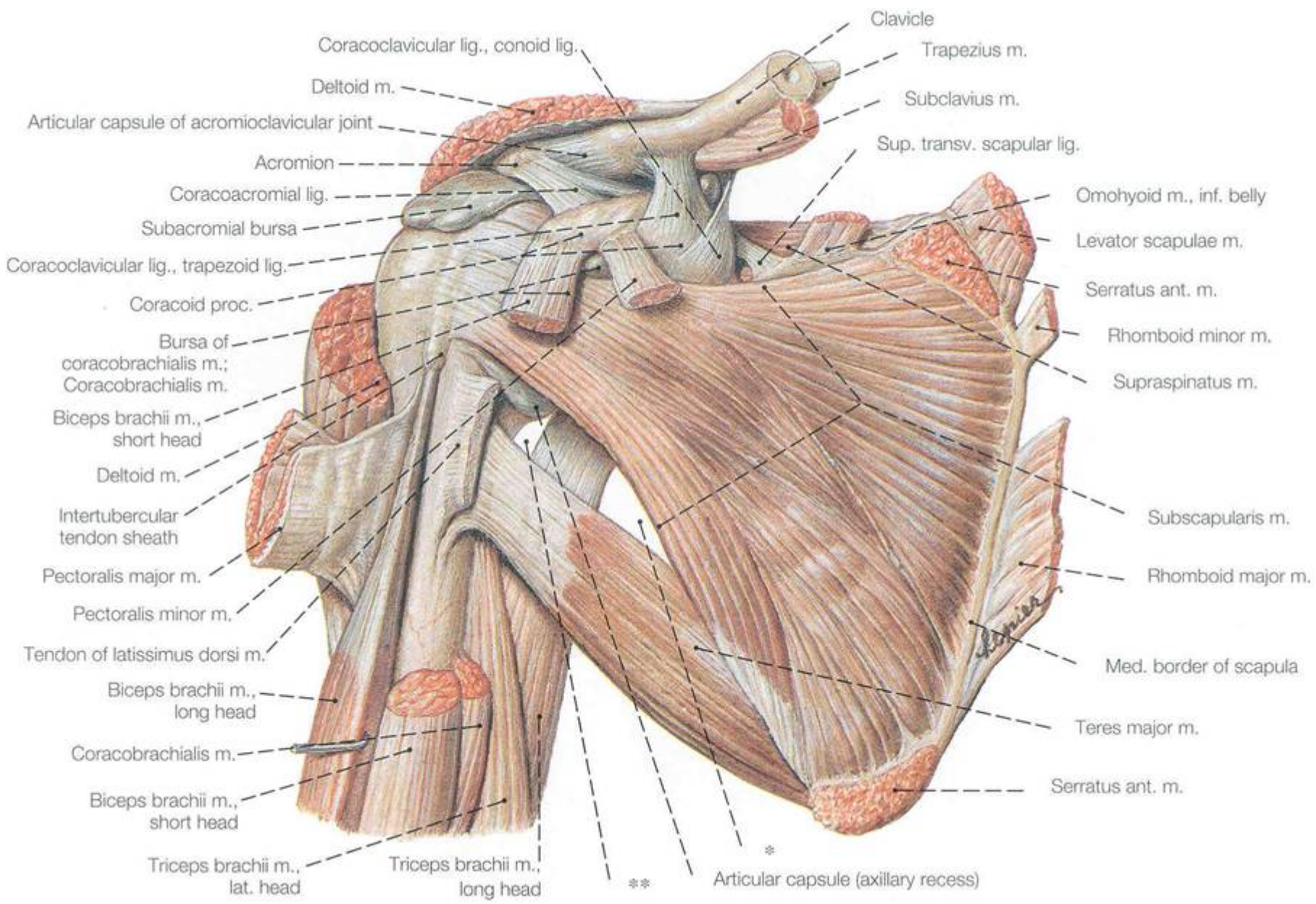
Subscapularis

Origin: Deep surface of scapula
Insertion: Lesser tubercle
Action: Medially rotates humerus
Innervation: Upper and lower scapular

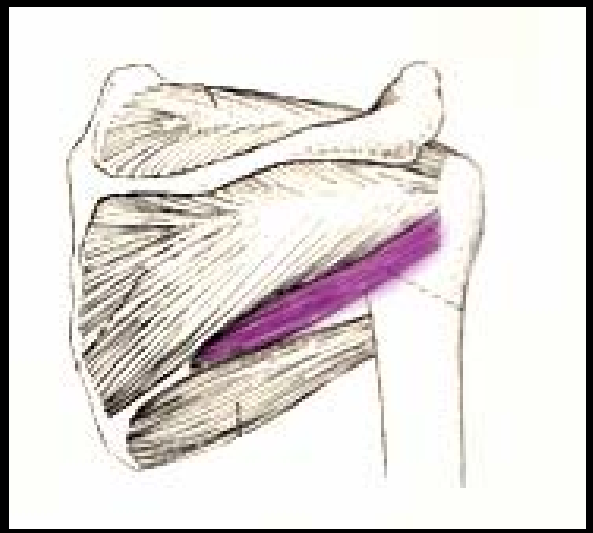


Internal View:

Subscapularis

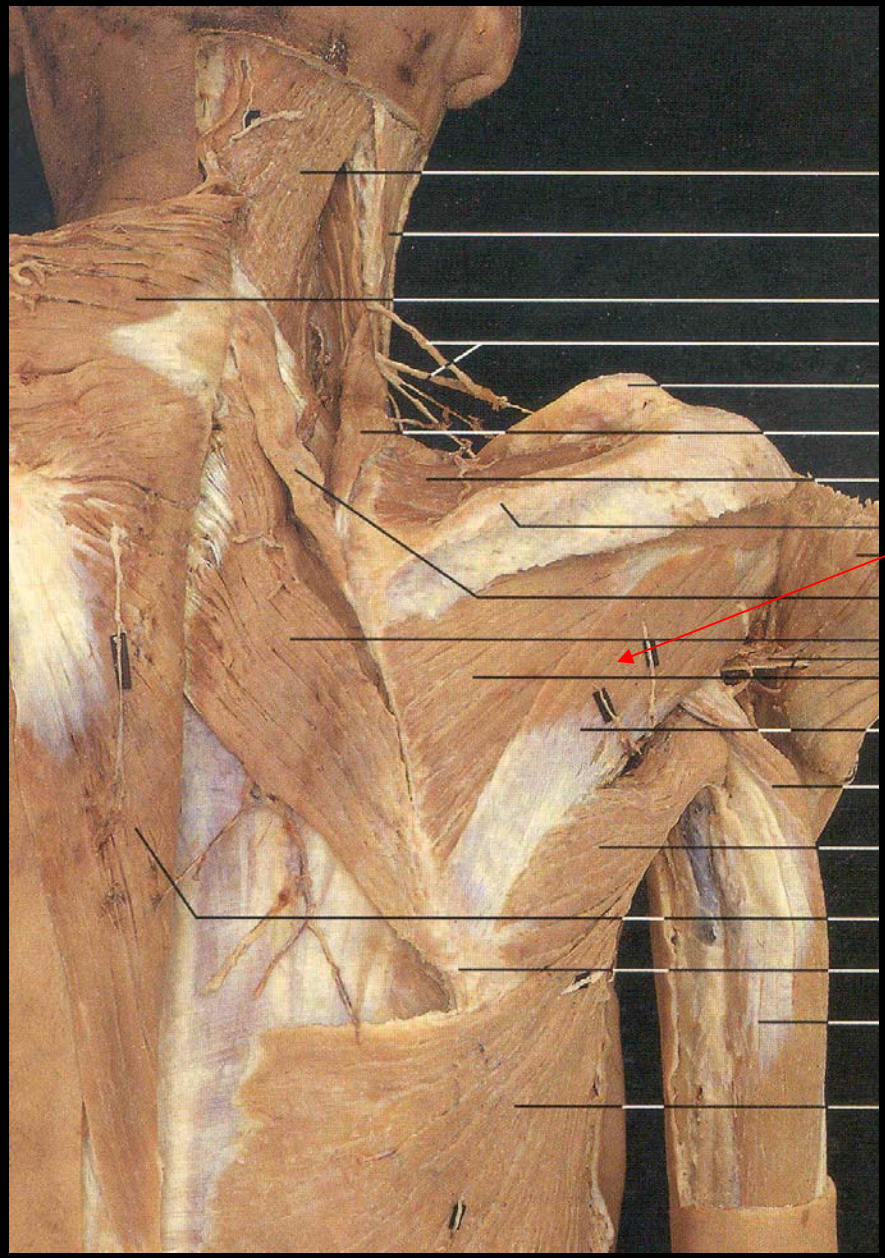

Clavicle
Coracoclavicular lig., conoid lig.
Trapezius m.
Deltoid m.
Subclavius m.
Articular capsule of acromioclavicular joint
Sup. transv. scapular lig.
Acromion
Omohyoid m., inf. belly
Coracoacromial lig.
Levator scapulae m.
Subacromial bursa
Serratus ant. m.
Coracoclavicular lig., trapezoid lig.
Rhomboid minor m.
Coracoid proc.
Supraspinatus m.
Bursa of coracobrachialis m.; Coracobrachialis m.
Biceps brachii m., short head
Subscapularis m.
Deltoid m.
Intertubercular tendon sheath
Rhomboid major m.
Pectoralis major m.
Pectoralis minor m.
Med. border of scapula
Tendon of latissimus dorsi m.
Biceps brachii m., long head
Teres major m.
Coracobrachialis m.
Serratus ant. m.
Biceps brachii m., short head
Triceps brachii m., lat. head
Triceps brachii m., long head
**
*
Articular capsule (axillary recess)

Elevators



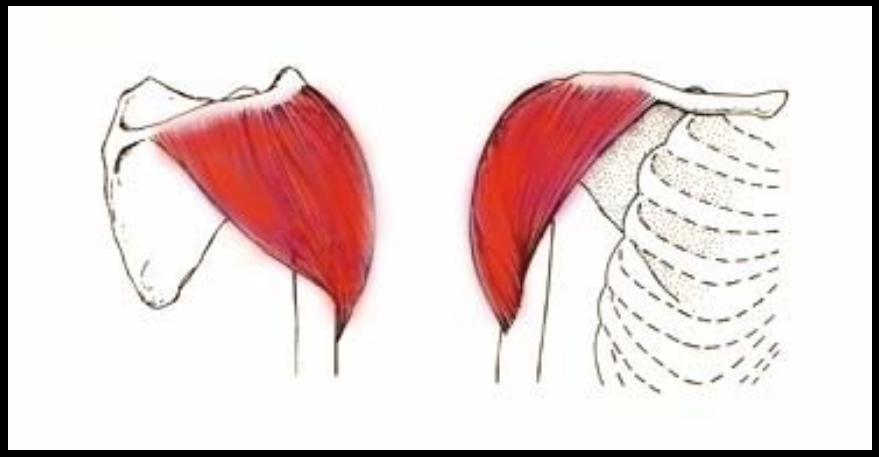
Teres Minor

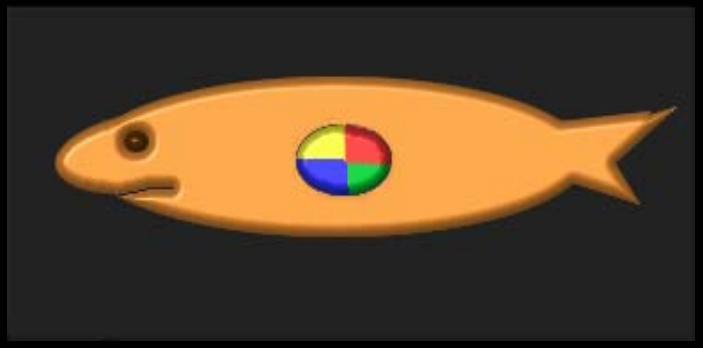
Origin: Lower edge of scapula
Insertion: Greater tubercle
Action: Laterally rotates humerus
Innervation: Axillary



Teres Minor

Elevators

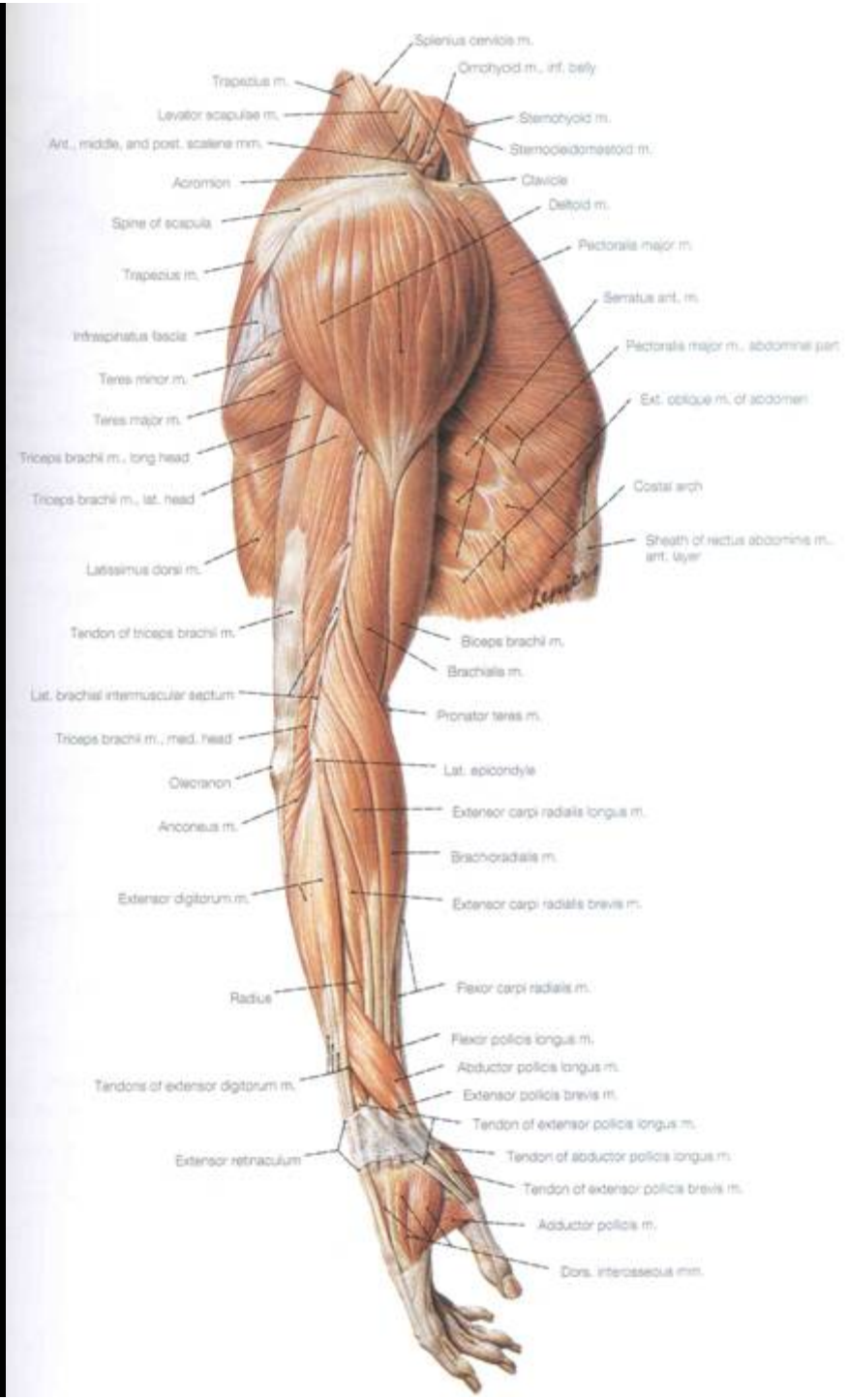




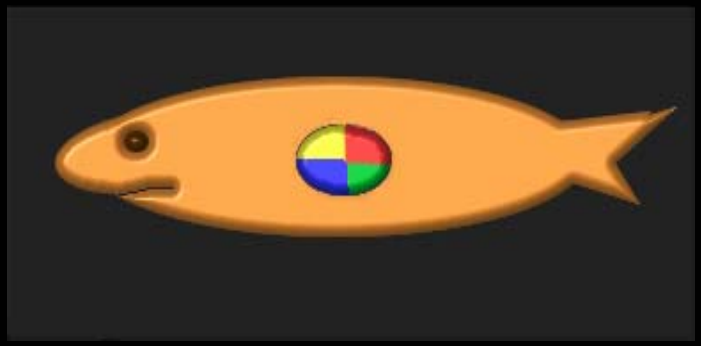
Deltoideus

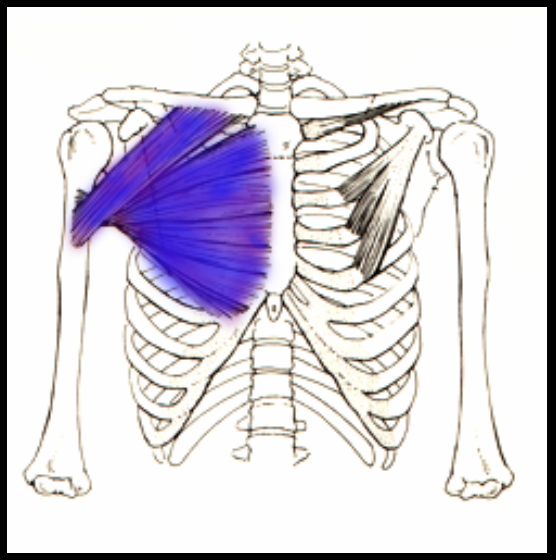
Origin: Lateral half of clavicle , Scapular spine, acromion process
Insertion: Deltoid tuberosity of humerus
Action: Abducts humerus (also flexes, extends, rotates and adducts)
Innervation: Axillary nerve

Deltoid


Splenius cervicis m.
Omohyoid m., inf. belly
Trapezius m.
Levator scapulae m.
Sternohyoid m.
Ant., middle, and post. scalene mm.
Sternocleidomastoid m.
Acromion
Clavicle
Spine of scapula
Deltoid m.
Pectoralis major m.
Trapezius m.
Serratus ant. m.
Infraspinatus fascia
Pectoralis major m., abdominal part
Teres minor m.
Ext. oblique m. of abdomen
Teres major m.
Triceps brachi m., long head
Costal arch
Triceps brachi m., lat. head
Sheath of rectus abdominis m., ant. layer
Latissimus dorsi m.
Tendon of triceps brachi m.
Biceps brachi m.
Brachialis m.
Lat. brachial intermuscular septum
Pronator teres m.
Triceps brachi m., med. head
Lat. epicondyle
Olecranon
Extensor carpi radialis longus m.
Anconeus m.
Brachioradialis m.
Extensor digitorum m.
Extensor carpi radialis brevis m.
Flexor carpi radialis m.
Radius
Flexor pollicis longus m.
Abductor pollicis longus m.
Tendons of extensor digitorum m.
Extensor pollicis brevis m.
Tendon of extensor pollicis longus m.
Extensor retinaculum
Tendon of abductor pollicis longus m.
Tendon of extensor pollicis brevis m.
Adductor pollicis m.
Dors. interosseous mm.

