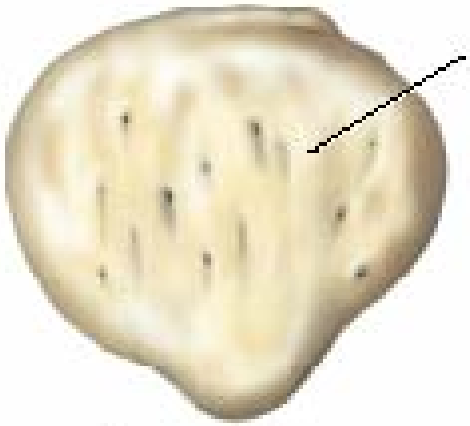
KINES 80

Chapter 1

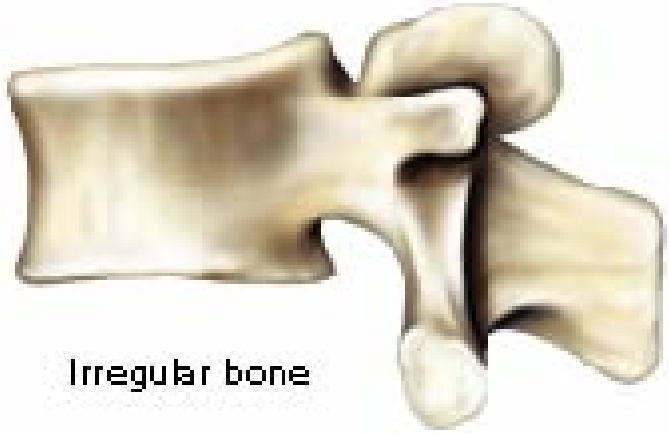
Structures

Long bone



Sesamoid bone

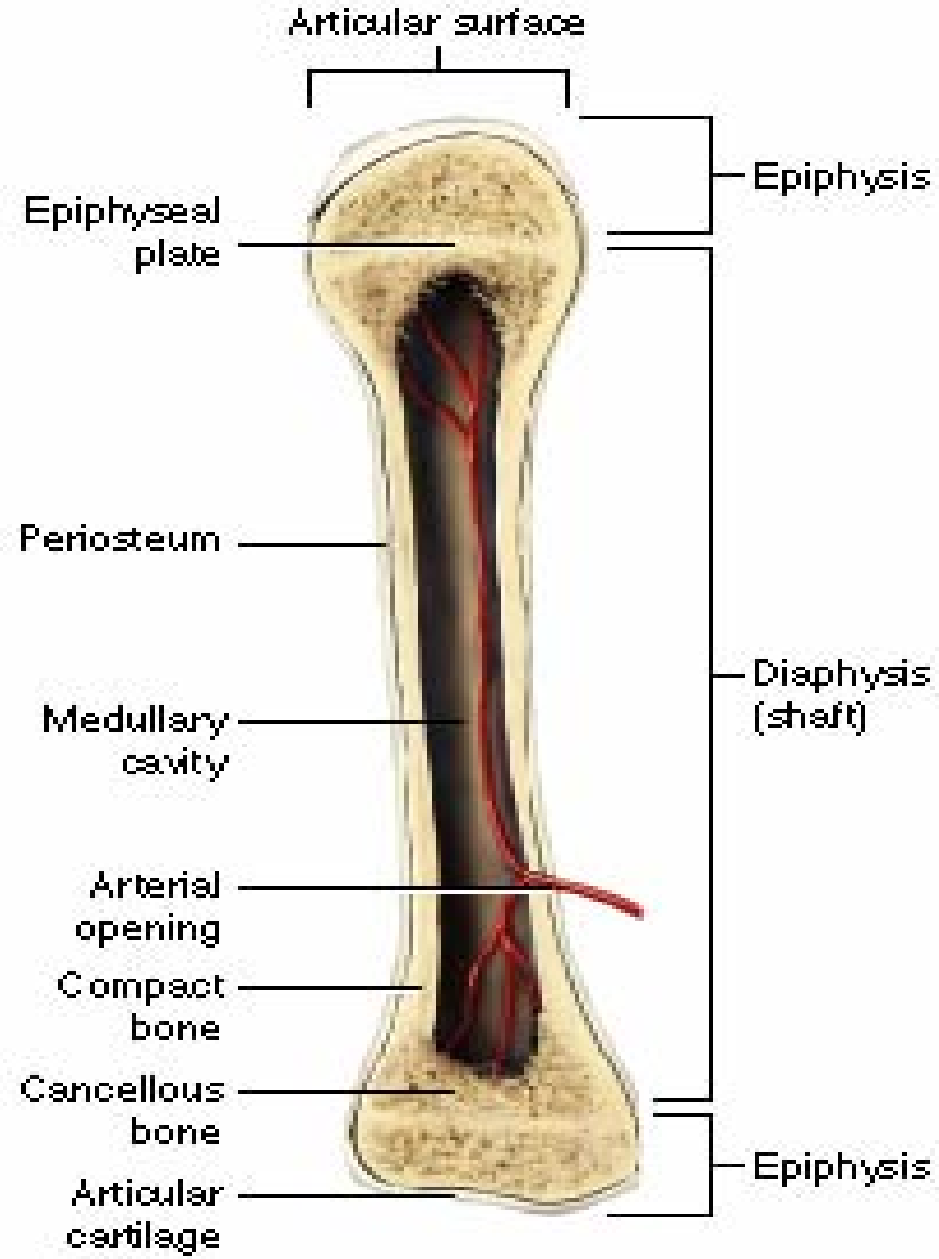
Short bone



Irregular bone

