24a A&P: Muscular System-Organization of Skeletal Muscle

#### 24a A&P: Muscular System -Organization of Skeletal Muscle Class Outline

5 minutes	Attendance, Breath of Arrival, and Reminders
10 minutes	Lecture:
25 minutes	Lecture:
15 minutes	Active study skills:
60 minutes	Total

#### 24a A&P: Muscular System -Organization of Skeletal Muscle Class Reminders

#### Quizzes:

- 29b Kinesiology Quiz
  - Supraspinatus, infraspinatus, teres minor, subscapularis, pec minor, & serratus anterior
- **3**1a Quiz (20a, 20b, 21b, 22a, 23a, 24b, 29b, and 30a)
- **32a** Quiz (24a, 25a, 26a, 27a, 28a, 29a, 30b, and 31b)

#### **Assignments:**

- 30a Review Questions
  - Packet A: 141-158

#### **Preparation for upcoming classes:**

- 25a A&P: Muscular System: Mechanism of Contraction
  - Trail Guide: subscapularis
  - Packet E: 37-40
  - RQ Packet A-151
- 25b Hydrotherapy: Dry Brushing, Cold Water Wash, Hand and Foot Treatment
  Packet G: 15-19

#### **Classroom Rules**

#### Punctuality - everybody's time is precious

- Be ready to learn at the start of class; we'll have you out of here on time
- Tardiness: arriving late, returning late after breaks, leaving during class, leaving early

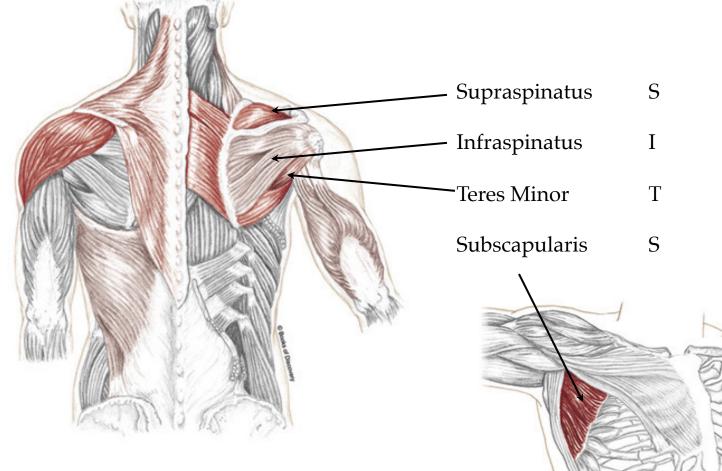
#### The following are not allowed:

- Bare feet
- Side talking
- Lying down
- Inappropriate clothing
- Food or drink except water
- Phones that are visible in the classroom, bathrooms, or internship

You will receive one verbal warning, then you'll have to leave the room.

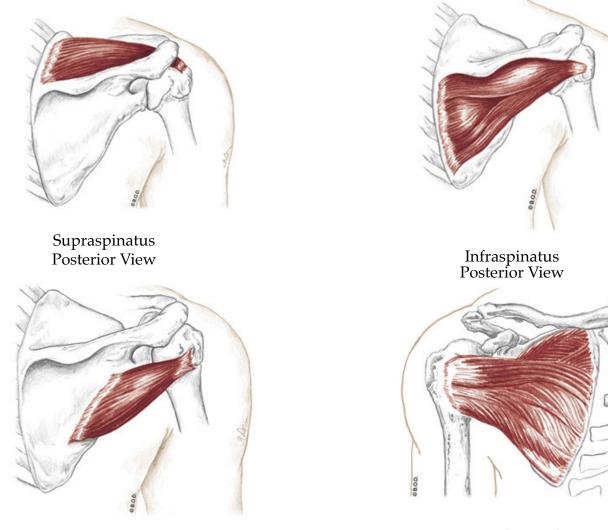
# Rotator Cuff

Trail Guide, Page 74



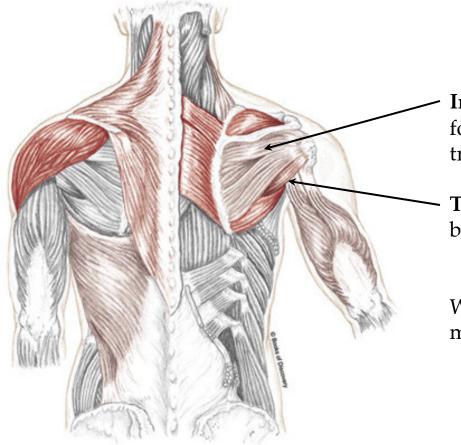
# Rotator Cuff

Trail Guide, Page 74



Teres Minor Posterior View Subscapularis Anterior View

# Infraspinatus and Teres Minor Trail Guide, Page 75



**Infraspinatus** is located in the infraspinous fossa, with its medial portion deep to the trapezius fibers.

**Teres minor** is a small muscle squeezed between infraspinatus and teres major.

What do you use infraspinatus and teres minor for?

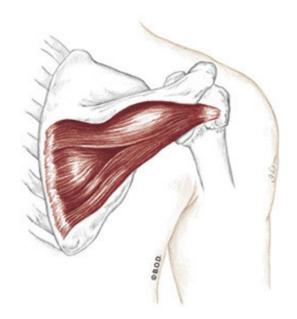
Laterally rotate the shoulder joint (glenohumeral joint)

Adduct the shoulder joint (glenohumeral joint)

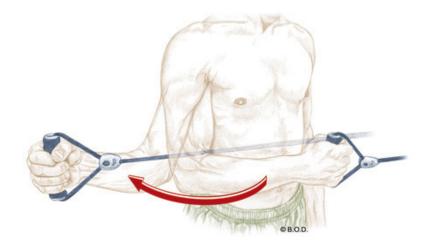
Stabilize the head of the humerus in glenoid cavity

Infraspinous fossa of the scapula

Greater tubercle of the humerus



Posterior View

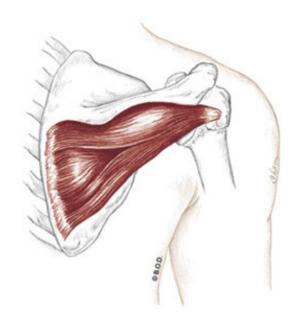


Laterally rotate the shoulder joint (glenohumeral joint)