Depressors

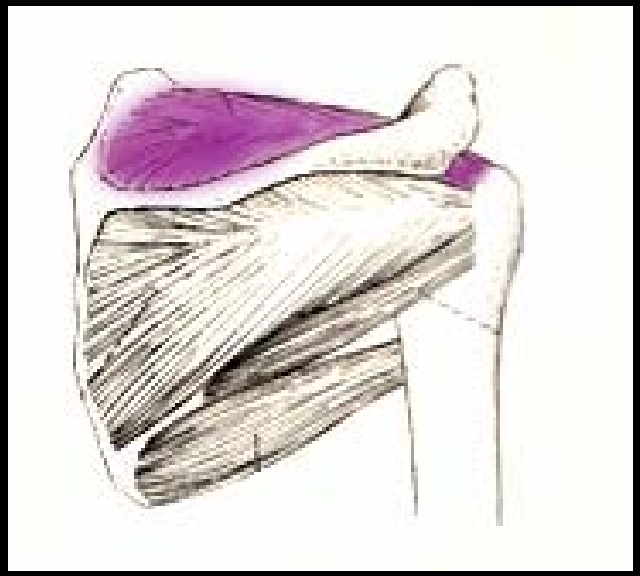




Pectoralis Major (Sternal Head)

Origin: Medial half of clavicle, sternum, costal cartilages 1-6
Insertion: Greater tubercular crest
Action: Medially rotates, flexes and adducts humerus
Innervation: Lateral and medial pectoral

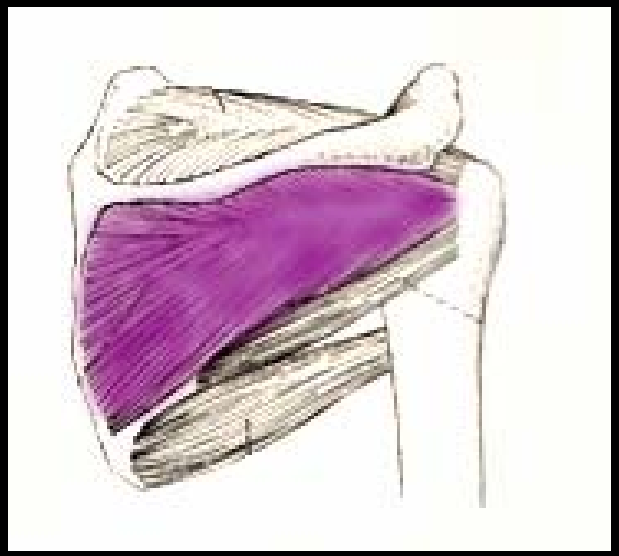
Depressors



Supraspinatus

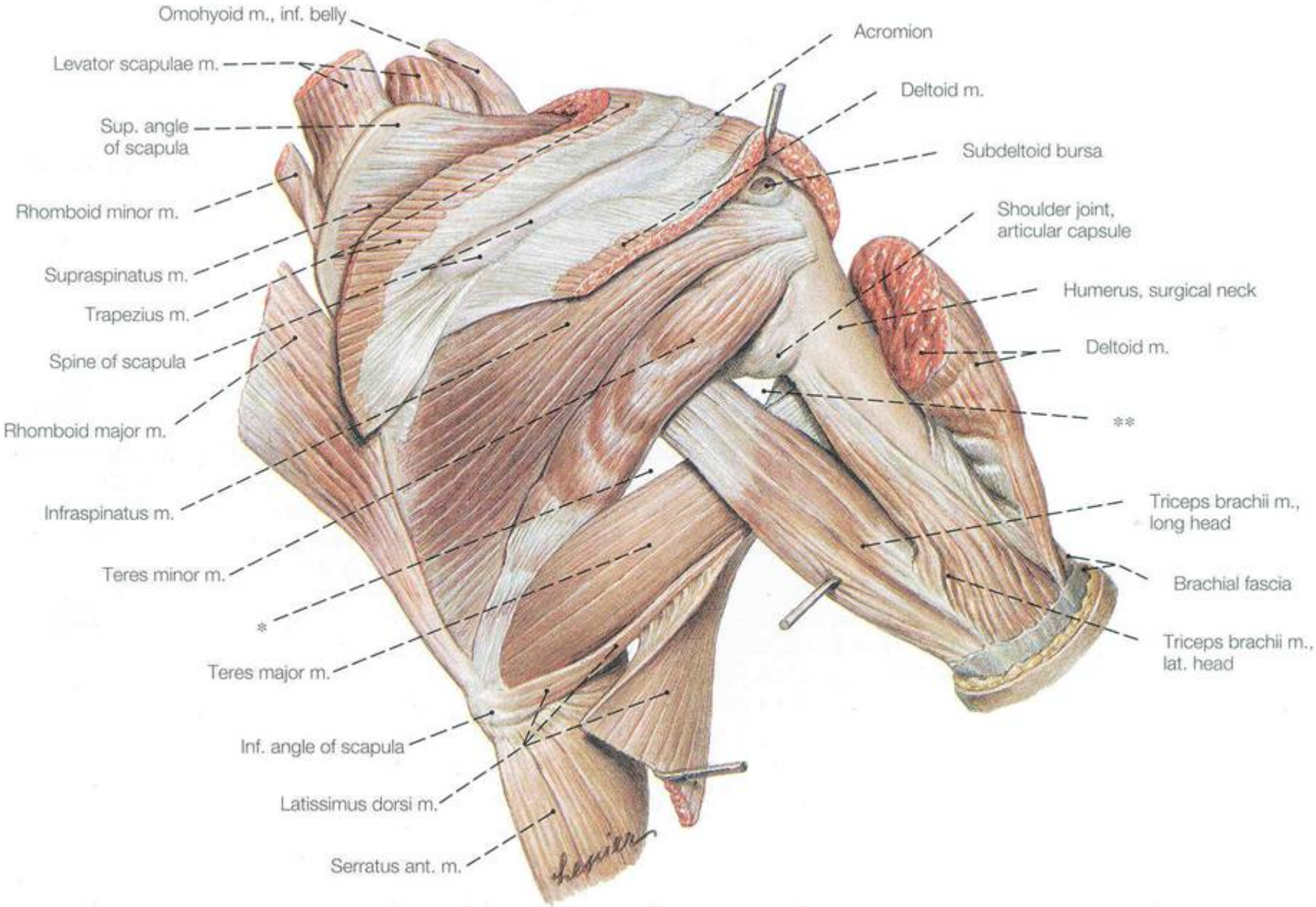
Origin: Supraspinous fossa of scaupla
Insertion: Greater tubercle of humerus
Action: Abducts humerus
Innervation: Subscapular

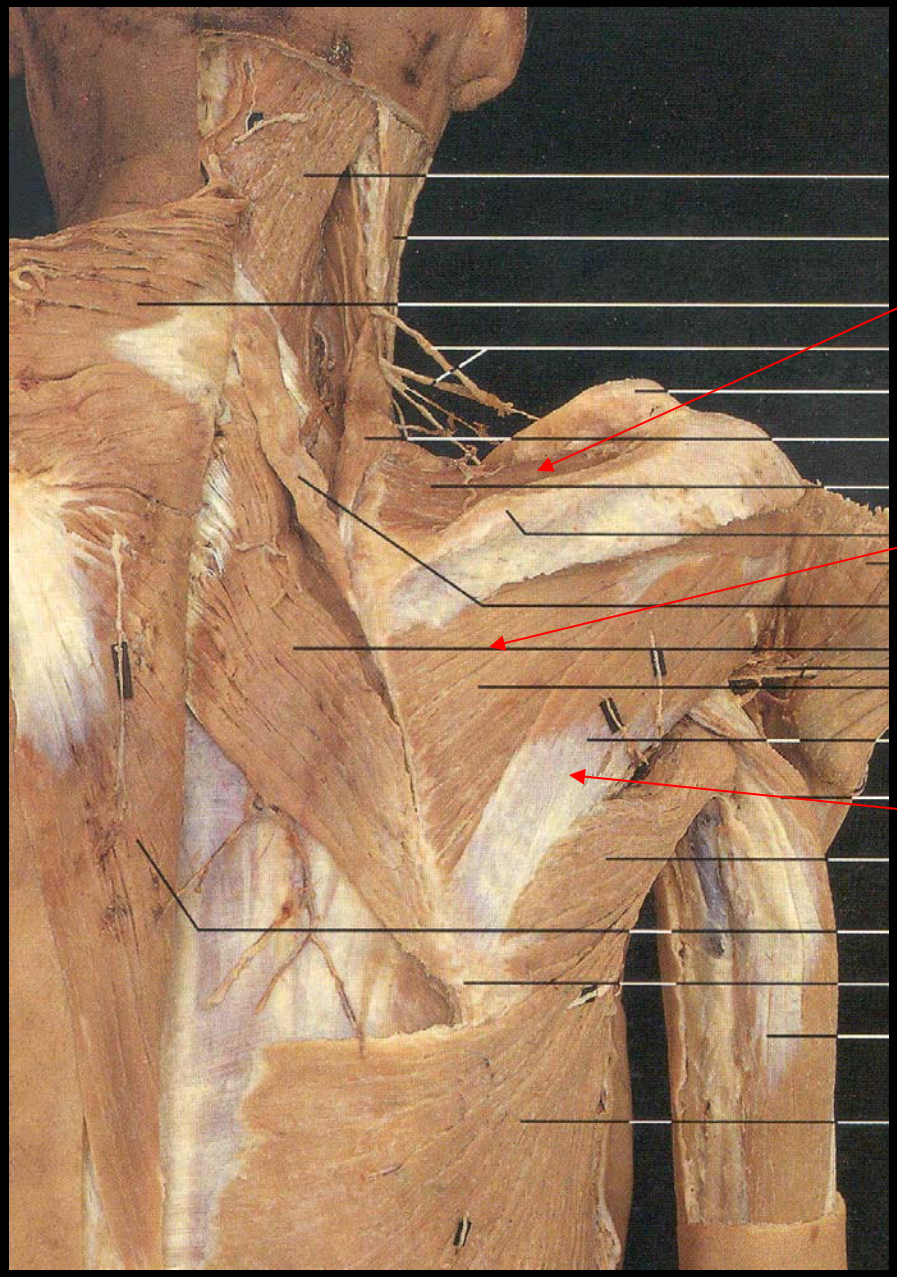
Depressors



Infraspinatus

Origin: Infraspinous fossa of scapula
Insertion: Greater tubercle of humeus
Action: Laterally rotates humerus
Innervation: Subscapular


Omohyoid m., inf. belly
Levator scapulae m.
Sup. angle of scapula
Rhomboid minor m.
Supraspinatus m.
Trapezius m.
Spine of scapula
Rhomboid major m.
Infraspinatus m.
Teres minor m.
*
Teres major m.
Inf. angle of scapula
Latissimus dorsi m.
Serratus ant. m.
Acromion
Deltoid m.
Subdeltoid bursa
Shoulder joint, articular capsule
Humerus, surgical neck
Deltoid m.
**
Triceps brachii m., long head
Brachial fascia
Triceps brachii m., lat. head

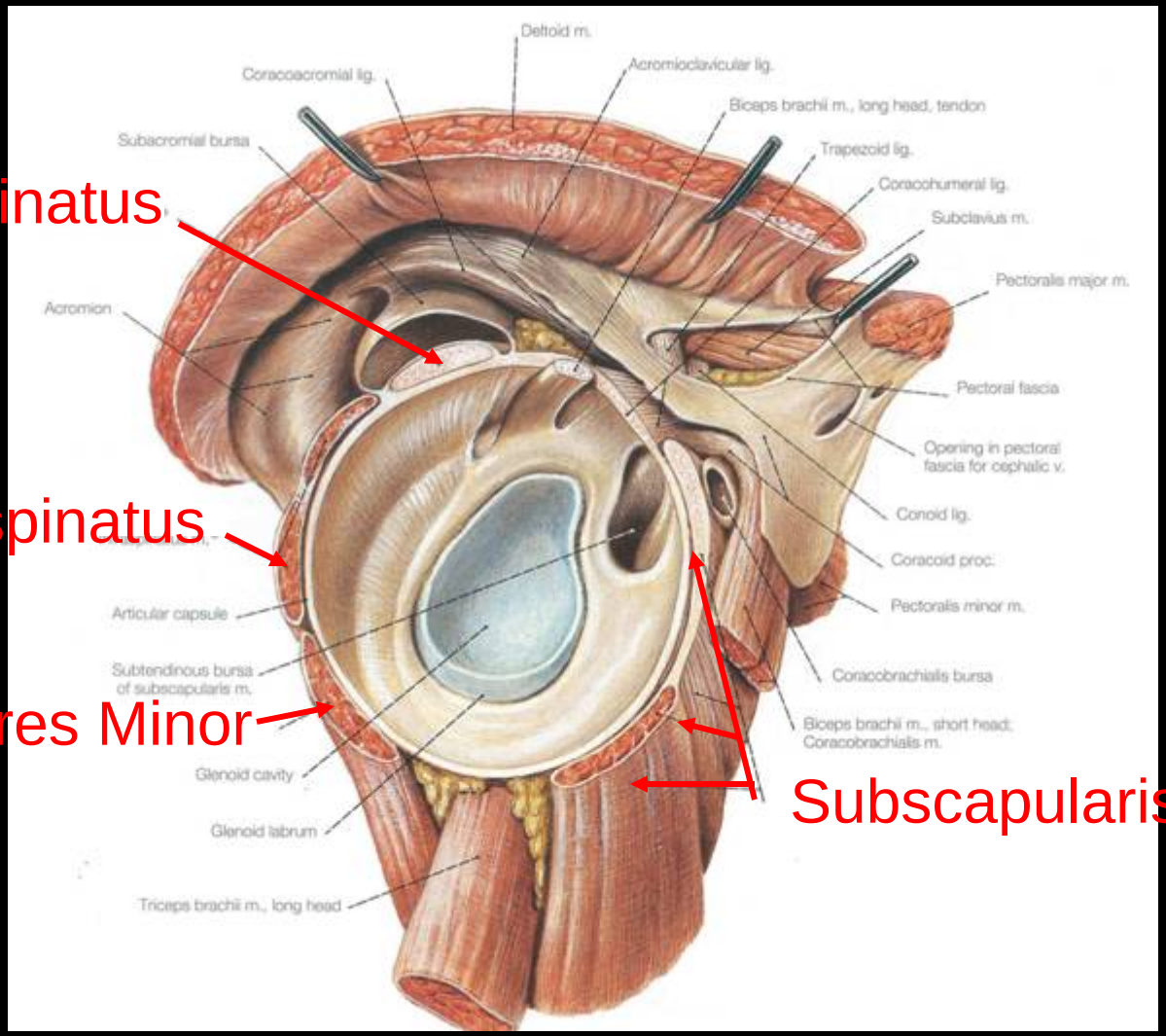


Supraspinatus

Infraspinatus

Teres Minor

Muscles of the Rotator Cuff



What You Should Know

1 SERIAL HOMOLOGIES

Glutei	Deltoid
Adductors	Pectoral group
Quadriceps	Triceps
Hamstrings	Brachii
Extensors	Extensors
Flexors	Flexors

What You Should Know

2: UPPER LIMB COMPLICATIONS

- Explain 4 .
- Explain the movements of the scapula

What You Should Know

3: UPPER LIMB COMPLICATIONS

- Origin, insertion, innervation and action of the following (Cartmill pages 224-230)
- Trapezius
- Serratus anterior
- Levator scapulae
- Rhomboid major
- Rhomboid minor
- Latissimus Dorsi
- Pectoralis Major (Sternal, Clavicular) and Minor