Flat bone

From *Kinetic Anatomy, Second Edition*, by Robert S. Behnke, 2006, Champaign, IL: Human Kinetics.



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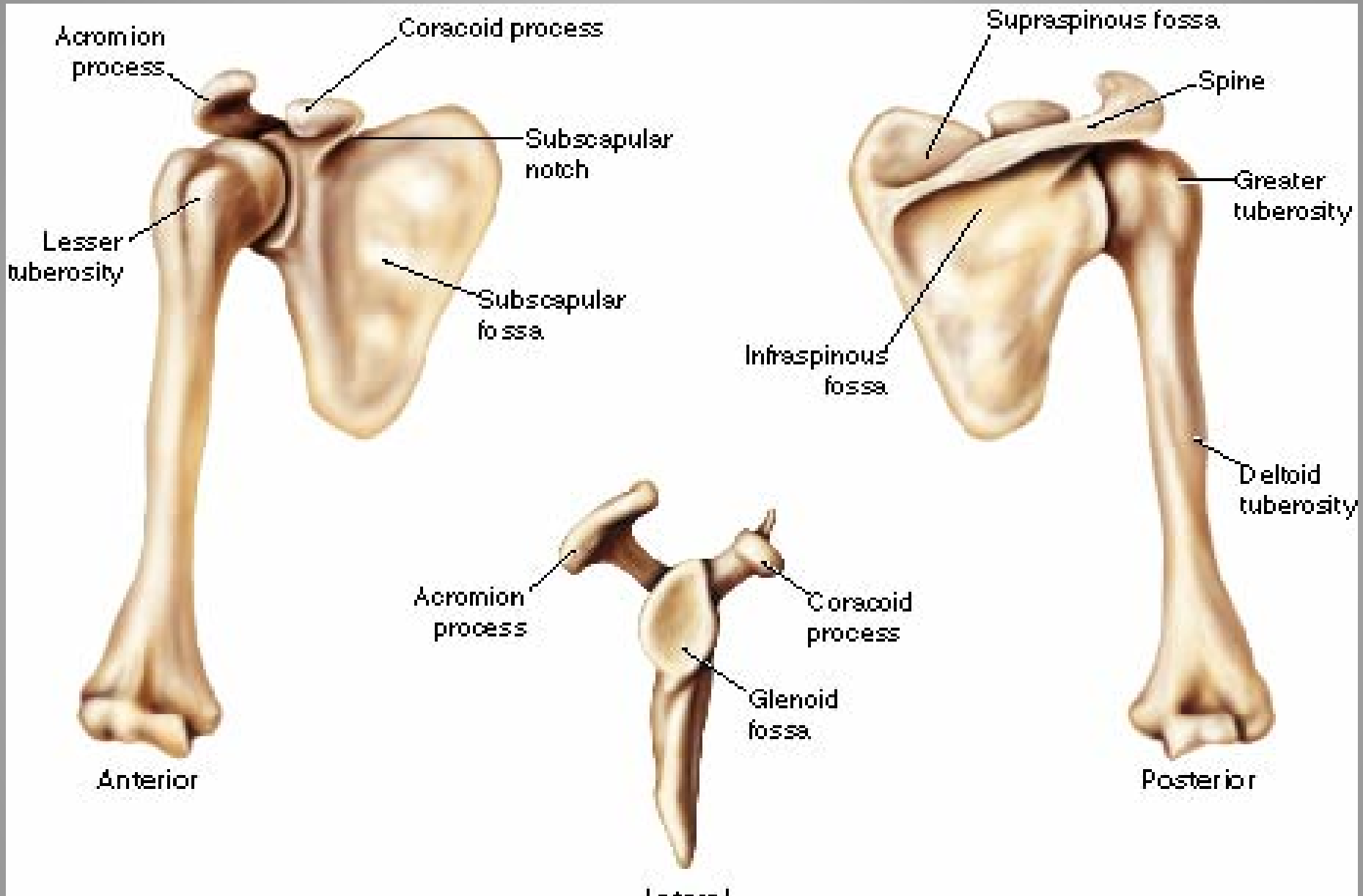