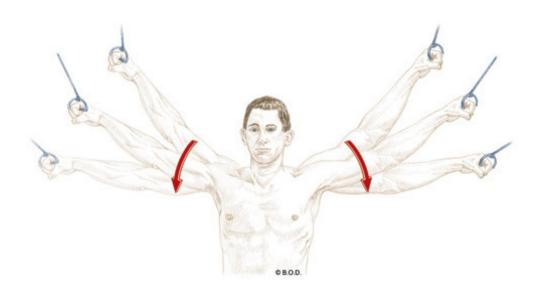
Adduct the shoulder joint (glenohumeral joint)

Stabilize the head of the humerus in glenoid cavity

- Infraspinous fossa of the scapula
  - Greater tubercle of the humerus



Posterior View



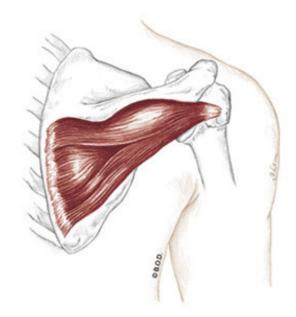
Laterally rotate the shoulder joint (glenohumeral joint)

Adduct the shoulder joint (glenohumeral joint)

Stabilize the head of the humerus in glenoid cavity

Infraspinous fossa of the scapula





Posterior View

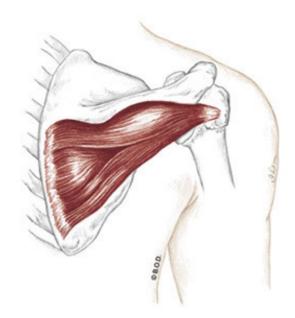
Laterally rotate the shoulder joint (glenohumeral joint)

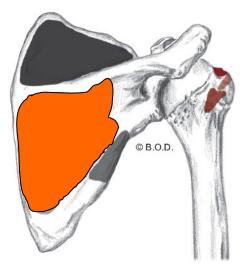
Adduct the shoulder joint (glenohumeral joint)

Stabilize the head of the humerus in glenoid cavity

Infraspinous fossa of the scapula

Greater tubercle of the humerus





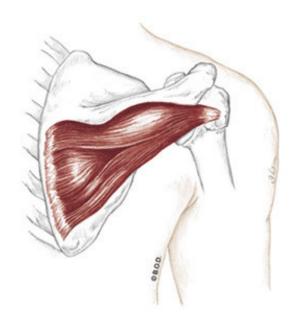
**A** Laterally rotate the shoulder joint (glenohumeral joint)

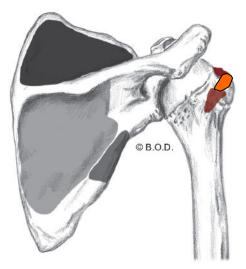
Adduct the shoulder joint (glenohumeral joint)

Stabilize the head of the humerus in glenoid cavity

Infraspinous fossa of the scapula

Greater tubercle of the humerus





#### Shift gears from Infraspinatus to Teres Minor



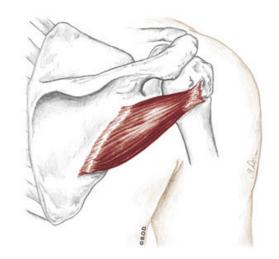
Laterally rotate the shoulder joint (glenohumeral joint)

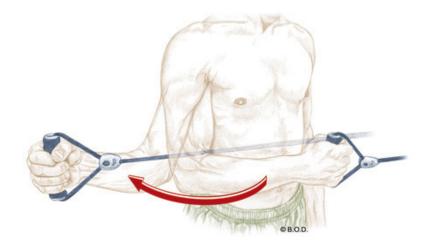
Adduct the shoulder joint (glenohumeral joint)

Stabilize the head of the humerus in glenoid cavity

Upper two-thirds of lateral border of the scapula

Greater tubercle of the humerus



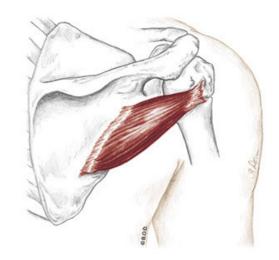


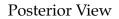
Laterally rotate the shoulder joint (glenohumeral joint)

Adduct the shoulder joint (glenohumeral joint)

Stabilize the head of the humerus in glenoid cavity

- Upper two-thirds of lateral border of the scapula
  - Greater tubercle of the humerus







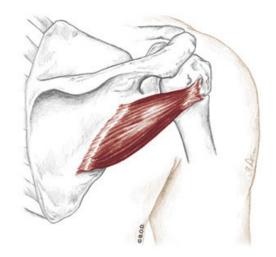
Laterally rotate the shoulder joint (glenohumeral joint)

Adduct the shoulder joint (glenohumeral joint)

Stabilize the head of the humerus in glenoid cavity

Upper two-thirds of lateral border of the scapula

Greater tubercle of the humerus



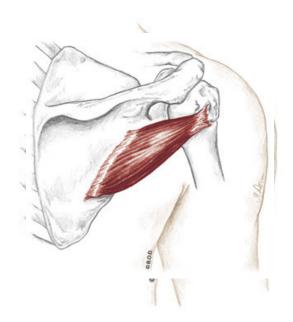
Laterally rotate the shoulder joint (glenohumeral joint)

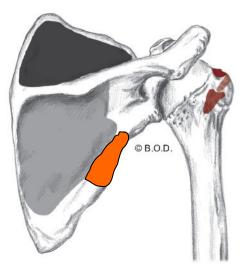
Adduct the shoulder joint (glenohumeral joint)

Stabilize the head of the humerus in glenoid cavity

Upper two-thirds of lateral border of the scapula

Greater tubercle of the humerus





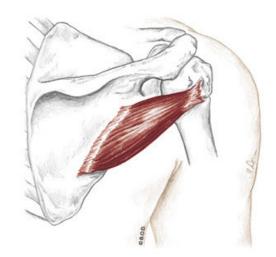
A Laterally rotate the shoulder joint (glenohumeral joint)