What You Should Know

4. THE SHOULDER

Cartmill pages 231-237

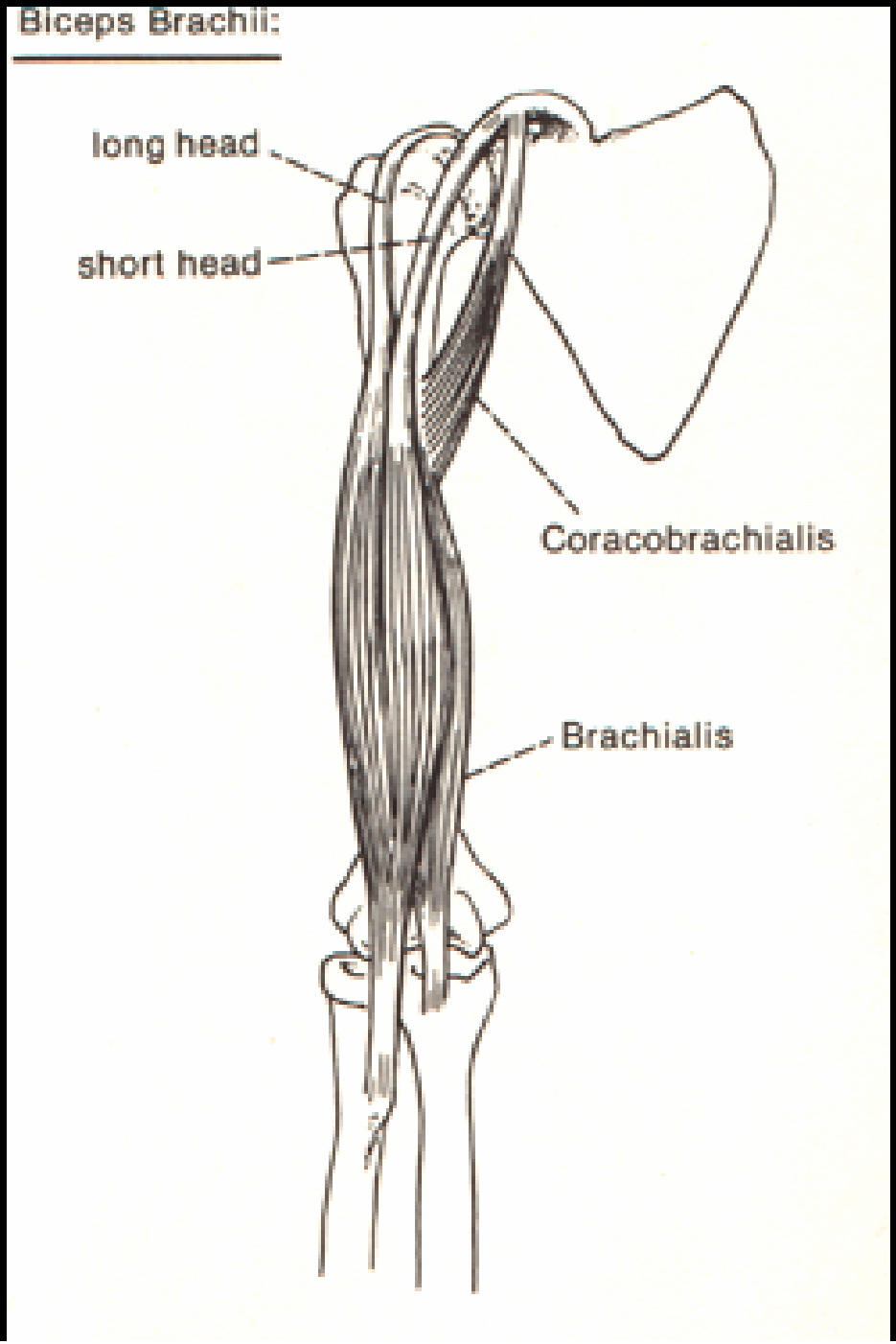
Origin, insertion, innervation and action of the following:

- Teres Major
- Teres minor
- Pectoralis Major
- Infraspinatus
- Subscapularis
- Deltoid
- Supraspinatus

Musculature Crossing the Elbow Joint

Muscles moving the elbow all cross the joint and insert on the bones of the forearm.

They may originate from the scapula or the brachium (humerus).



Which muscle is NOT a flexor of the elbow?

Answer =A Coracobrachialis

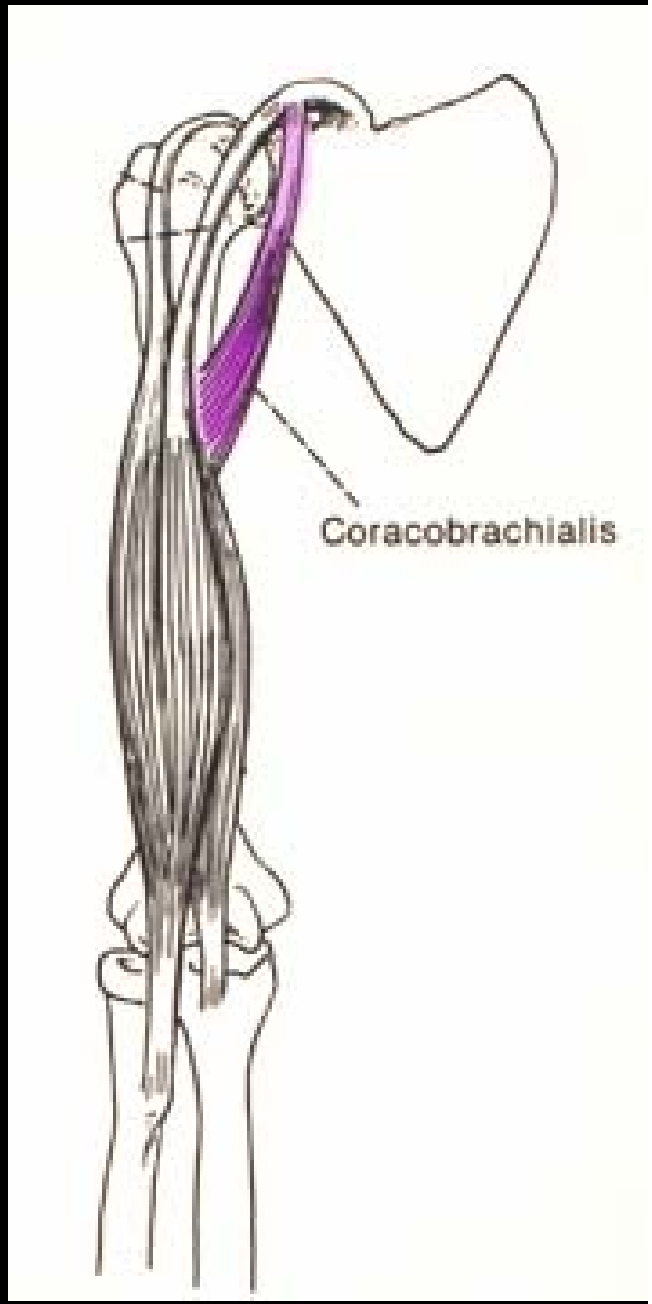
The Coracobrachialis makes up part of the mass of the upper arm but doesn't actually cross the joint (scapula to humerus only).

Origin: coracoid process

Insertion: Humerus

Flexion and adduction of humerus.

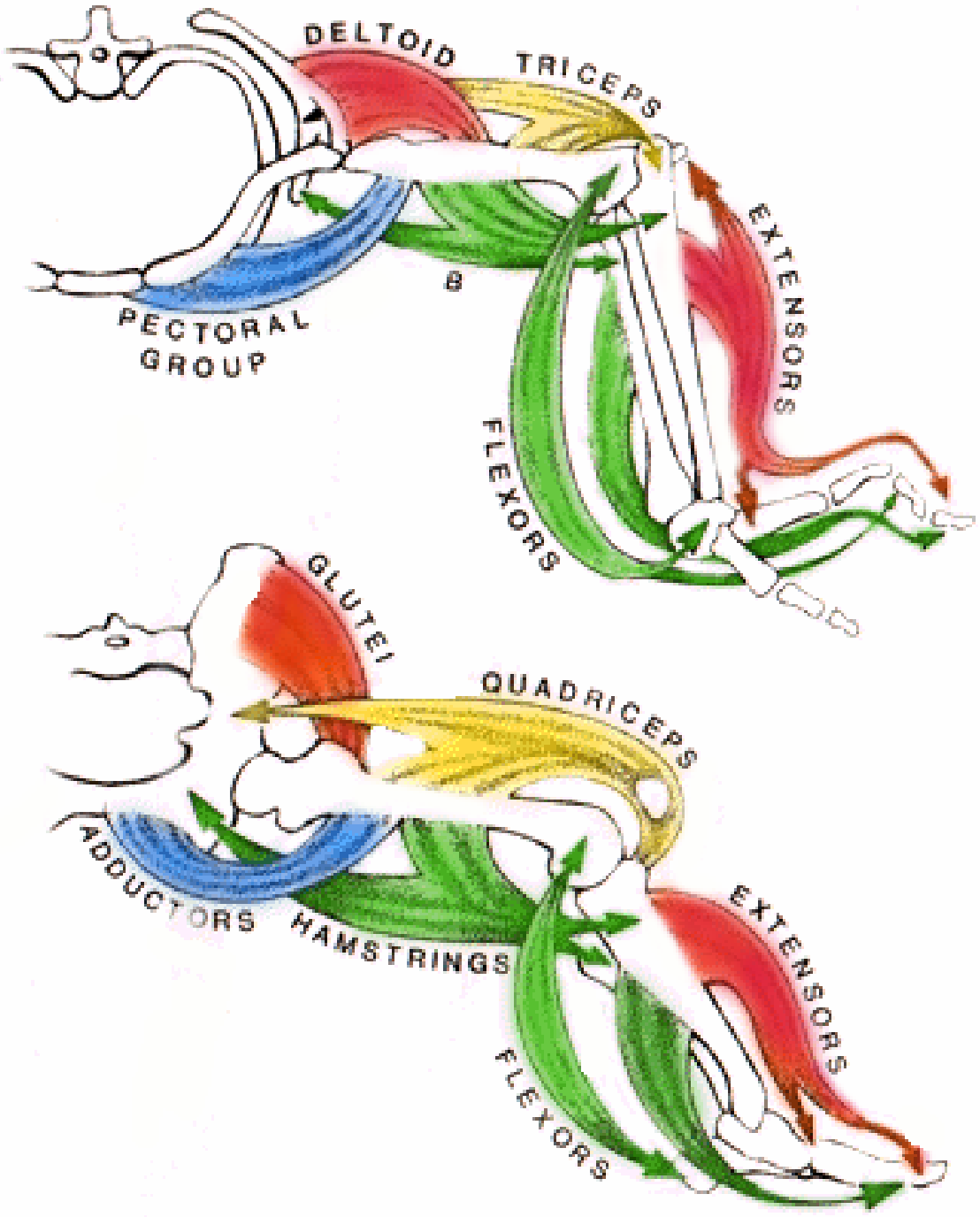
Musculocutaneous nerve



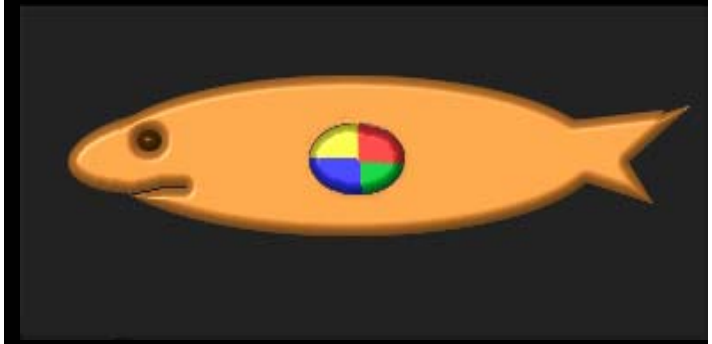
Elbow extensors

Triceps brachii

(Radial Nerve)

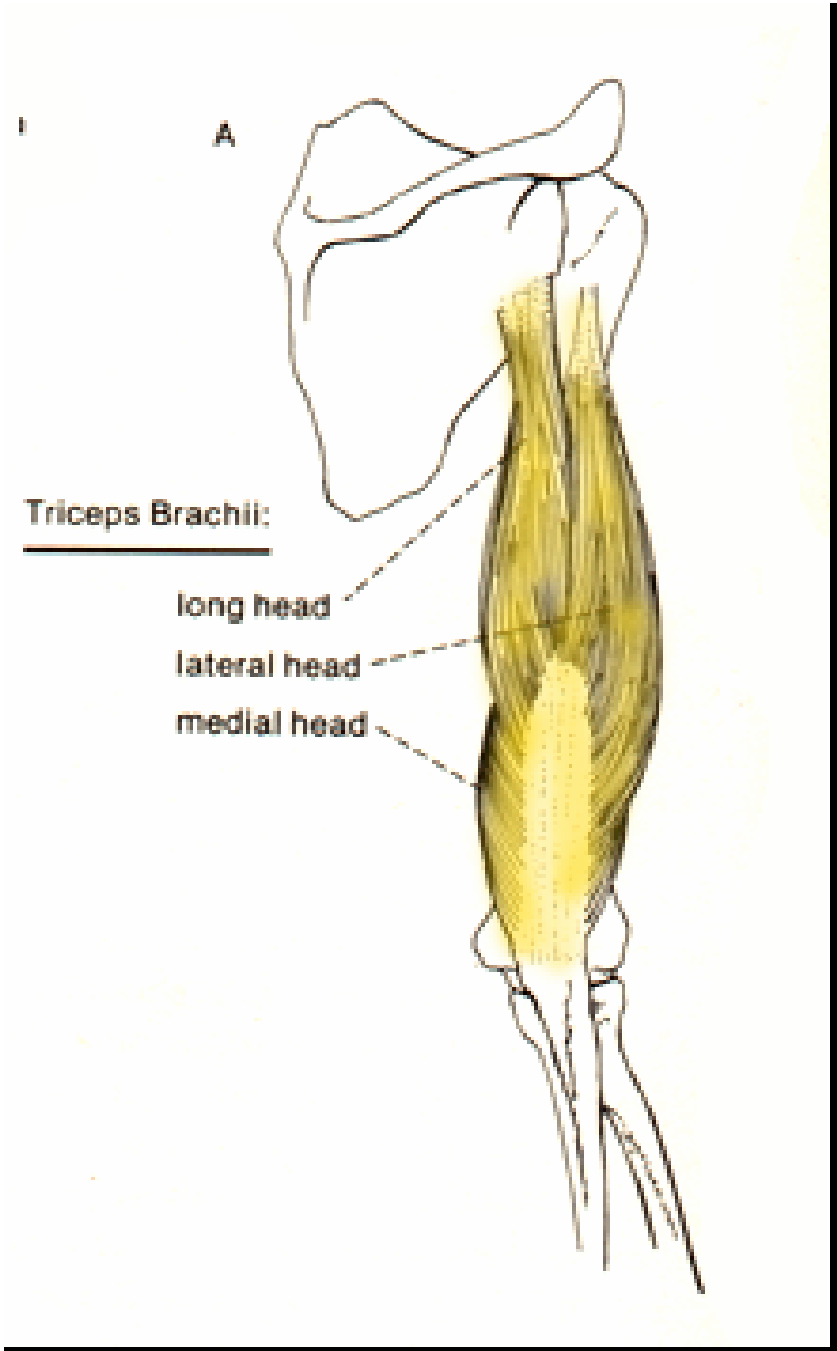


Cranial/dorsal



Triceps =

Quadriceps



Origin:

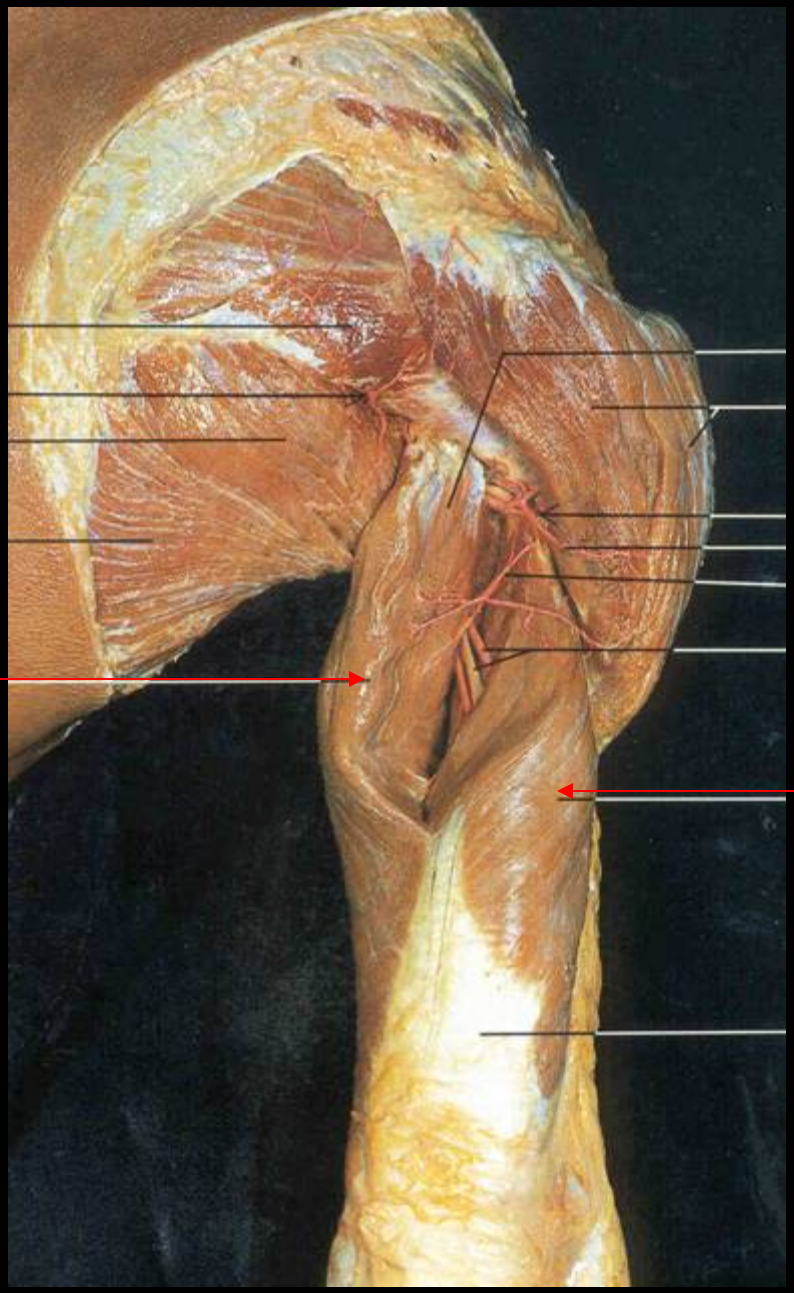
Long Head: Glenoid Fossa

Medial & Lateral Heads: Posterior surface of humeral shaft

Insertion: Olecranon process of ulna

Action: Extends elbow

Triceps Long Head

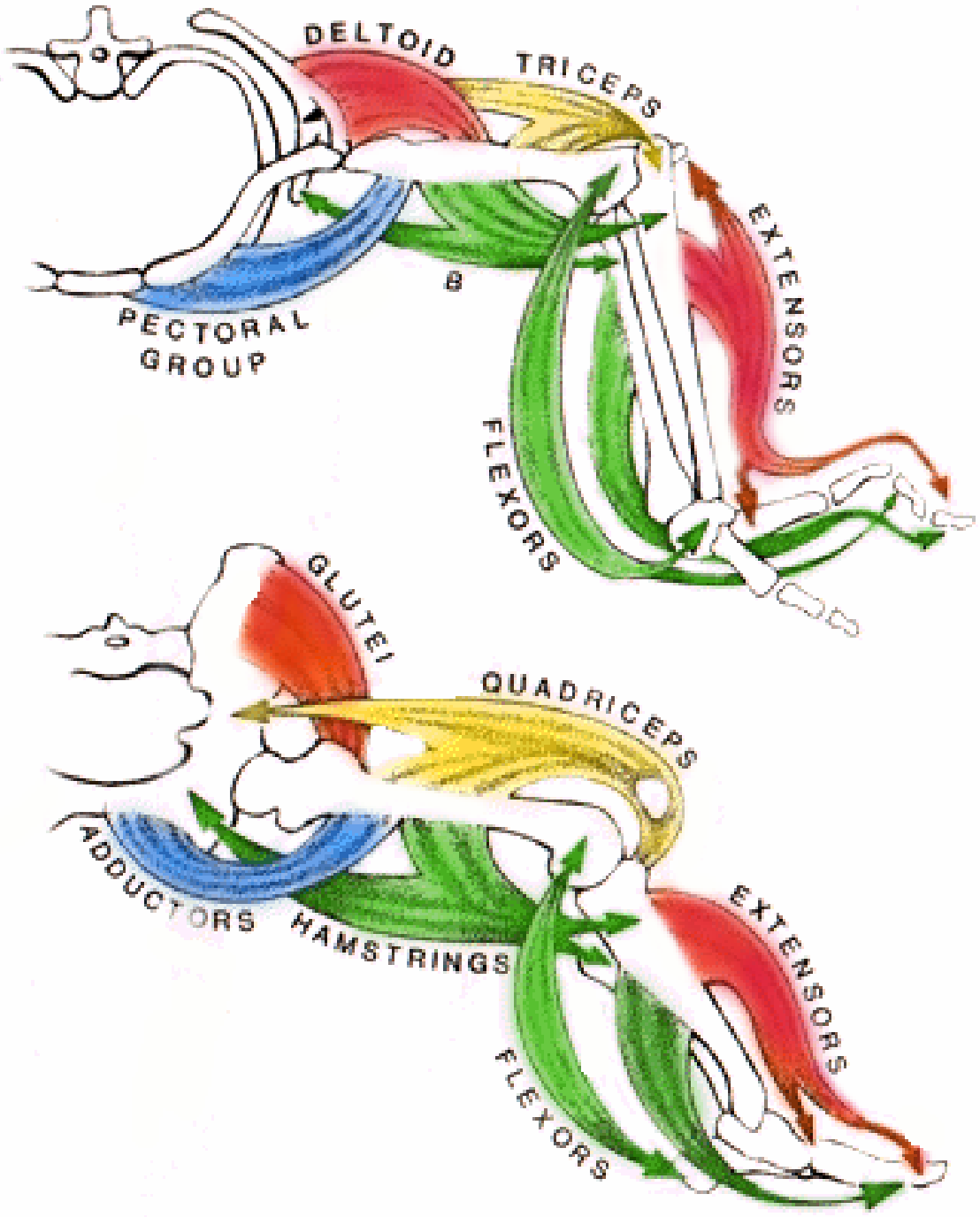


Triceps, Lateral Head

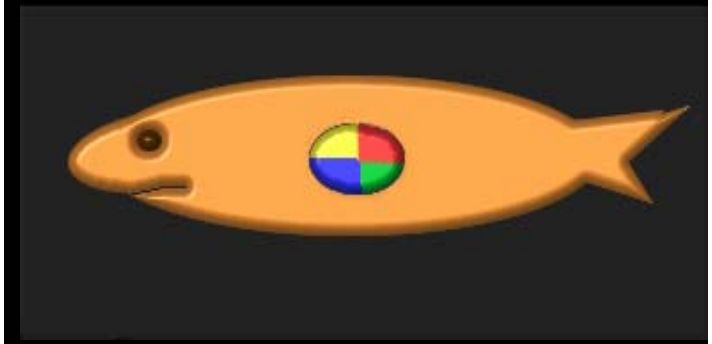
Elbow flexors

Brachii (brachial group)

(Here, spelling counts…)



Caudal/ventral



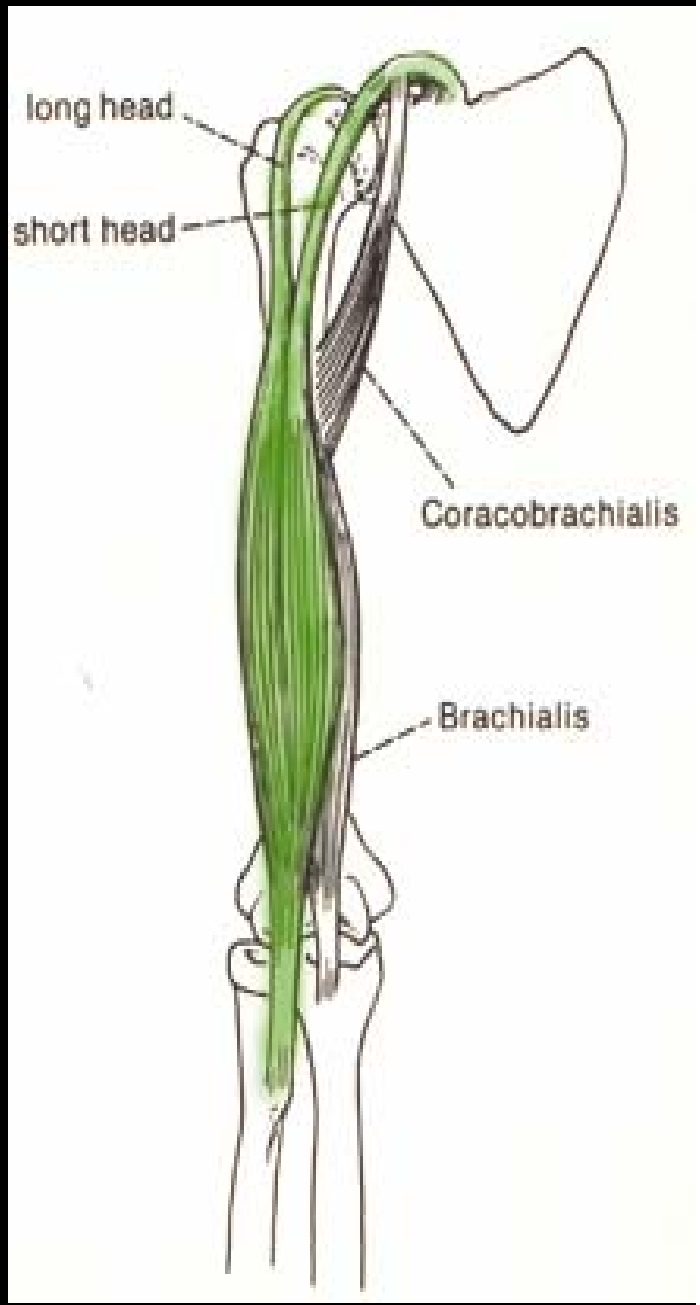
Hamstrings = brachii

Biceps brachii
(musculocutaneous n.)

Origin:
Short head: coracoid process
Long head; glenoid fossa

Insertion:
Proximal radius

Action:
Flexes elbow
supinates

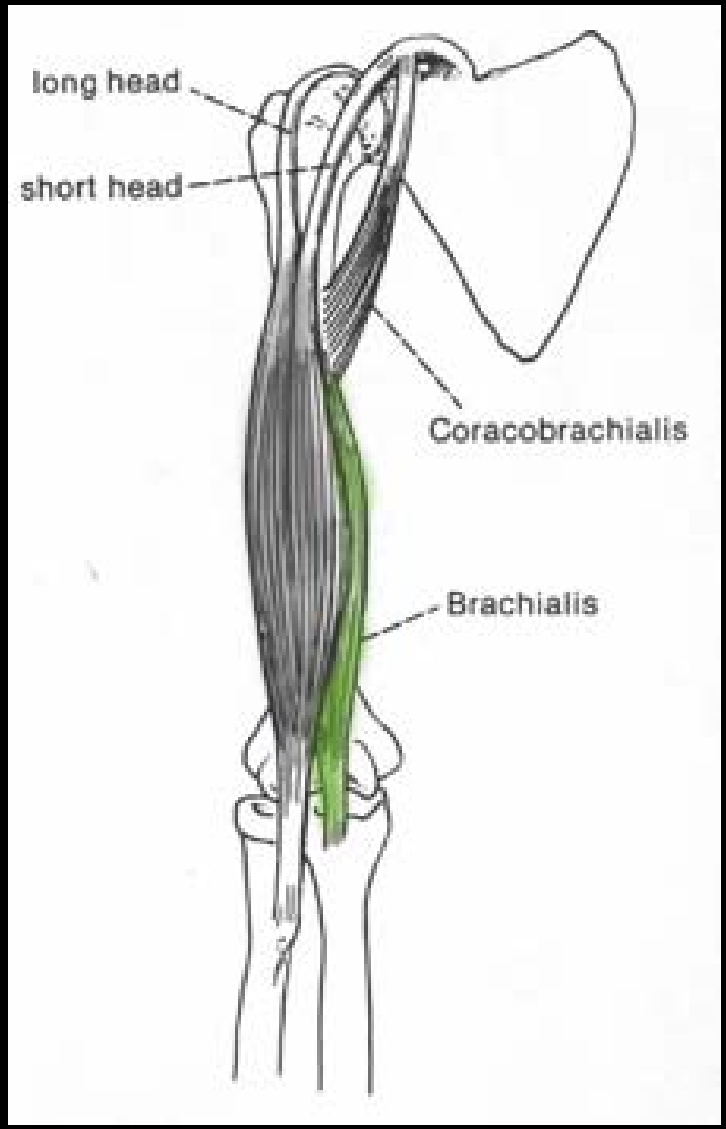


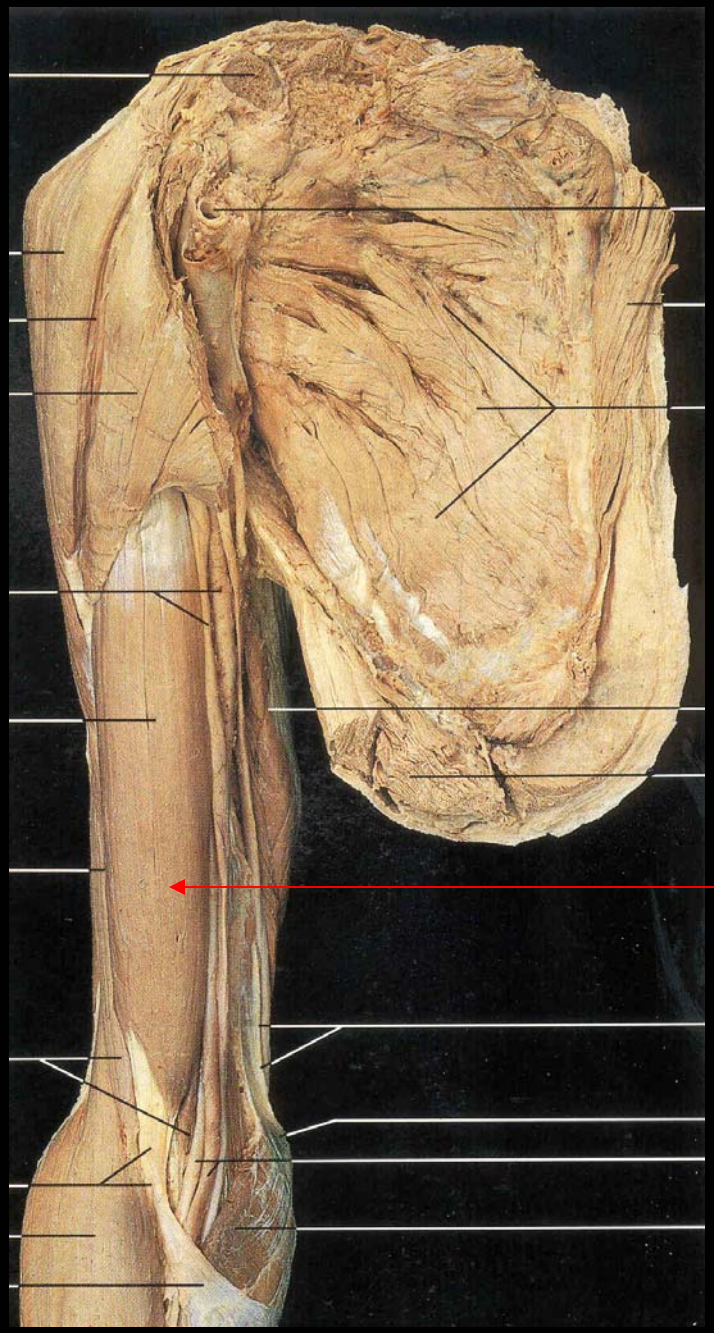
Brachialis (musculocutaneous n.)

Origin:
Humeral shaft

Insertion
Proximal ulna

Action: flexes elbow

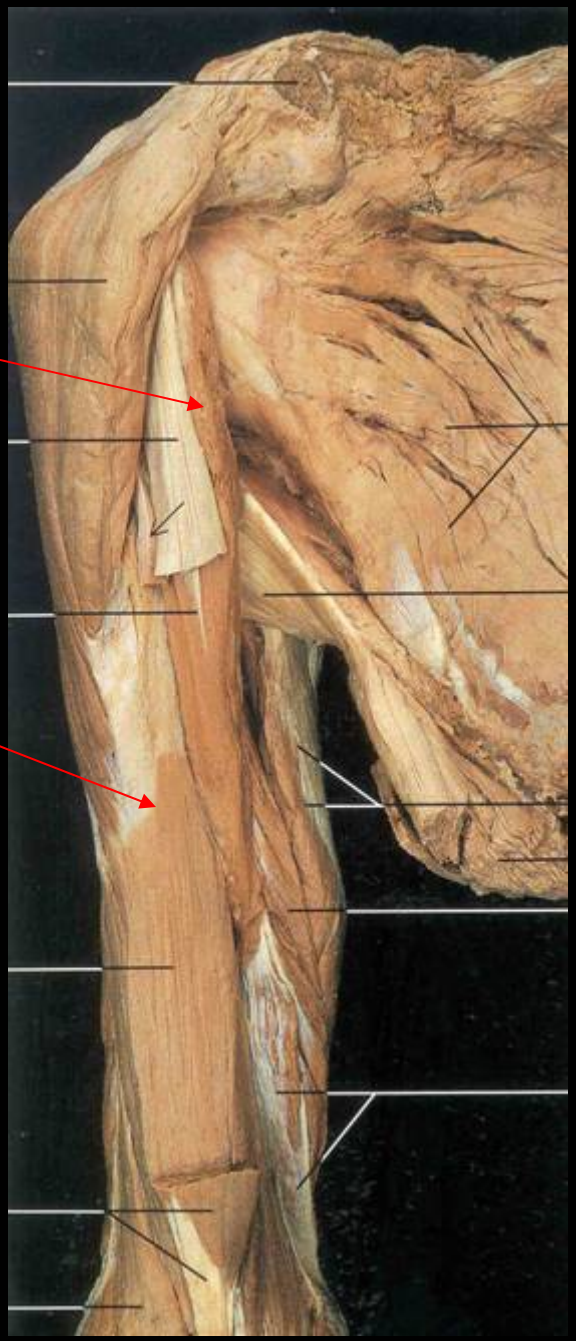




Corcobrachialis

Brachialis

Biceps



Brachioradialis
(Radial n.* exception)