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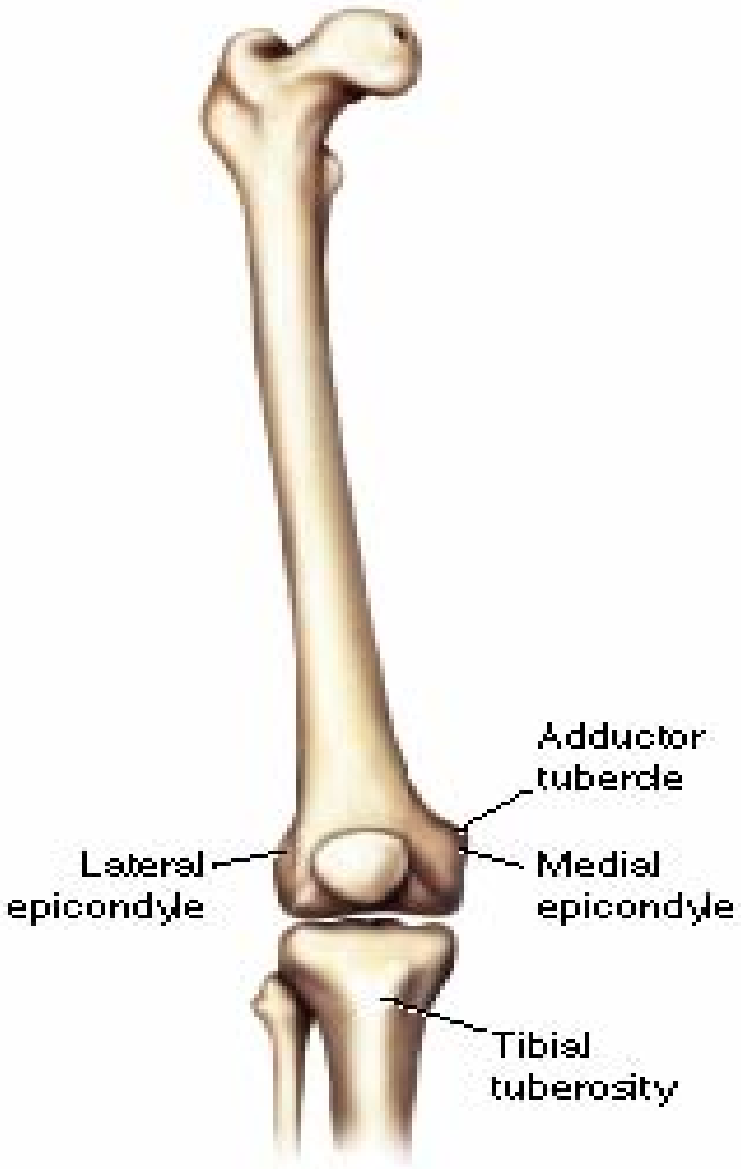