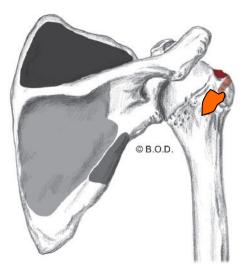
Adduct the shoulder joint (glenohumeral joint)

Stabilize the head of the humerus in glenoid cavity

Upper two-thirds of lateral border of the scapula

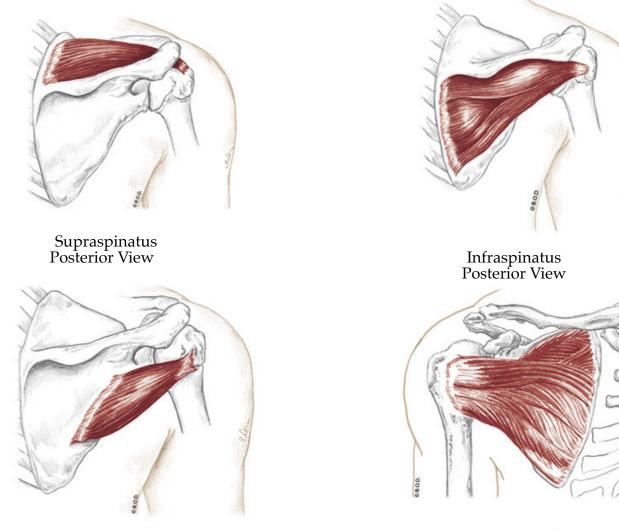
Greater tubercle of the humerus





# Rotator Cuff

Trail Guide, Page 74

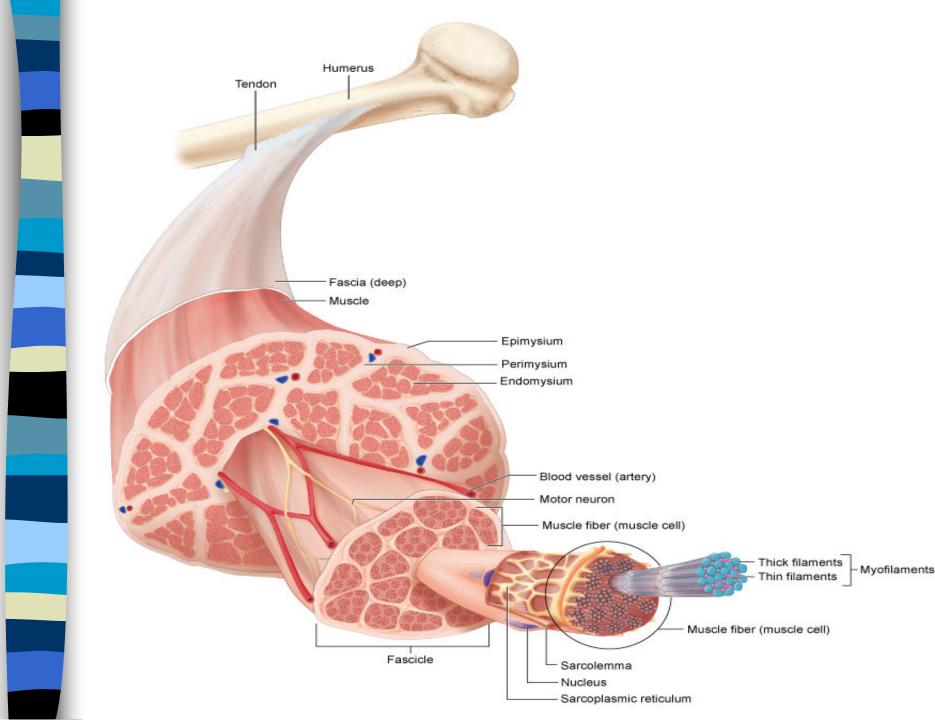


Teres Minor Posterior View Subscapularis Anterior View 24a A&P: Muscular System -Organization of Skeletal Muscle E-37



#### Anatomy

Skeletal <u>muscles</u>. Related fascial structures including <u>tendons</u> and aponeuroses.

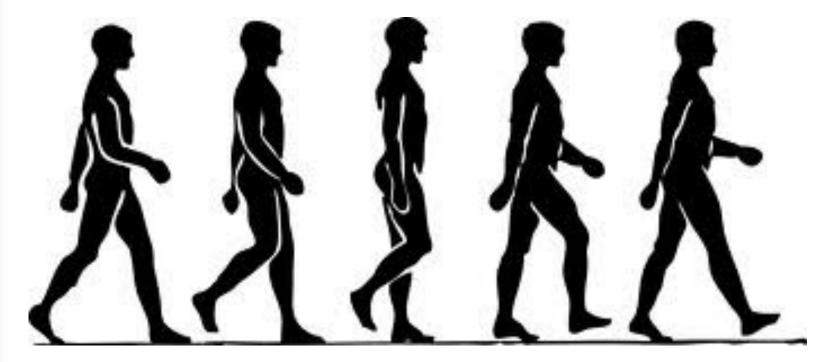




Movement Posture maintenance Moving substances Heat production

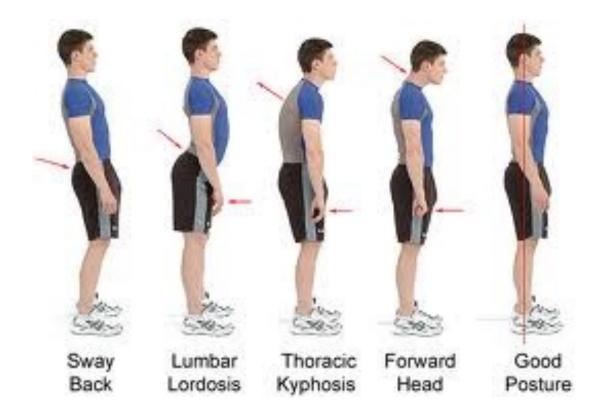


**Movement** Skeletal muscle <u>contractions</u> produce movement of the body as a whole, called locomotion, and movement of its parts.