Origin:
distal humerus

Insertion:
Styloid process of ulna

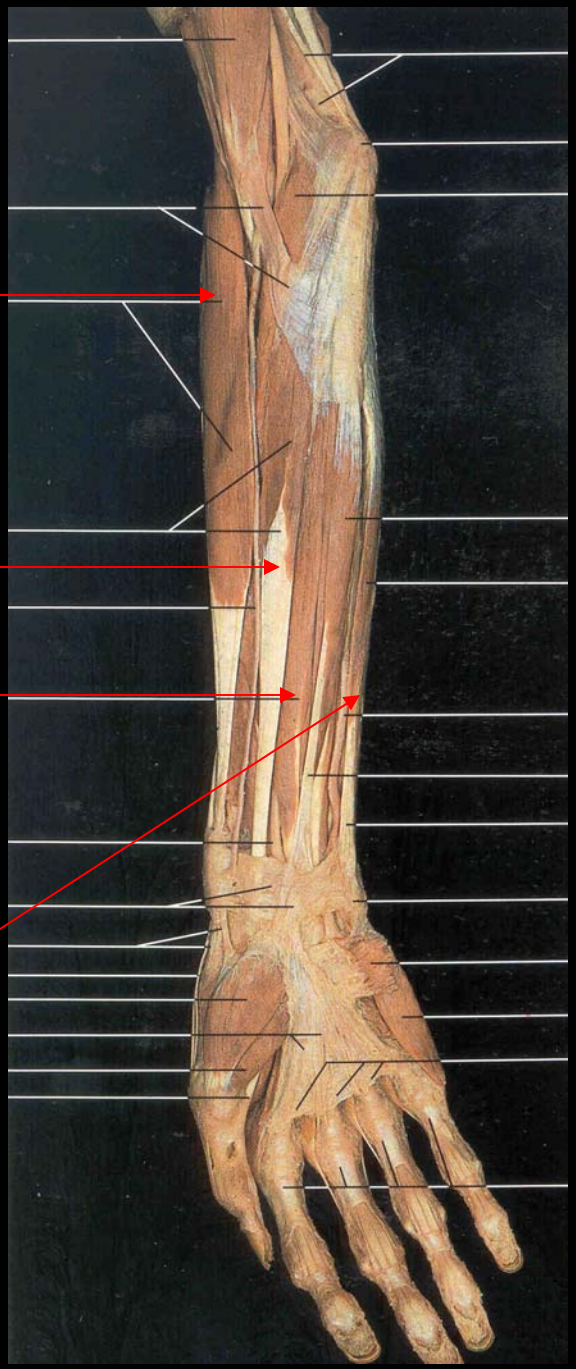
Action:
Flexes elbow

Brachioradialis

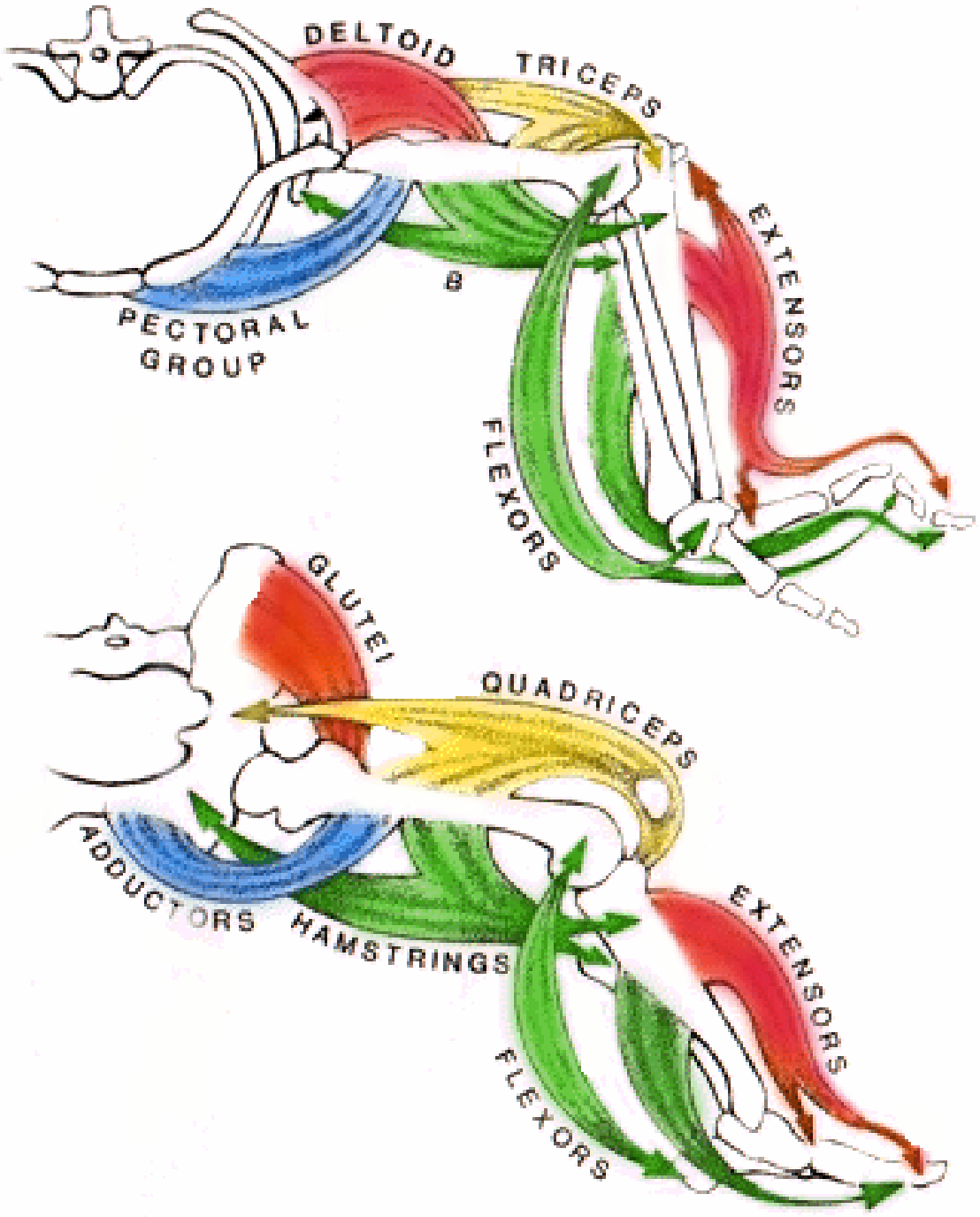
Flexor Carpi Radialis

Flexor Digitorum Superficialis

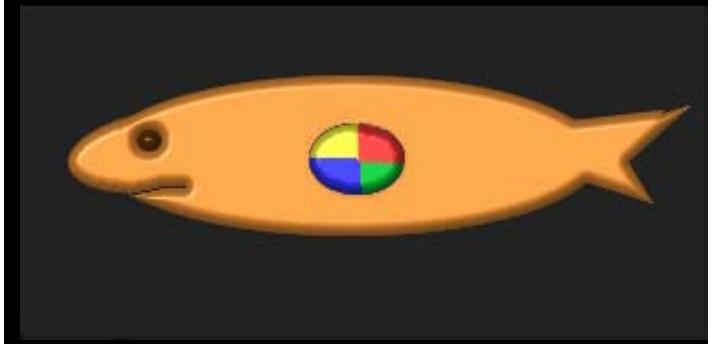
Flexor Carpi Ulnaris



FLEXORS of the Wrist



Caudal/ventral



Flexors = Flexors

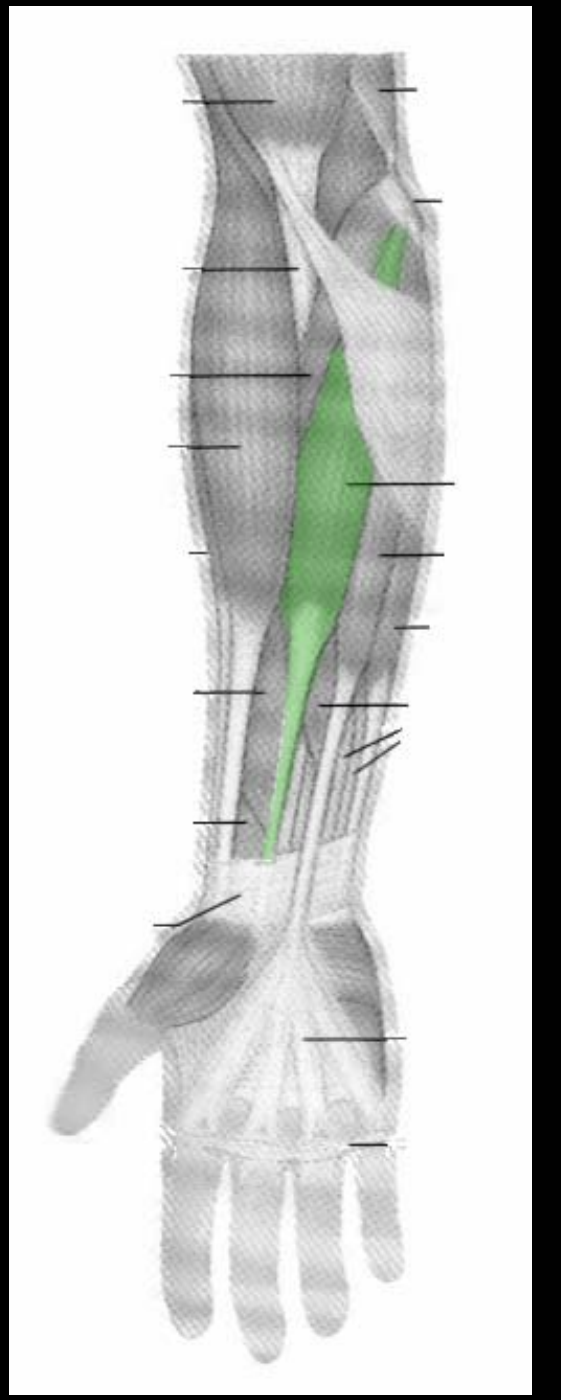
Superficial Layer

Flexor carpi radialis
Median n.

Origin:
Medial epicondyle of humerus

Insertion:
Base of 2nd & 3rd metacarpals

Action:
Flexes wrist; abducts hand



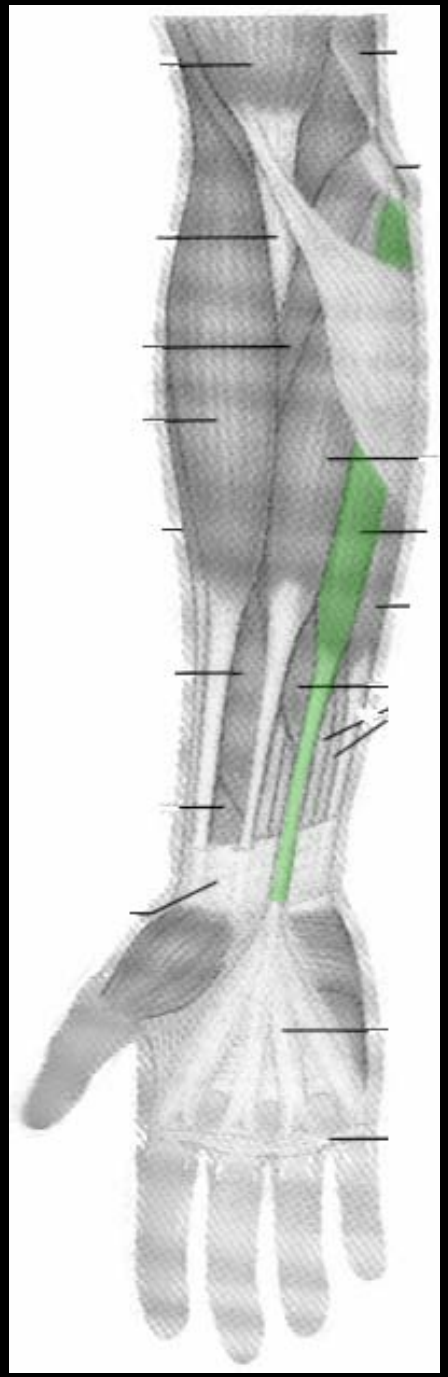
Superficial Layer

Palmaris longus
Median n.

Origin:
Medial epicondyle of humerus

Insertion:
Palmar aponeurosis

Action:
Flexes wrist



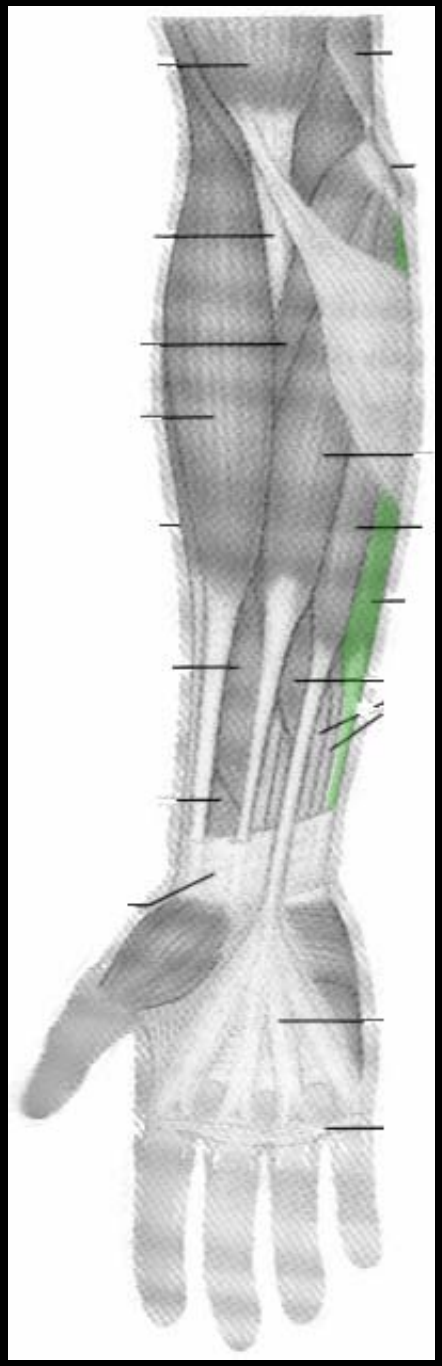
Superficial Layer

Flexor carpi ulnaris
Ulnar n.

Origin:
Medial epicondyle of humerus

Insertion:
Pisiform and base of 5th metacarpal

Action:
Flexes wrist; adducts hand



Intermediate Layer

Flexor digitorum superficialis
Median n

Origin:

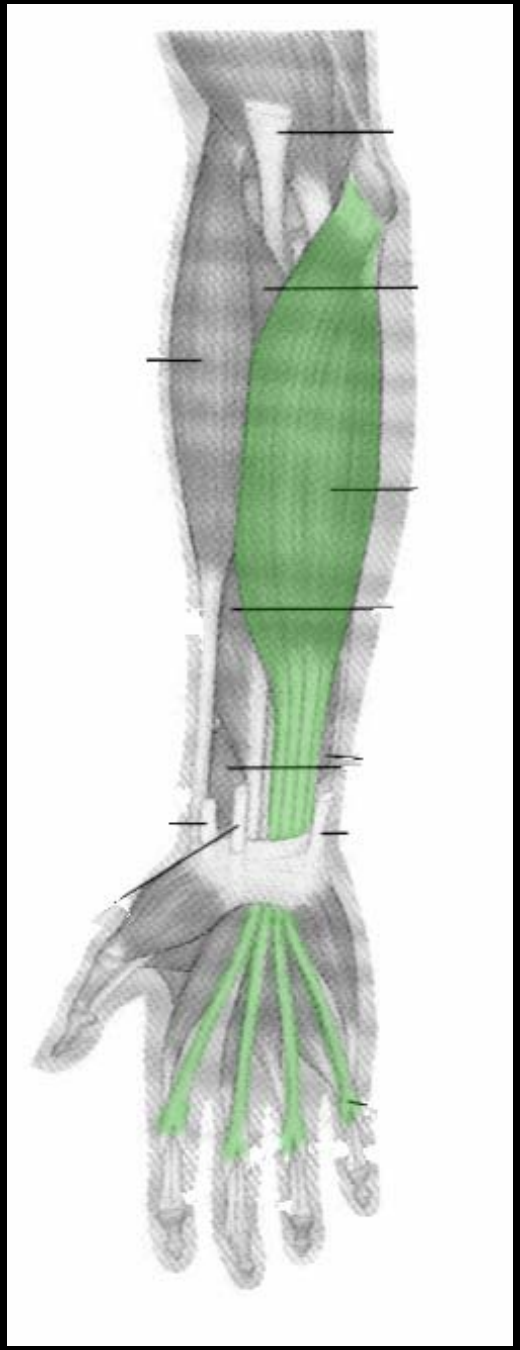
Medial epicondyle of humerus

Insertion:

Middle phalanges of fingers 2-5

Action:

Flexes wrist and middle phalanges



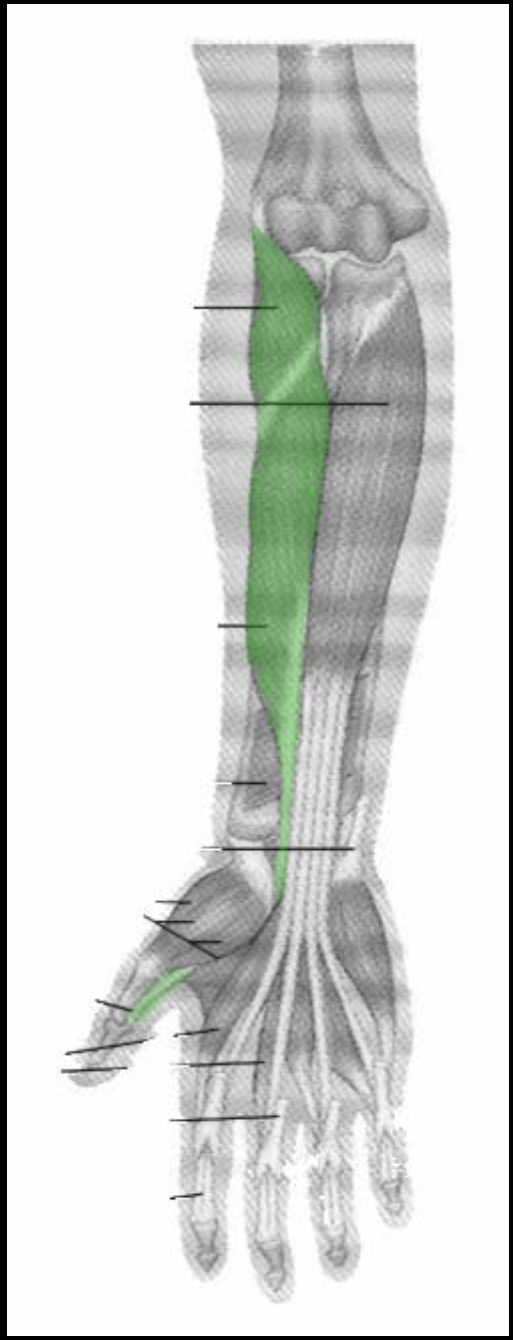
Deep Layer

Flexor pollicis longus
Median n

Origin:
Anterior surface of radius

Insertion:
Distal phalanx of thumb

Action:
Flexes distal phalanx of thumb



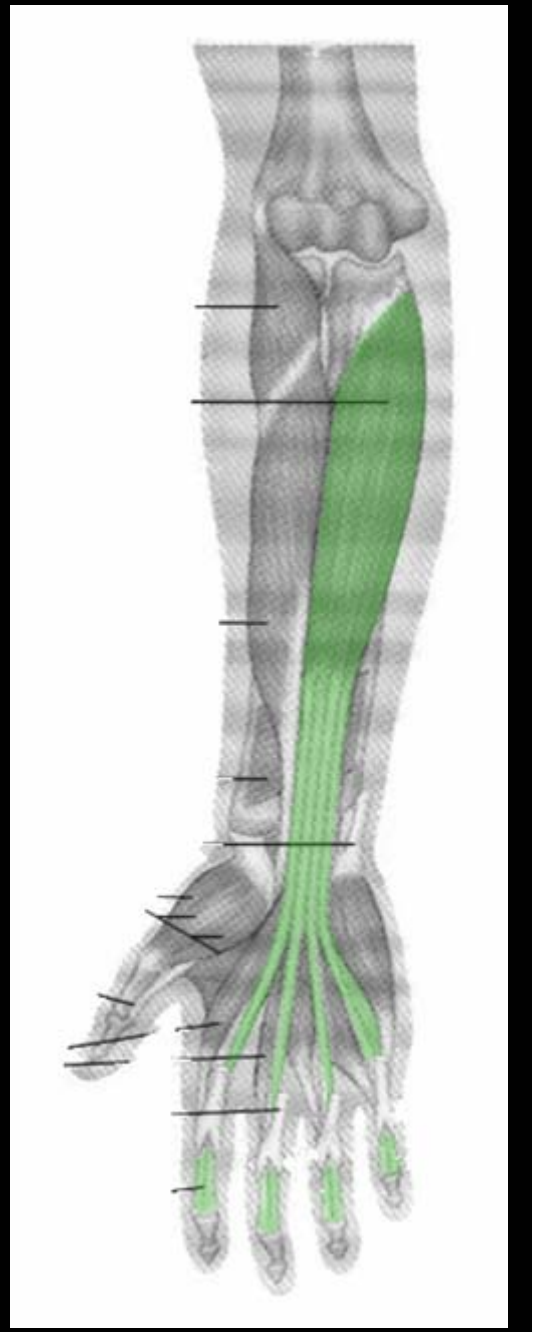
Deep Layer

Flexor digitorum profundus
Median n

Origin:
Anteromedial surface ulna

Insertion:
Distal phalanges of fingers 2-5

Action:
Flexes distal phalanges

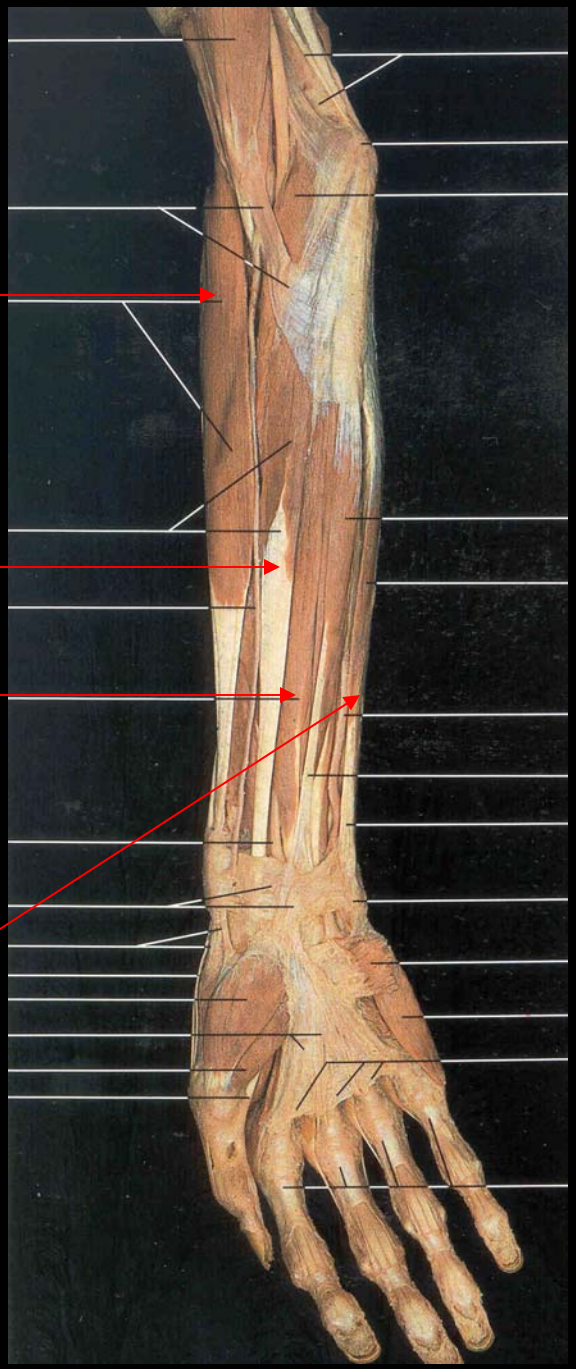


Brachioradialis

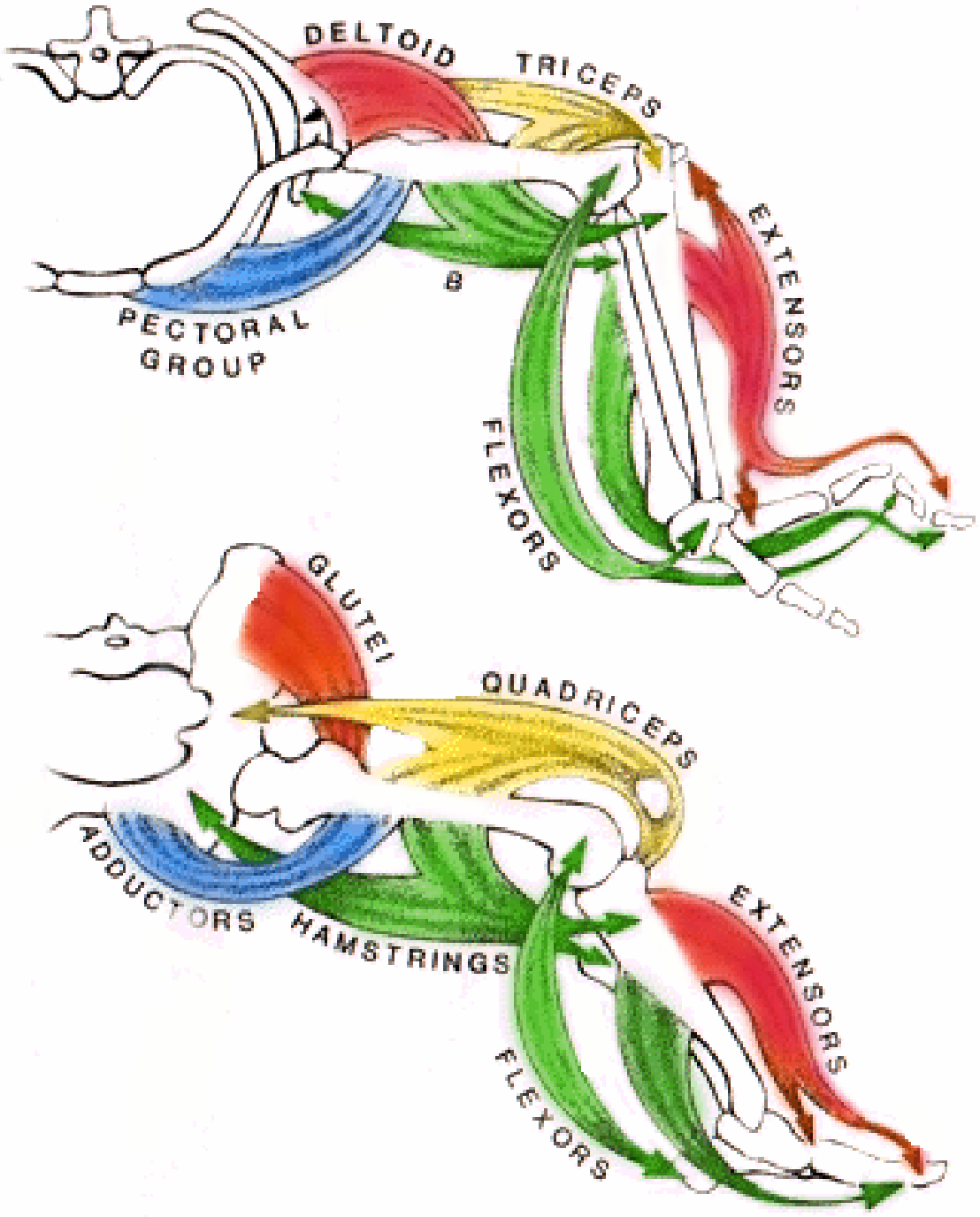
Flexor Carpi Radialis

Flexor Digitorum Superficialis

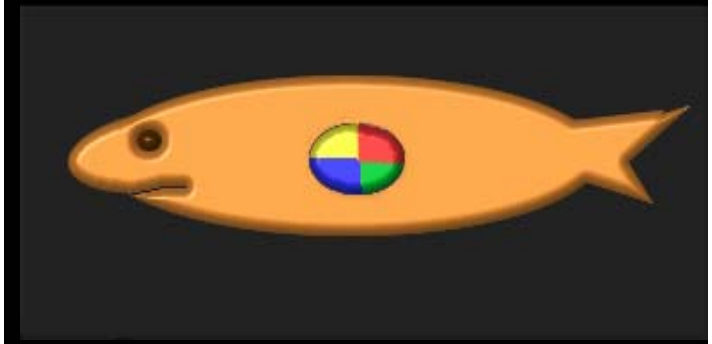
Flexor Carpi Ulnaris



EXTENSORS of the Wrist



Caudal/dorsal



Extensors = Extensors

Superficial

Extensor carpi radialis brevis

Radial n.

Origin:

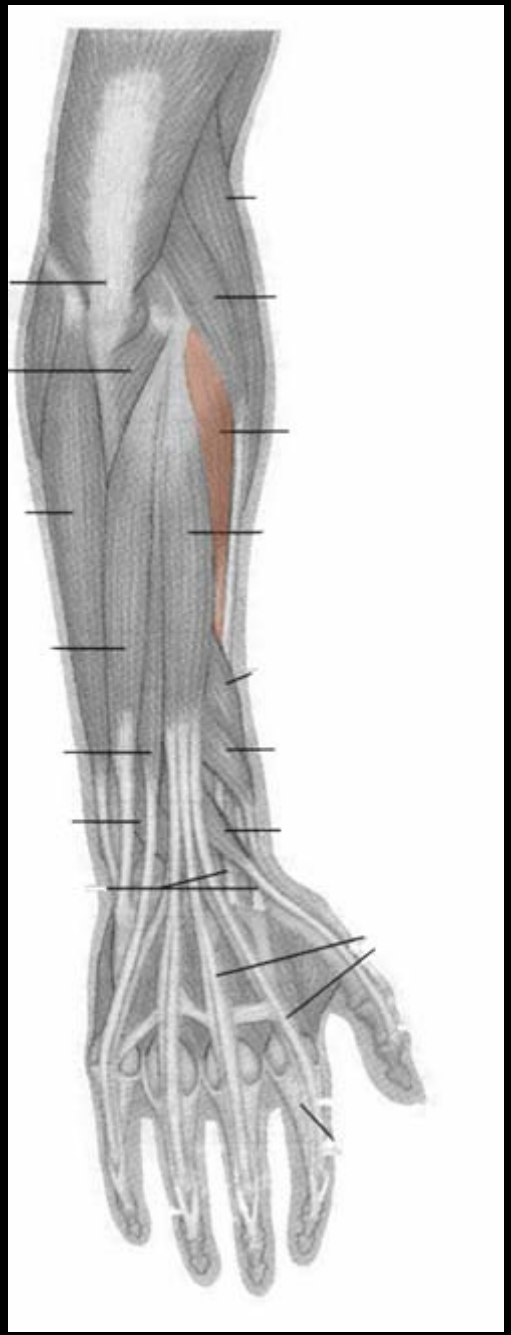
Lateral epicondyle of humerus

Insertion:

Base of 3rd metacarpal

Action:

Extends and abducts wrist



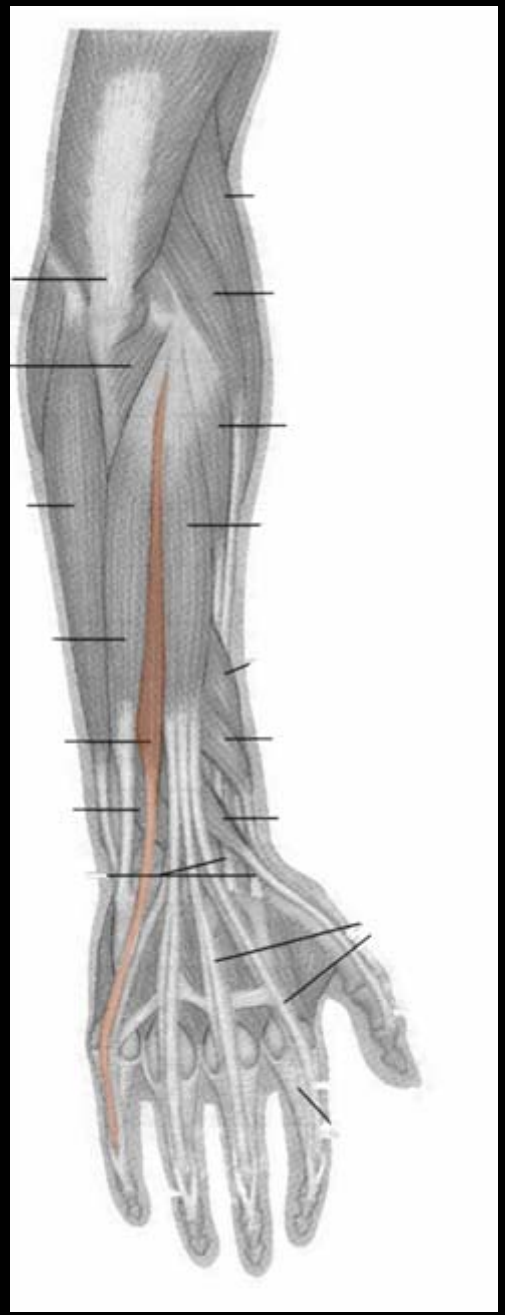
Superficial

Extensor digitorum minimi
Radial n.