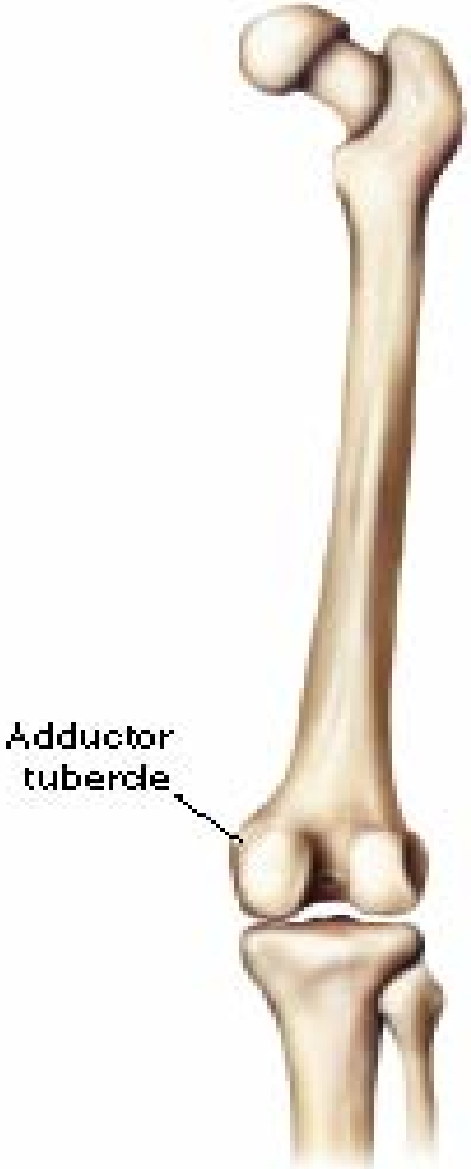

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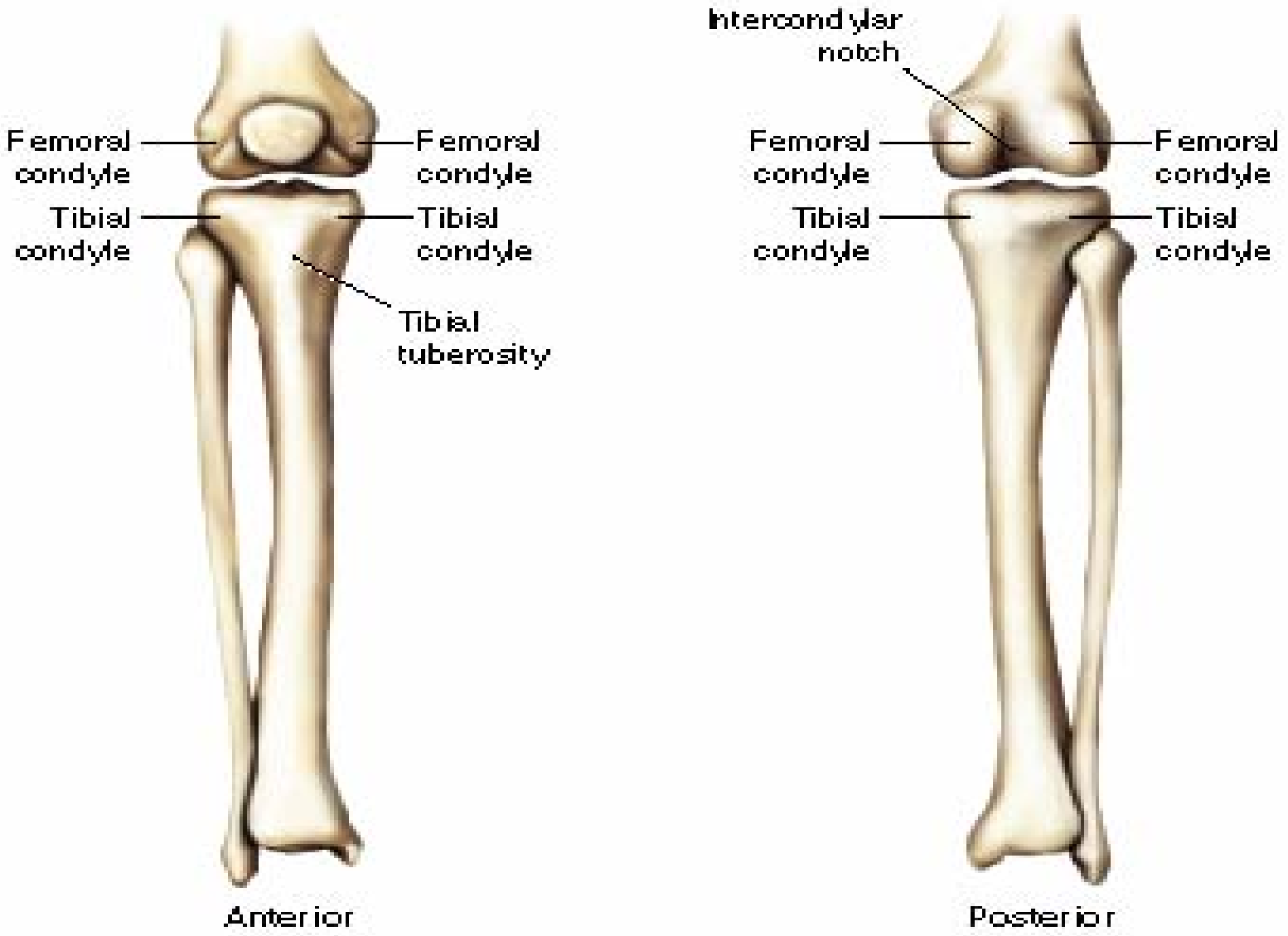