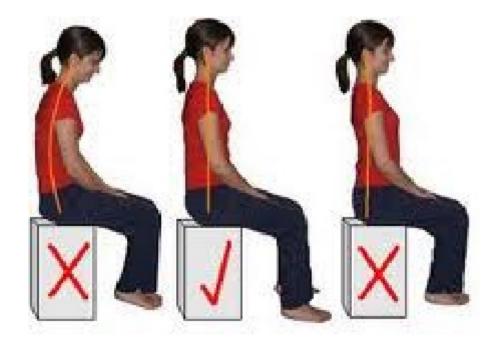


**Posture maintenance** Skeletal muscles must contract to maintain static postures, such as in sitting and <u>standing</u>.



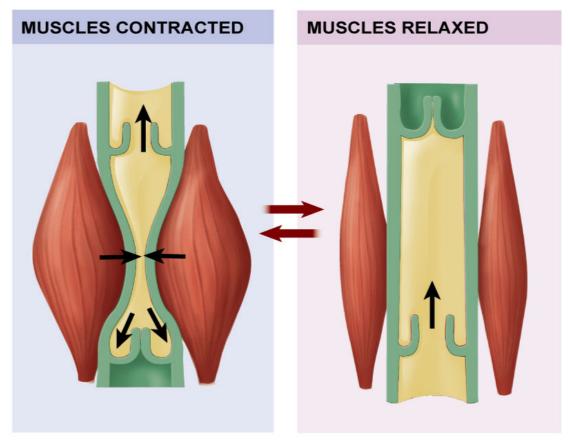


**Posture maintenance** Skeletal muscles must contract to maintain static postures, such as in sitting and <u>standing</u>.



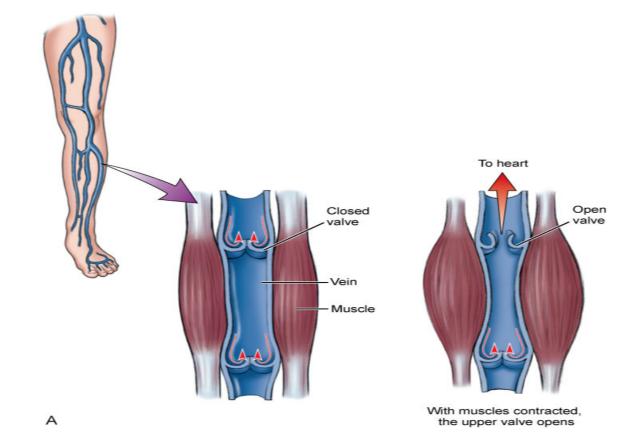


**Moving substances** Contraction of skeletal muscles promotes lymphatic flow and blood flow from the extremities to the <u>heart</u>.





**Moving substances** Contraction of skeletal muscles promotes lymphatic flow and blood flow from the extremities to the <u>heart</u>.





**Heat production (AKA: thermogenesis)** Muscle contractions produce and release heat that is important for homeostasis.



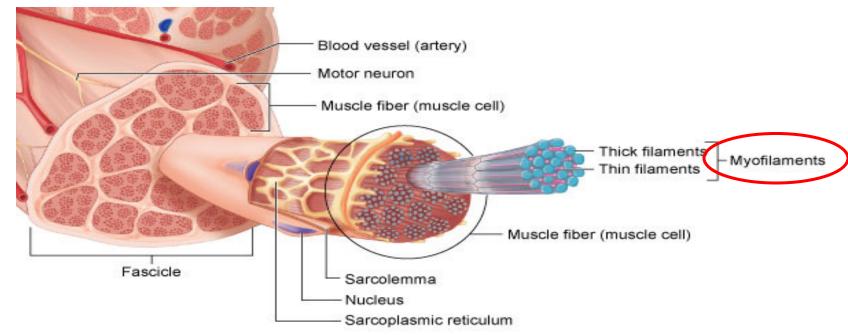


Muscle group  $\rightarrow$  skeletal muscle  $\rightarrow$  fascicle $\rightarrow$  muscle fiber  $\rightarrow$  myofibril  $\rightarrow$  myofilamentCovered byCovered byCovered byDeep fascia $\rightarrow$  epimysium $\rightarrow$  perimysium  $\rightarrow$  endomysium

Myofilaments Sarcomere Myofibrils Muscle fiber Fasciculi

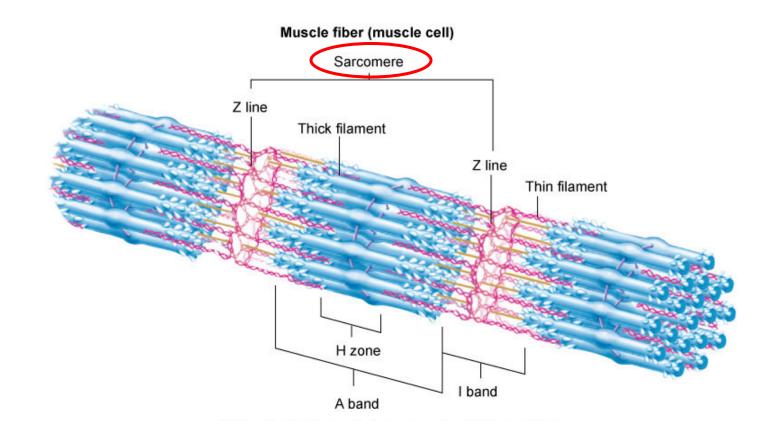


**Myofilaments** Thick and thin protein strands within each sarcomere. Consist of actin and myosin.



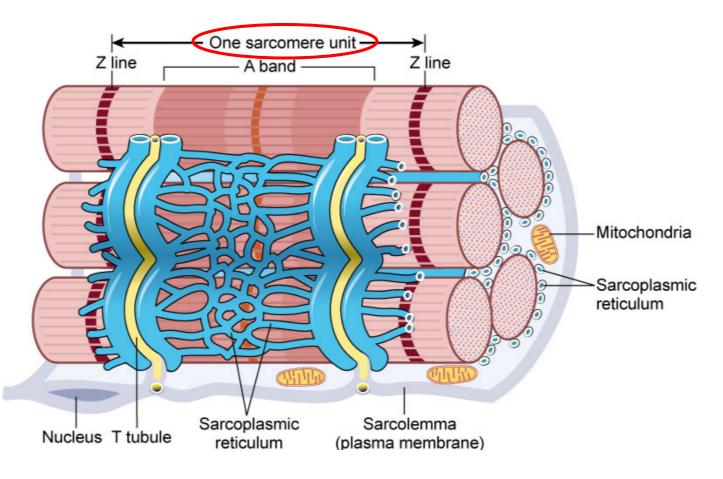


Sarcomere A muscle's contractile unit. Found within myofibrils.