Origin:
Lateral epicondyle of humerus

Insertion:
Distal phalange of little finger

Action:
Extends little finger



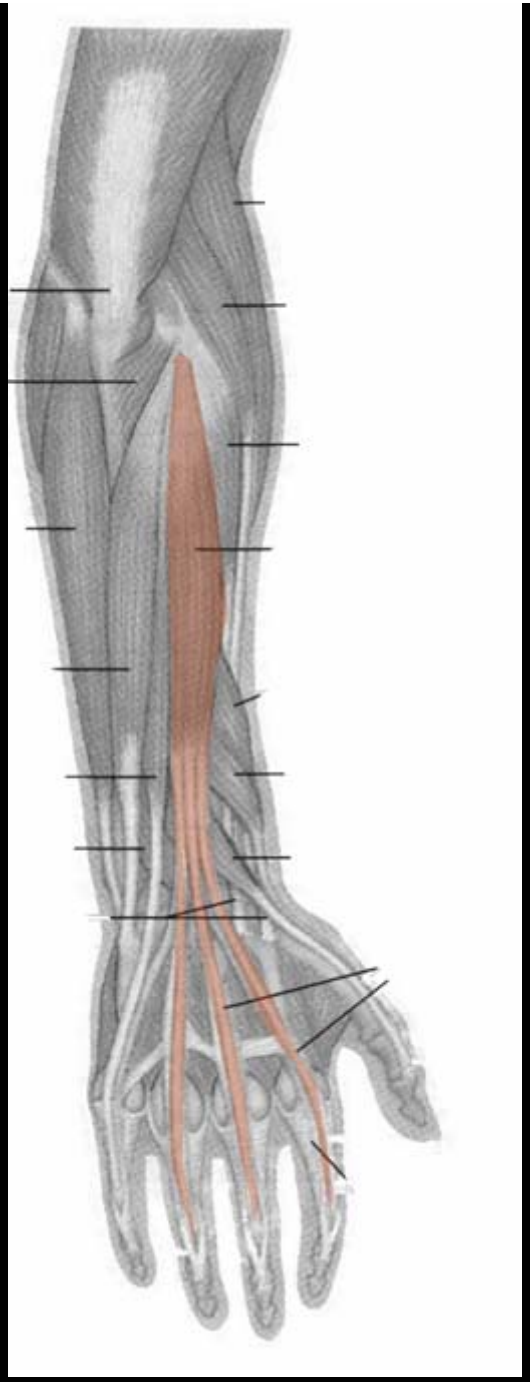
Superficial

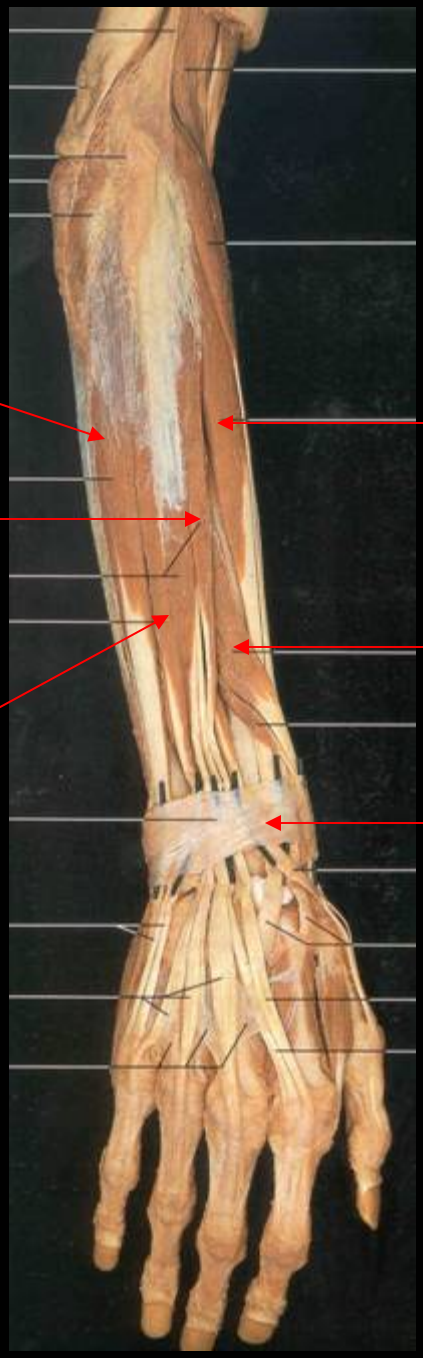
Extensor digitorum
Radial n.

Origin:
Lateral epicondyle of humerus

Insertion:
Distal phalange of fingers 2-4

Action:
Extends fingers and wrist; abduct fingers




Extensor Carpi Ularis
Extensor Indicis
Extensor Digitorum Superficialis
Extensor Carpi Radialis
Abductor Pollicis Longus
Extensor Retinaculum

Deep

Extensor indices

Radial n.

Origin:

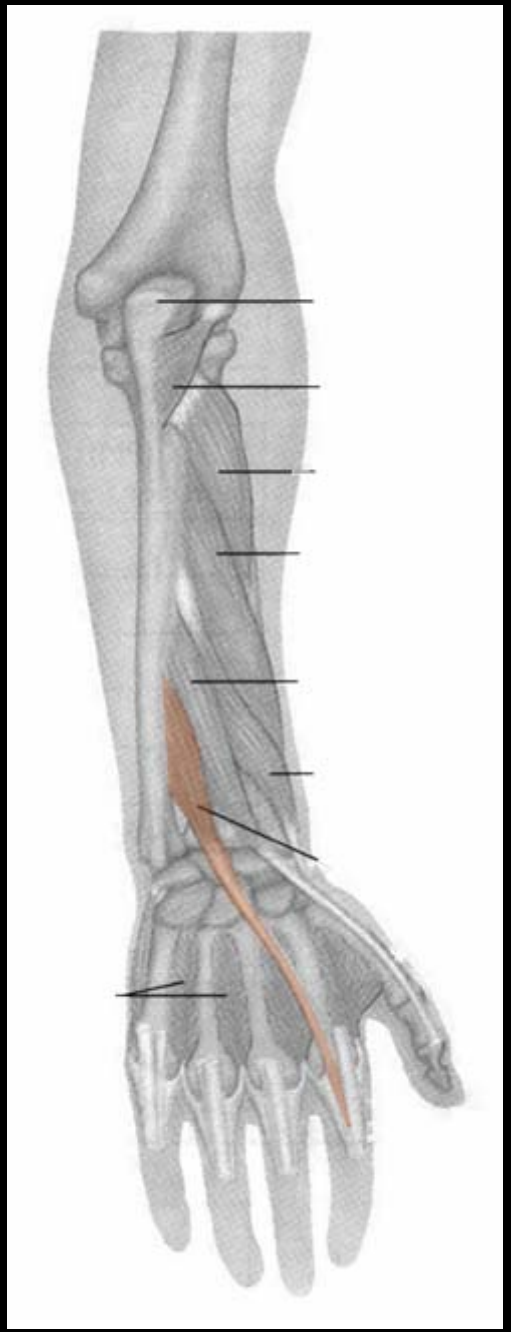
Posterior surface of distal ulna

Insertion:

Extensor expansion of index finger

Action:

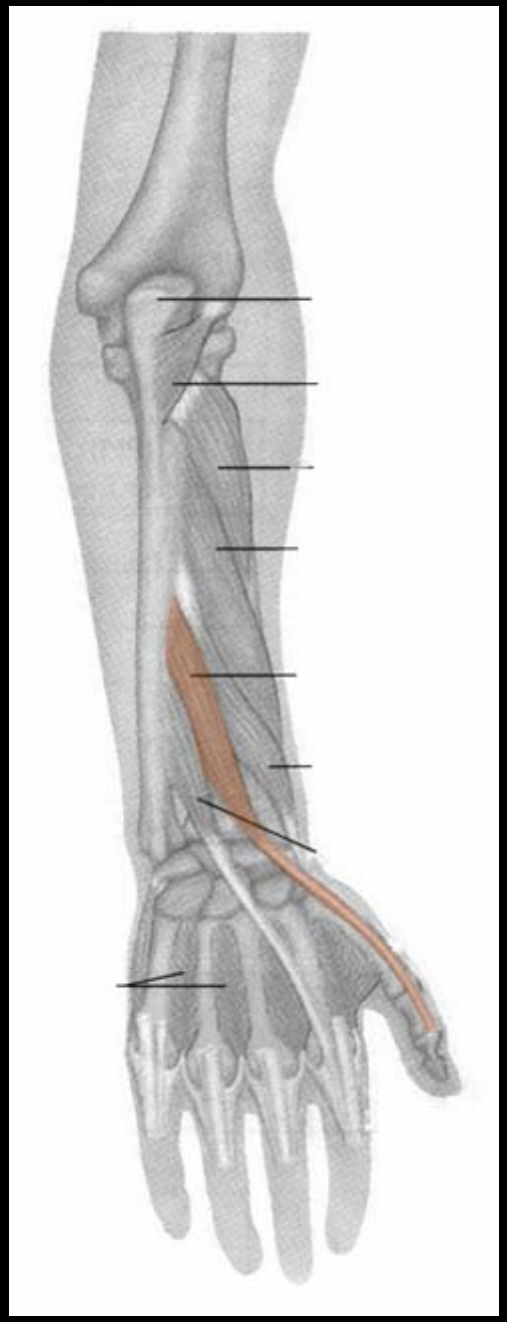
Extends index finger



Deep

Extensor pollicis longus
Radial n.

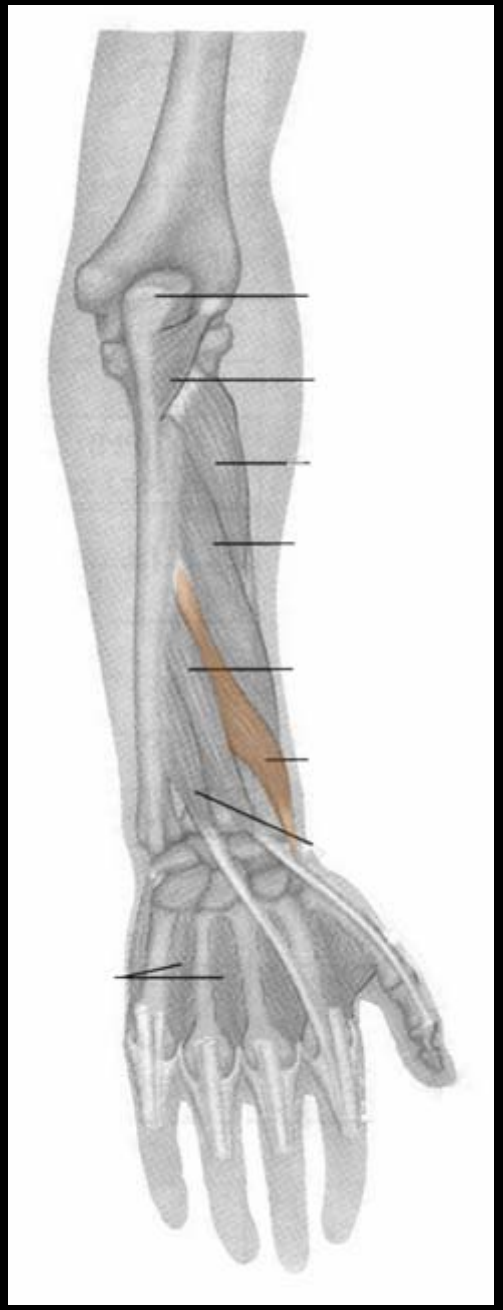
Origin:
Dorsal shaft of radius and ulna
Insertion:
Base of distal phalanx of thumb
Action:
Extends thumb



Deep

Extensor pollicis brevis
Radial n.

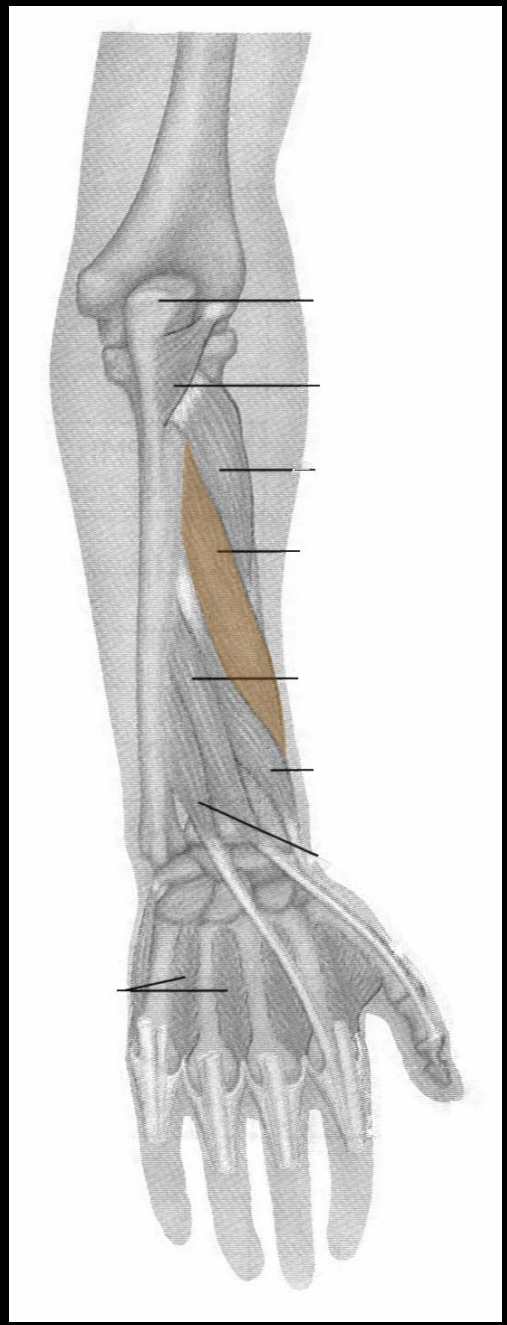
Origin:
Dorsal shaft of radius and ulna
Insertion:
Base of proximal phalanx of thumb
Action:
Extends thumb



Deep

Abductor pollicis longus
Radial n.

Origin:
Posterior surface of radius and ulna
Insertion:
Base of 1st metacarpal
Action:
Abducts and extends thumb



Muscles of Pronation and Supination

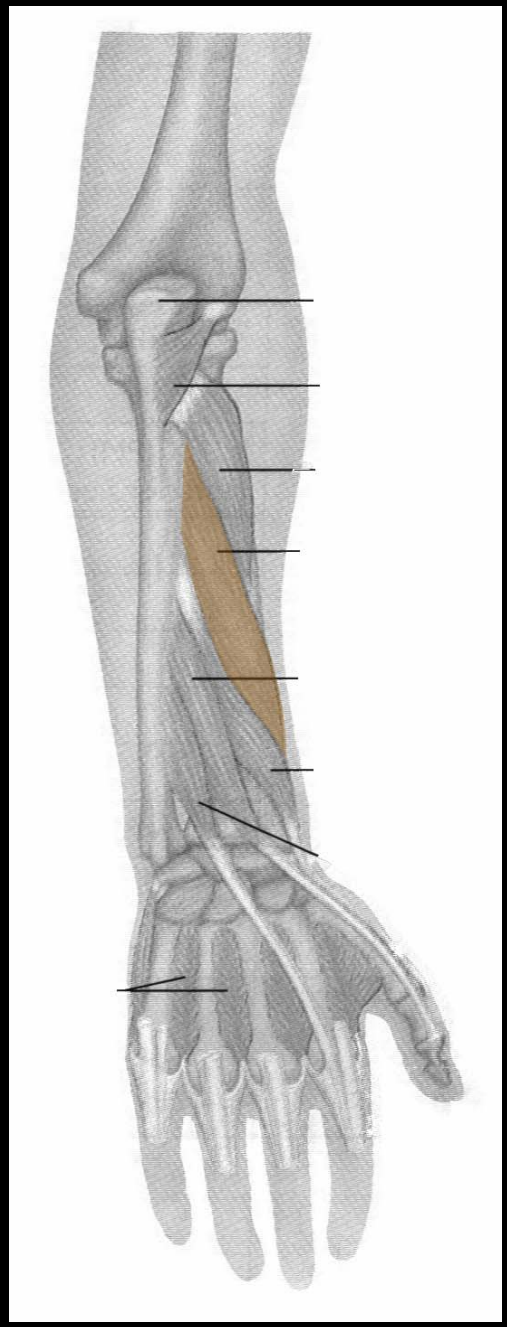
Deep

Abductor pollicis longus
Radial n.

Posterior surface of radius and ulna

Base of 1st metacarpal

Abducts and extends thumb

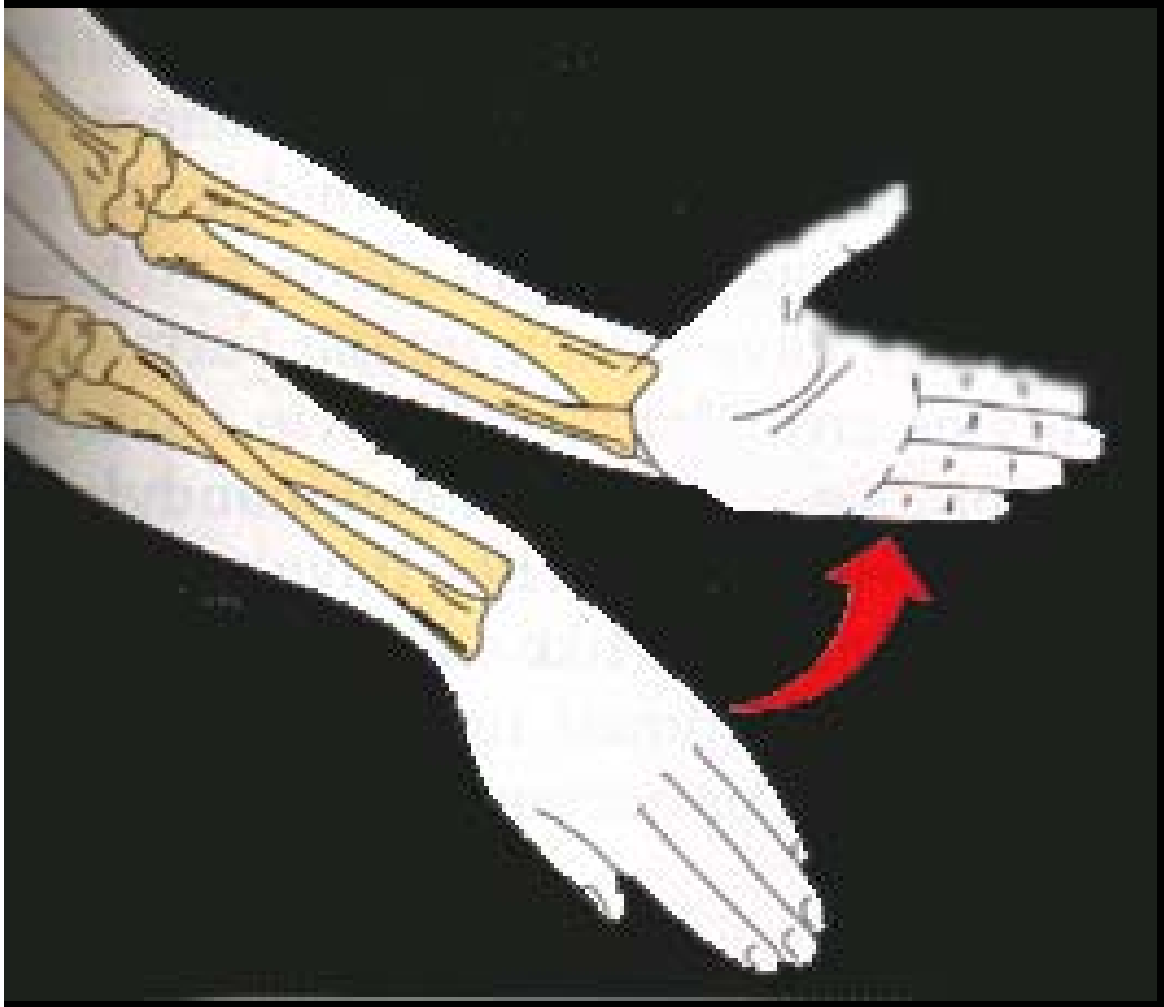


Supination:

Movement of the radius and ulna

Lateral rotation of the arm so palm faces superiorally

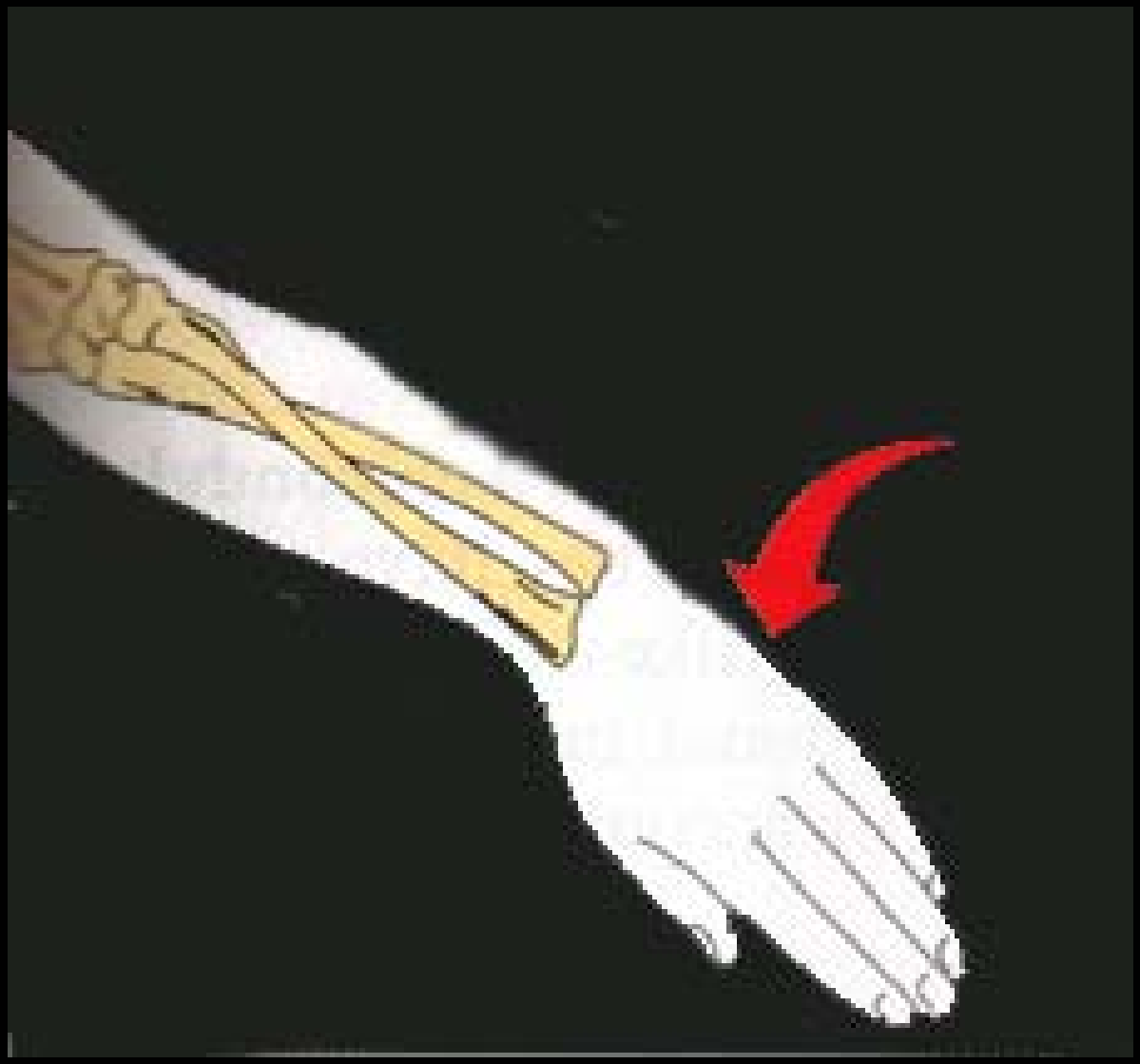
(anatomical position)



Ulna and Radius are parallel

Pronation:

Opposite of supination
Medial rotation of the arm so palm faces inferiorally
Relaxed position



Ulna and Radius are crossed

Supination

Supinator

Radial n.

Origin:

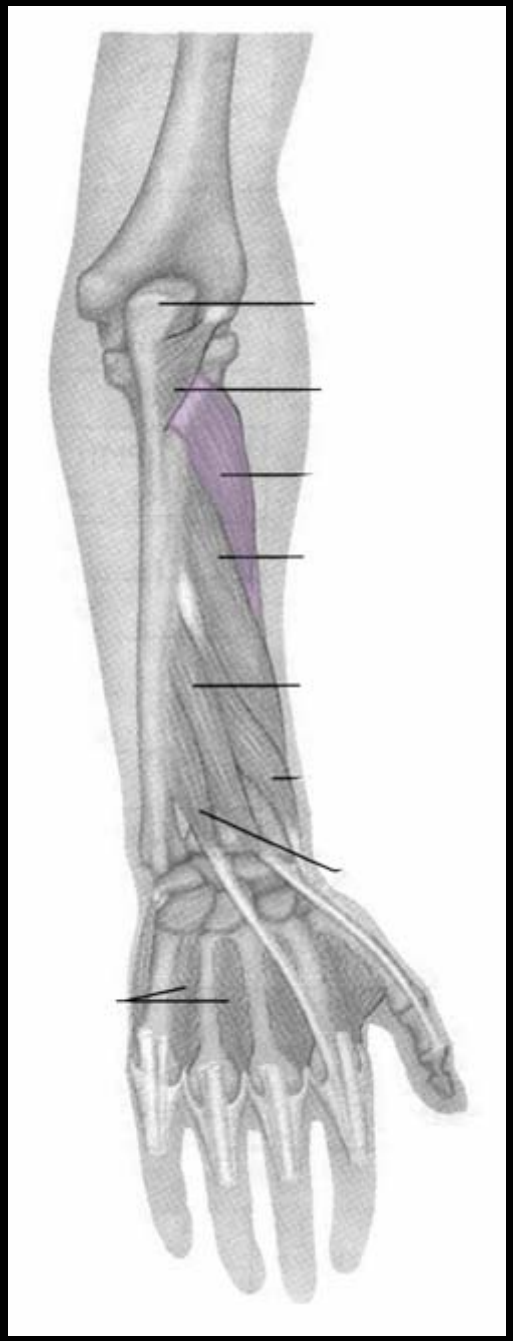
Lateral epicondyle of humerus

Insertion:

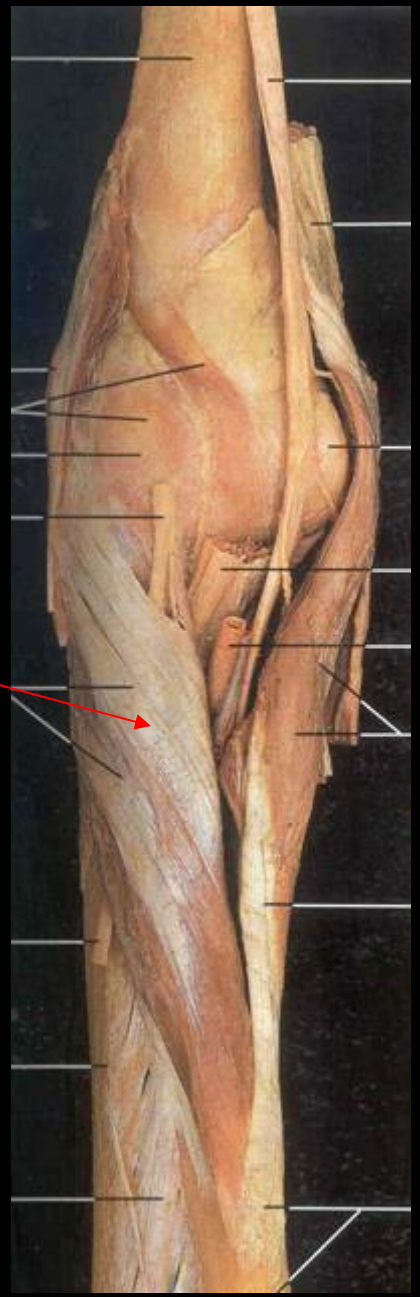
Proximal end of radius

Action:

Supinates forearm



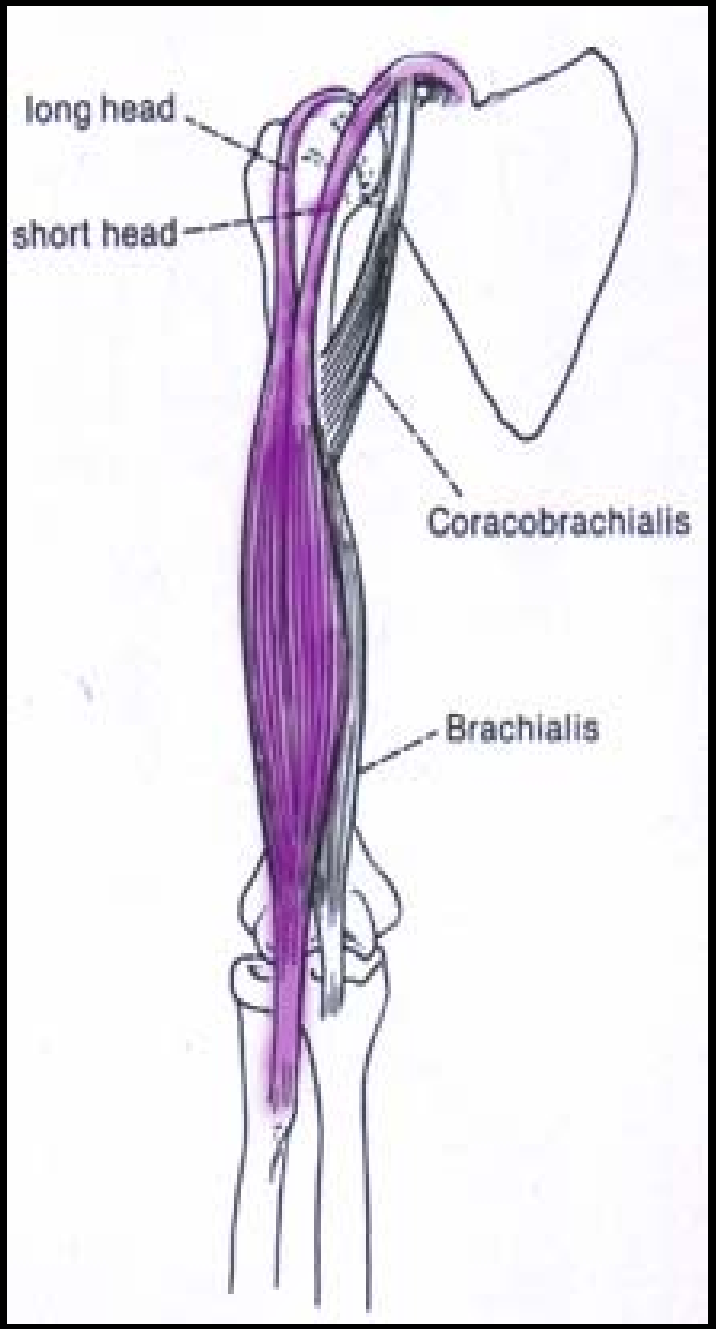
Supinator



Supination

Biceps brachii
musculocutaneous n.

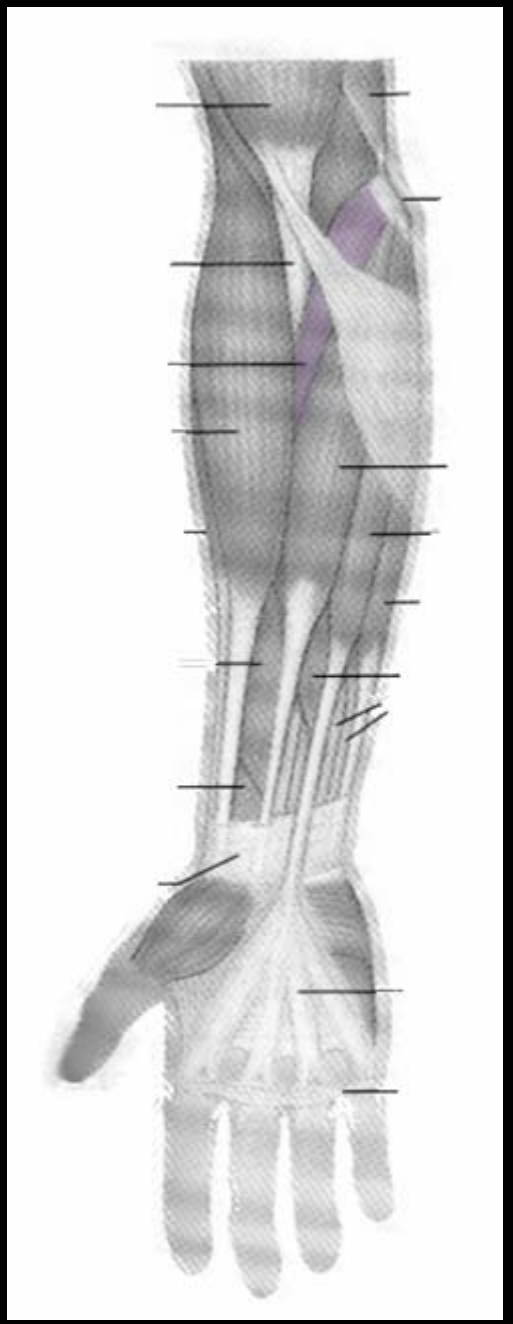
Origin:
Short head: coracoid process
Long head; glenoid fossa
Insertion:
Proximal radius
Action:
Flexes elbow
supinates



Pronation

Pronator teres
Median n.

Origin:
Medial condyle of humerus
Coronoid process of ulna
Insertion:
Lateral radius (midshaft)
Action:
Pronates forearm



Pronation

Pronator quadratus
Median n.

Origin:

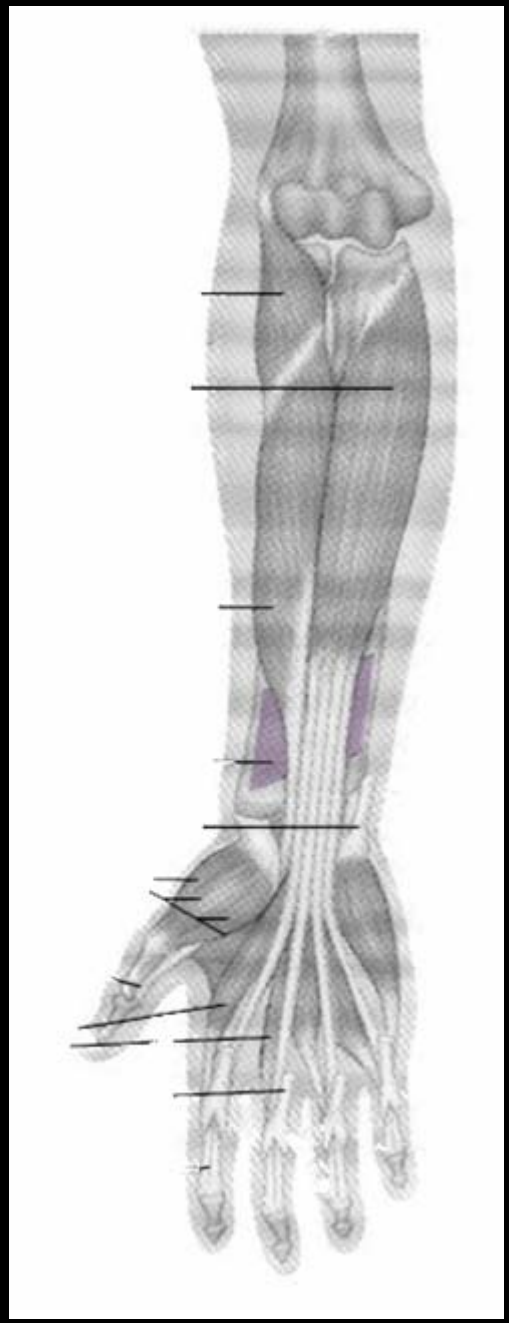
Distal portion of anterior ulnar shaft

Insertion:

Distal surface of anterior radius

Action:

Pronates forearm



Pronator Teres

Pronator Quadratus

What You Should Know

1: Muscles Crossing the Elbow Joint

- Flexors (ventral)
- Extensors (dorsal)

2: Muscles Crossing the Wrist Joint

Flexors (ventral)

Extensors (dorsal)

What You Should Know

3: Muscles of Elbow Extension, Flexion

- **Origin and Insertion**
- **Innervation**

3: Muscles of Pronation and Supination

- **Origin and Insertion**
- **Innervation**

What You Should Know

3: Serial Homologs of Major Groups

4: Functions of all Muscles Presented

5: A Summary of these muscles are in the Laboratory Manual and Cartmill's Text.