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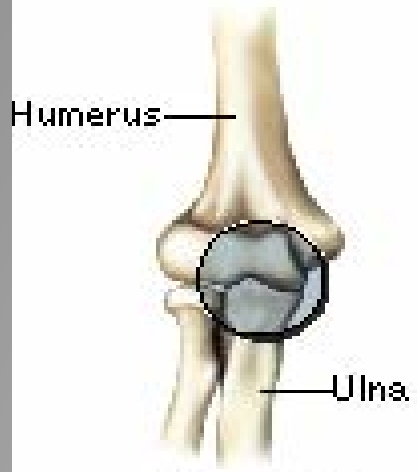
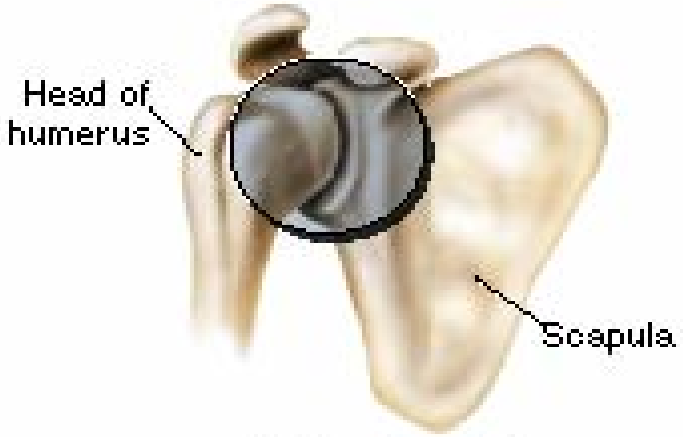
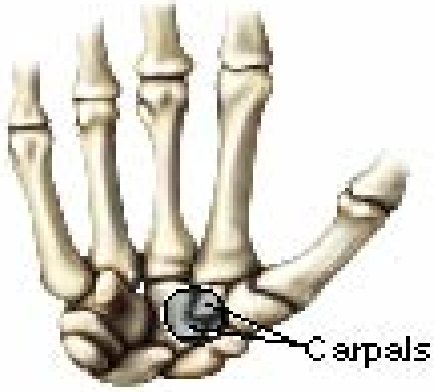