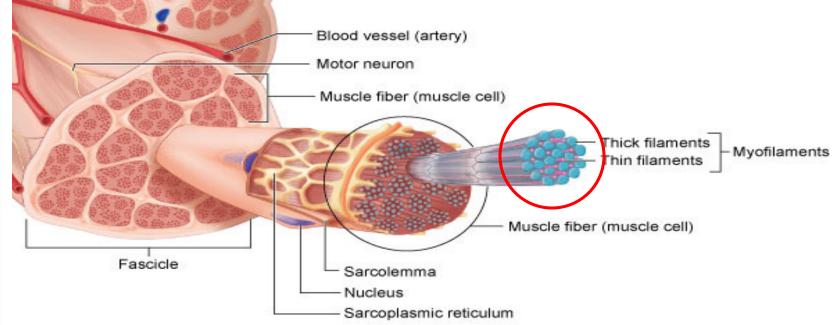


#### Sarcomere A muscle's contractile unit. Found within myofibrils.



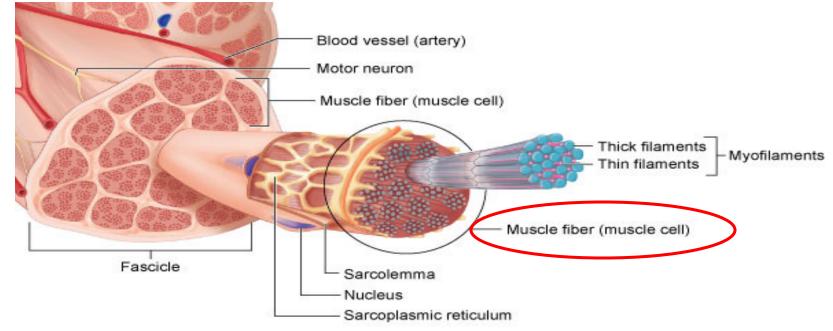


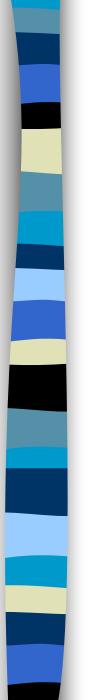
#### Myofibrils Thin strands within each muscle fiber. Contain myofilaments.



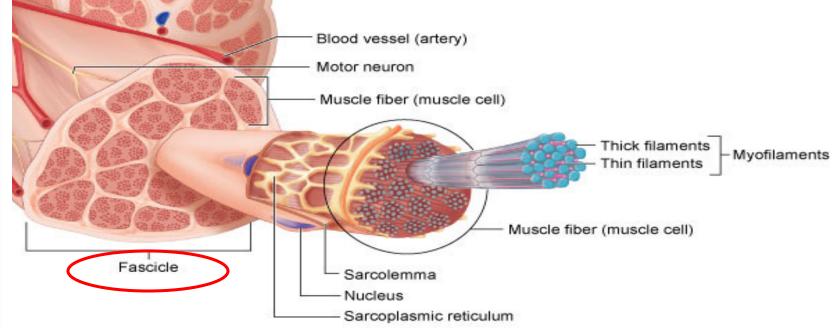


Muscle fiber Thread-like muscle cell.





Fasciculi (s. fascicle) Groups of muscle fibers or neurons.

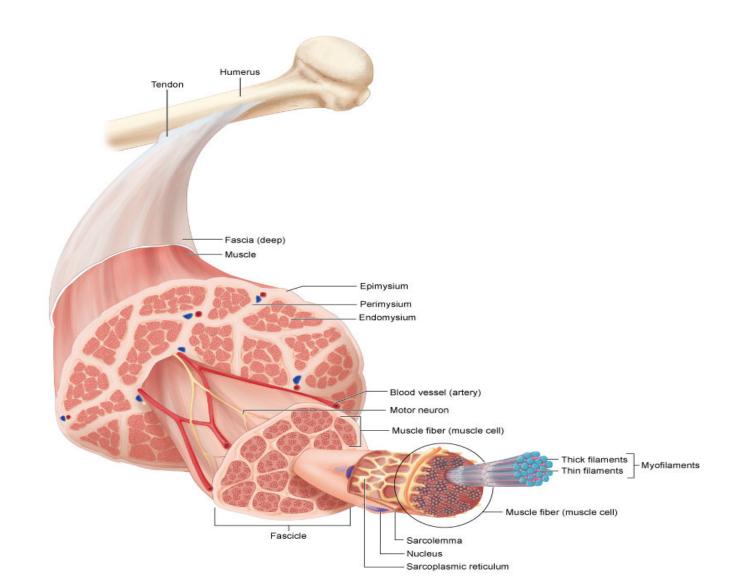




Endomysium Perimysium Epimysium Deep fascia

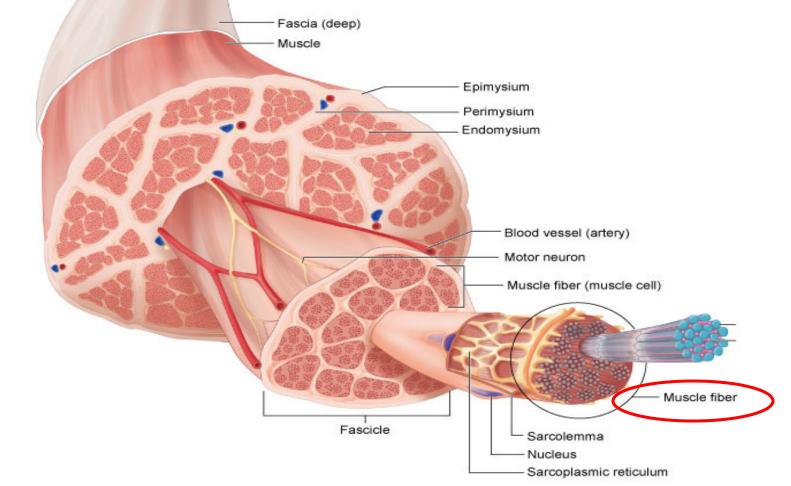
Myofascial Tendon Aponeurosis Retinaculum

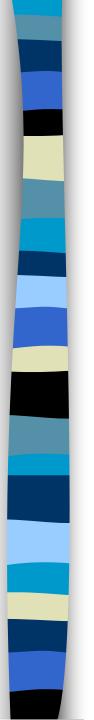
# Deep Fascia, Epimysium, Perimysium, Endomysium



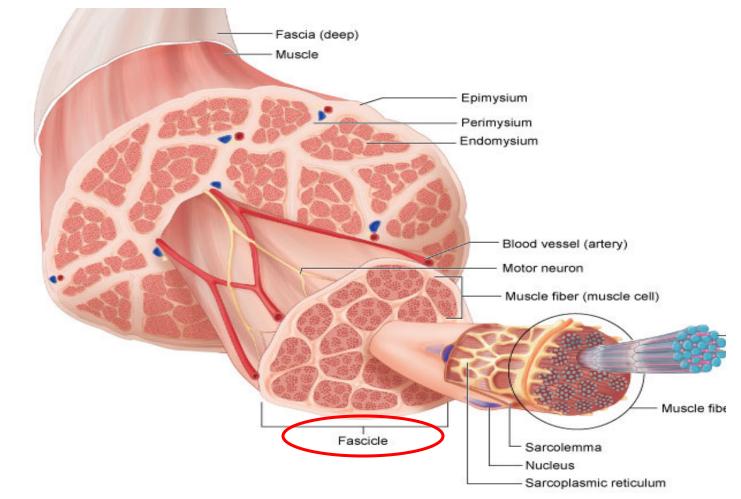


#### Endomysium Connective tissue layer that surrounds individual muscle <u>fibers</u>



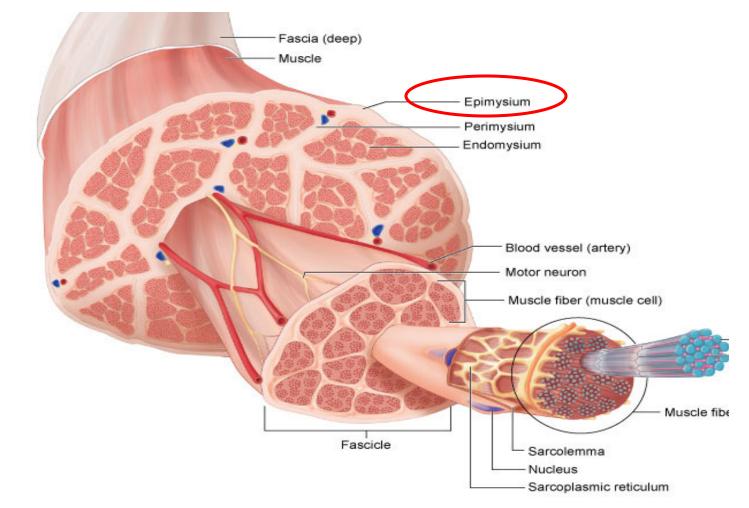


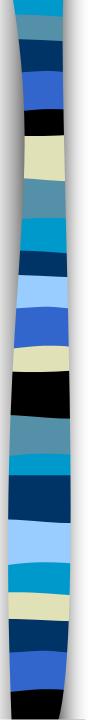
**Perimysium** Connective tissue layer that surrounds <u>fasciculi</u>.