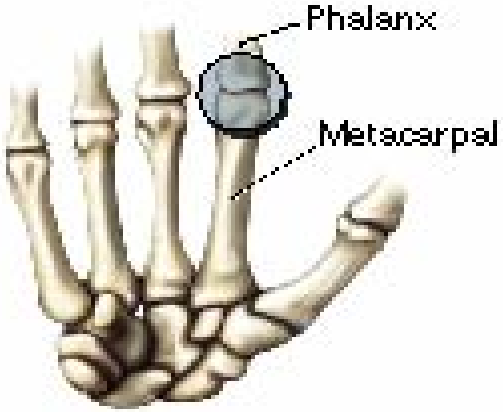
Hinge joint



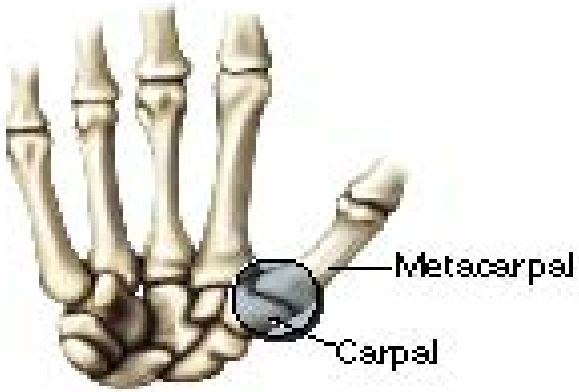
Ball-and-socket joint



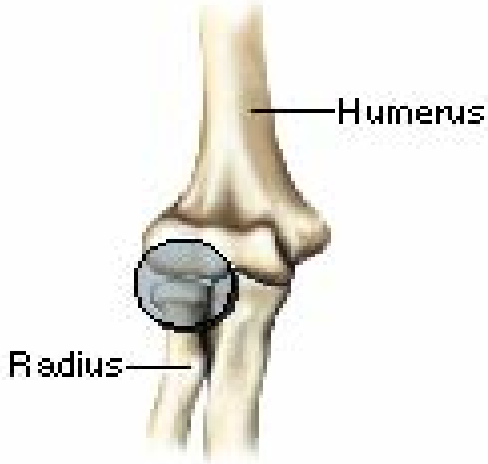
Irregular joint



Condyloid joint



Saddle joint



Pivot joint

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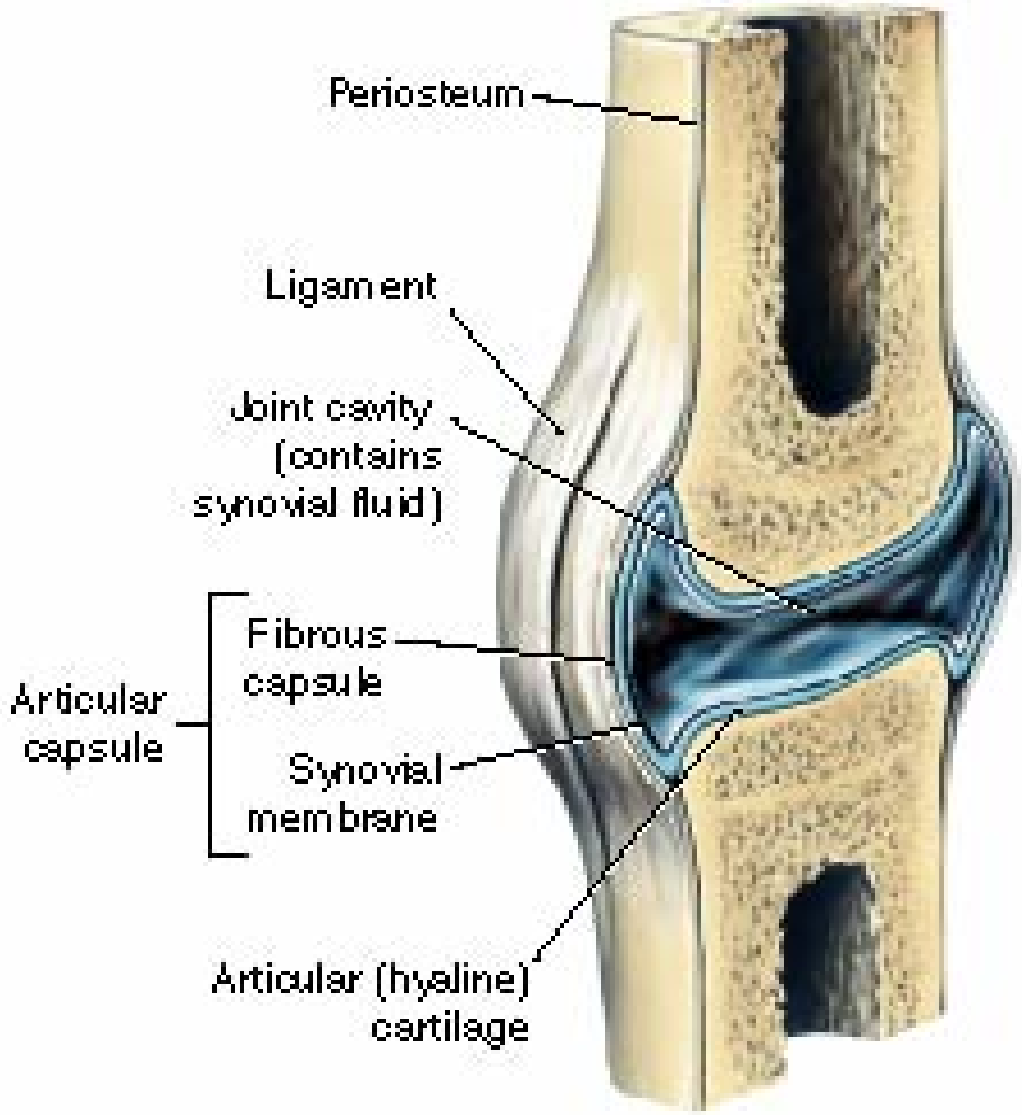

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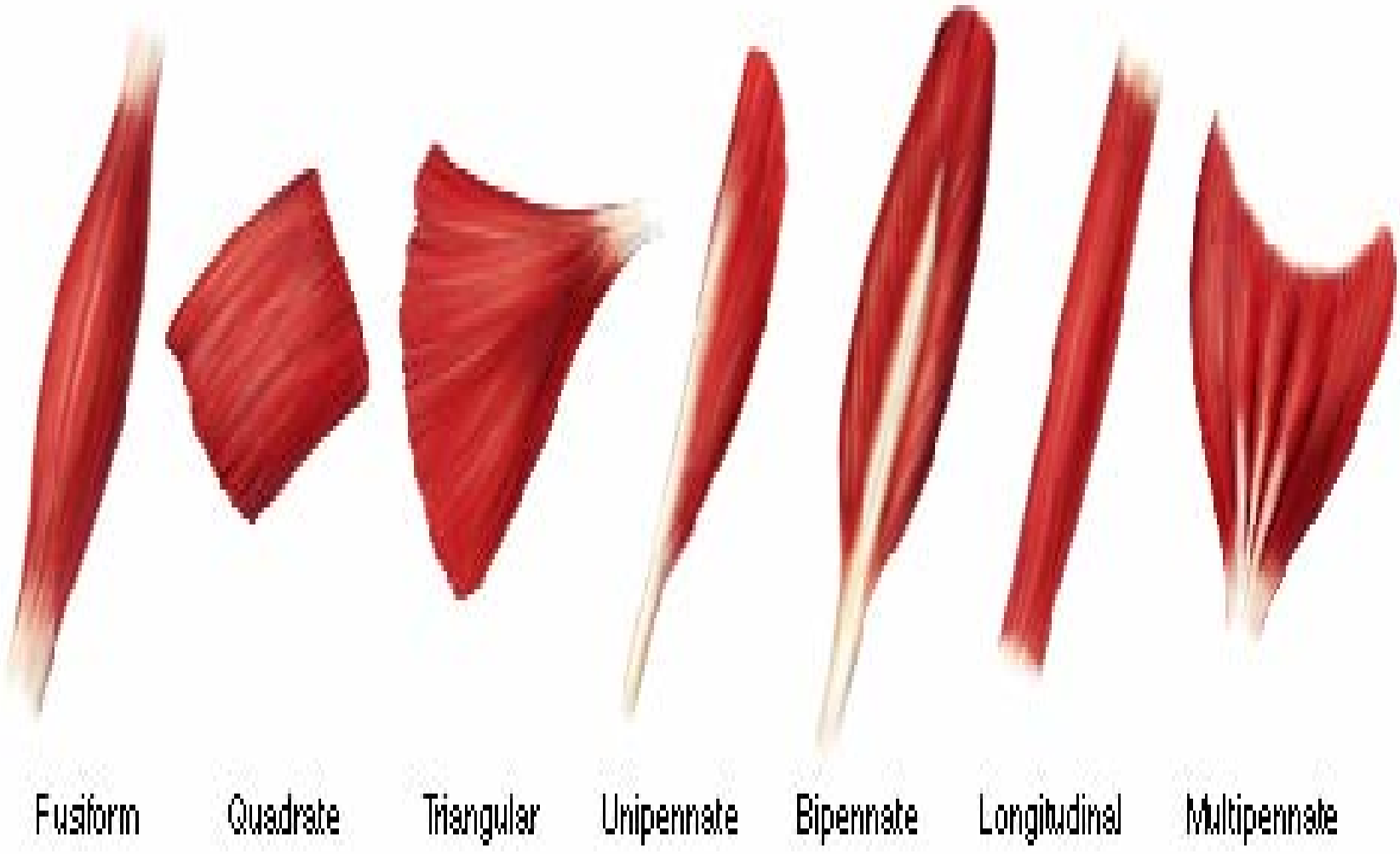