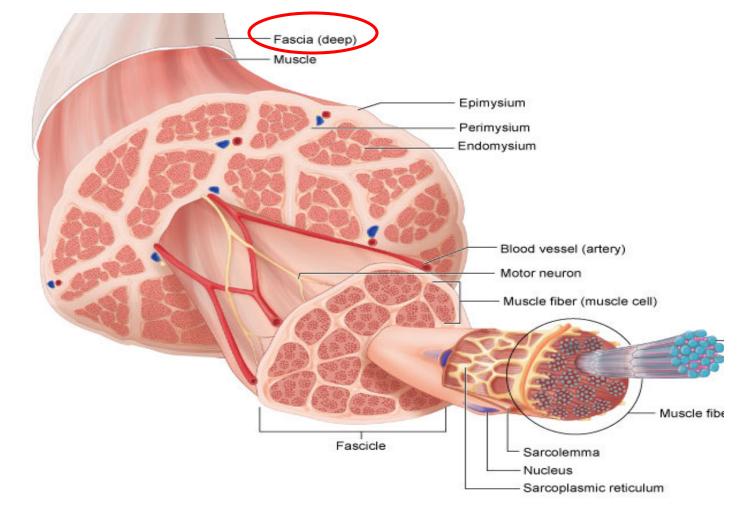


#### **Epimysium** Connective tissue layer surrounding an entire <u>muscle</u>.





**Deep fascia** Connective tissue layer that surrounds muscle <u>groups</u>.



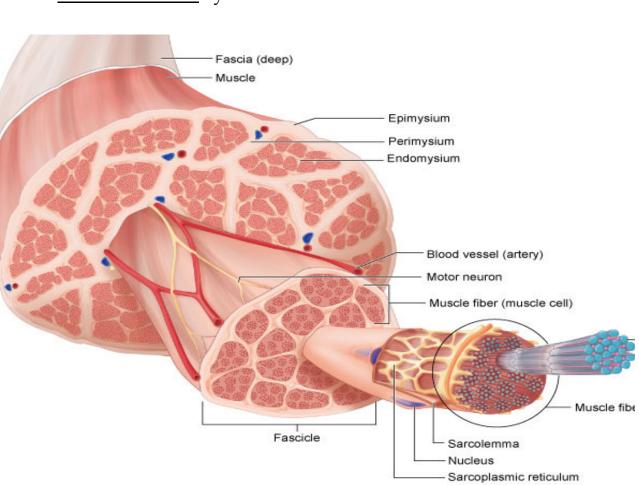


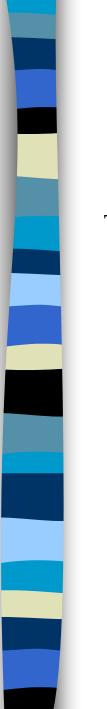
# Superficial Fascia



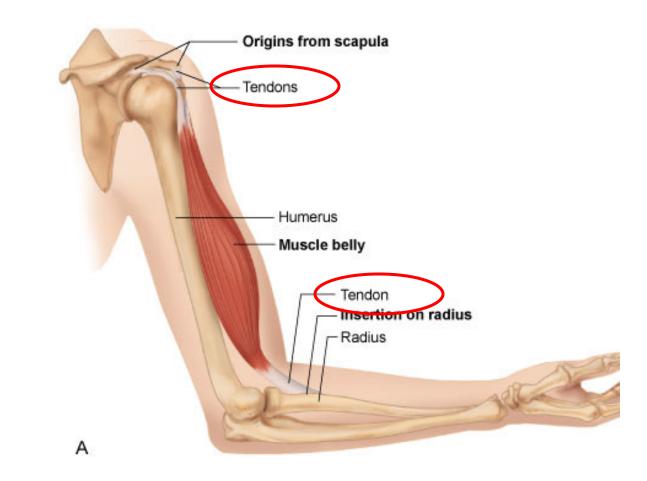


# **Connective Tissues** Myofascial Referring to skeletal muscles and related fascia in the <u>muscular</u> system.



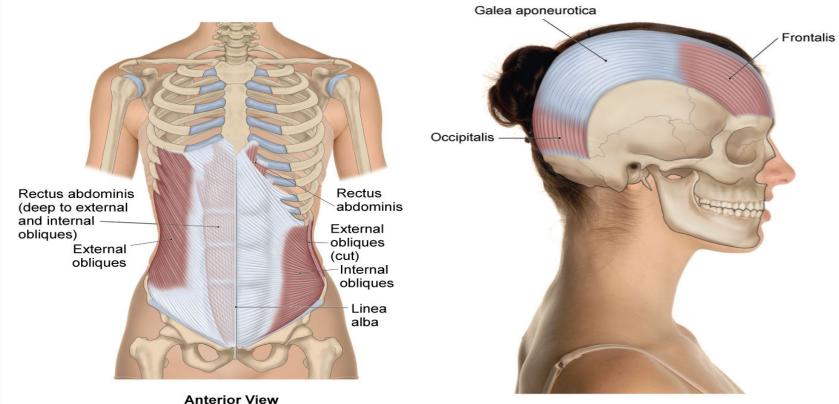


#### **Tendon** Cord-like structure anchoring the end of a <u>muscle</u> to a bone.





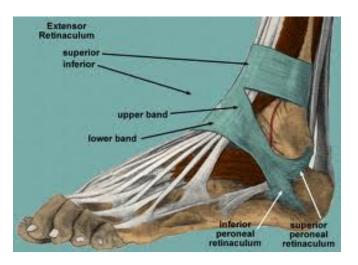
**Aponeurosis (p. aponeuroses)** Broad, <u>flat</u> tendon. Attaches skeletal muscle to bone, another muscle, or skin.

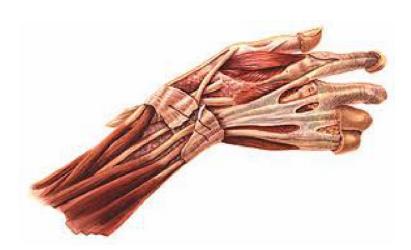


Lateral View



**Retinaculum (p. retinacula)** <u>Bandage</u>-like retaining bands of connective tissue found primarily around the elbows, knees, ankles, and wrists. May also act as a pulley for tendons.



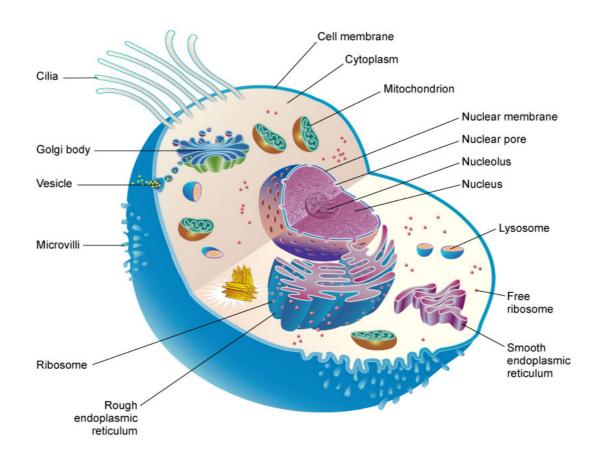


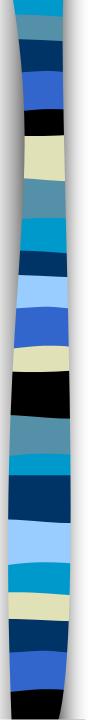


Sarcoplasm Sarcolemma Sarcoplasmic reticulum T-tubules Sarcomere

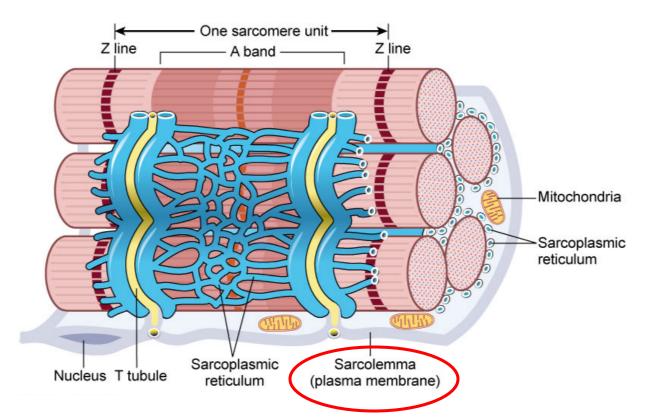


#### Sarcoplasm Muscle cell <u>cytoplasm</u>. Sarcolemma Muscle cell <u>membrane</u>.



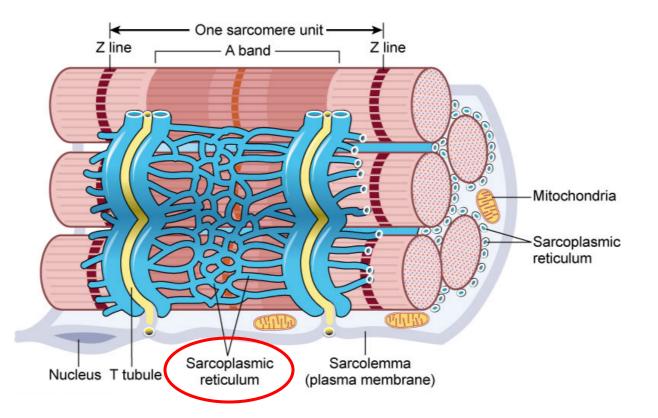


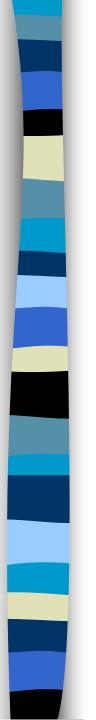
SarcoplasmMuscle cellcytoplasmSarcolemmaMuscle cellmembrane



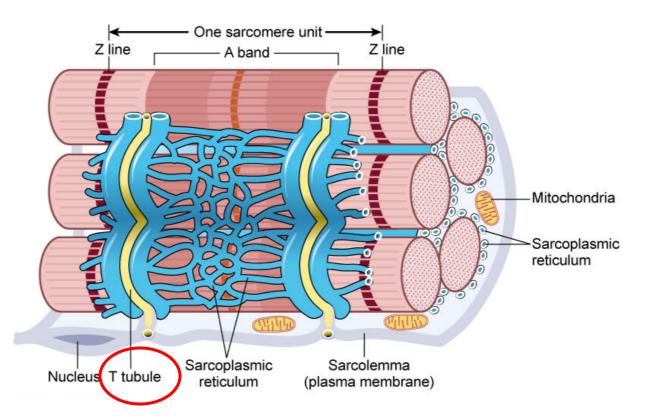


**Sarcoplasmic reticulum** A fluid-filled system of sacs that store calcium.



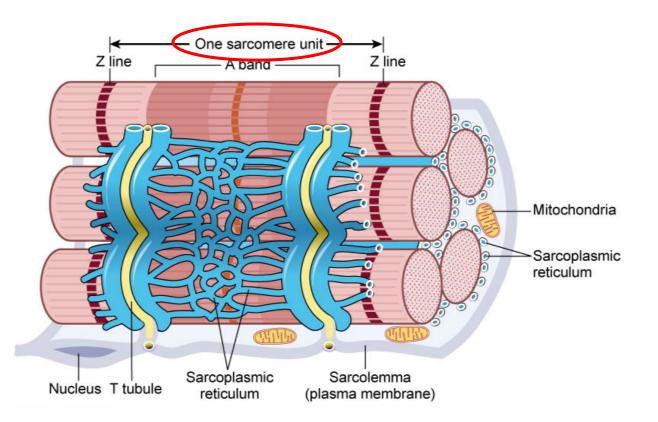


**T-tubule** Runs <u>transversely</u> across the sarcoplasmic reticulum, forming inward channels. Transports stored calcium ions from the sarcoplasmic reticulum into the interior of the muscle cell.





**Sarcomere** A muscle's <u>contractile</u> unit. Found within myofibrils.





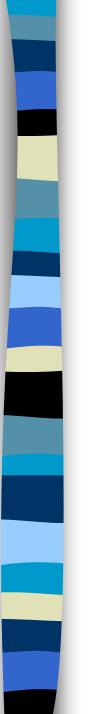
#### Myofilaments

Thin myofilaments

Actin Tropomyosin Troponin

#### Thick myofilaments

Myosin

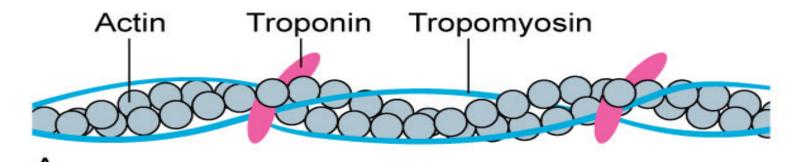


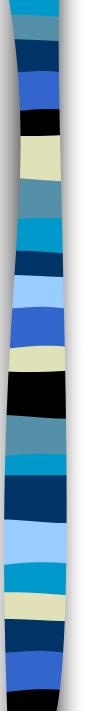
# Myofilaments

#### Thin myofilaments

Actin Protein molecules within a muscle cell that contain binding sites used during skeletal muscle contraction. Help make up thin myofilaments.

**Tropomyosin** Protein molecule. **Troponin** Protein molecule.

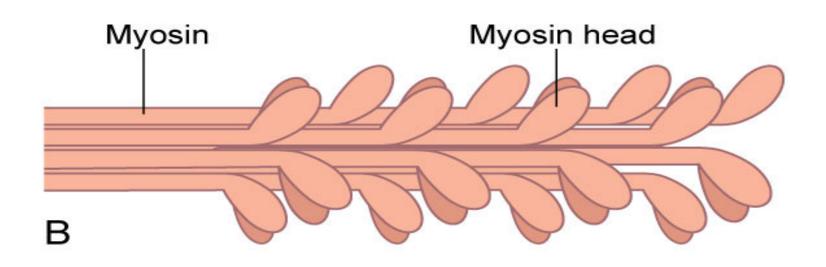




# Myofilaments

#### Thick myofilaments

**Myosin** Protein molecules within a muscle cell that attach to actin during skeletal muscle contraction. Make up the bulk of thick myofilaments.





# Muscle Cell Properties

Excitability Contractility Extensibility Elasticity



# Muscle Cell Properties

**Excitability** The ability to respond to a <u>stimulus</u>.

**Contractility** The ability to <u>shorten</u>.

**Extensibility** The ability to <u>lengthen</u>.

**Elasticity** The ability to return to its original <u>shape</u> after movement.

24a A&P: Muscular System-Organization of Skeletal Muscle