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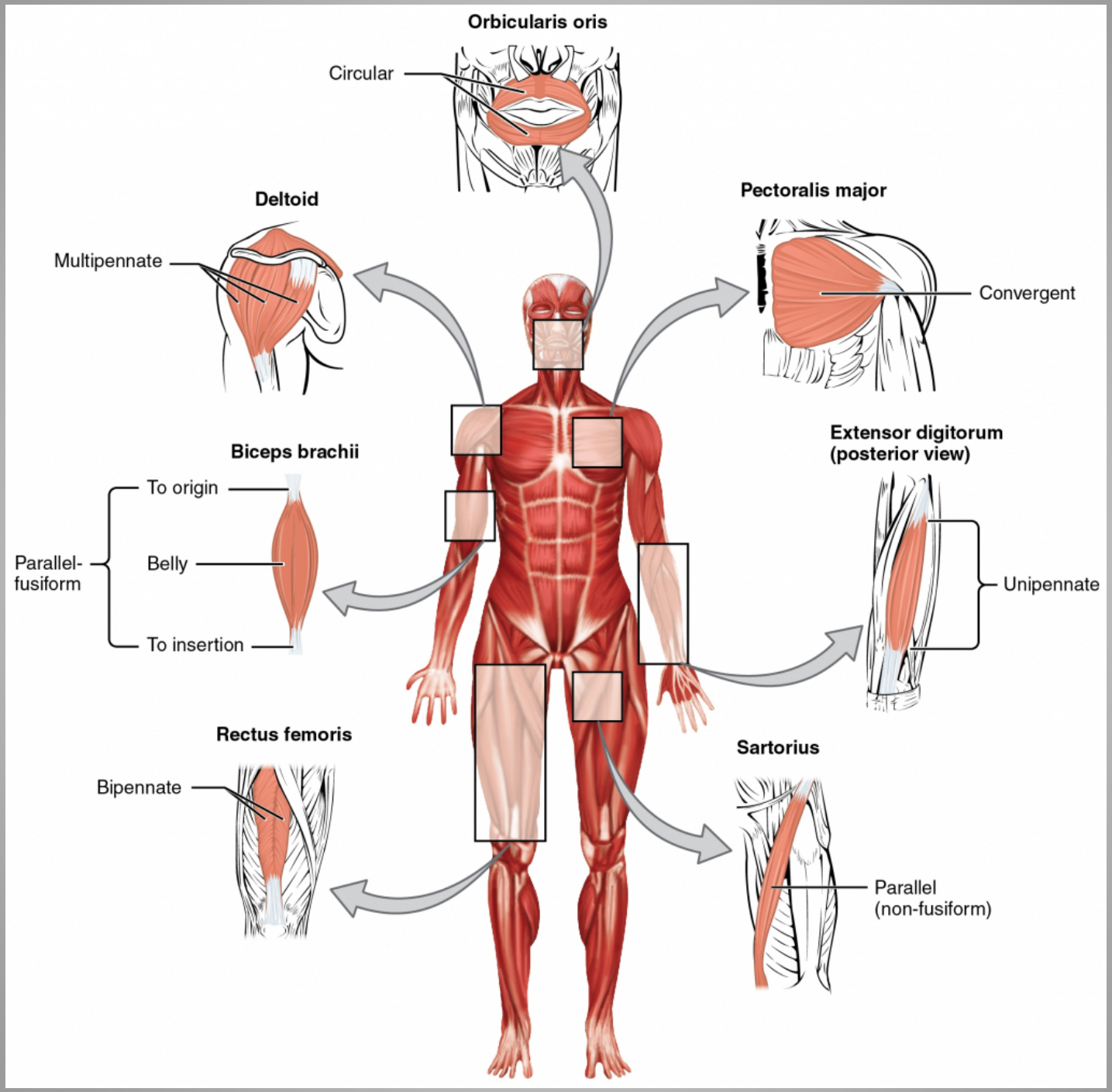
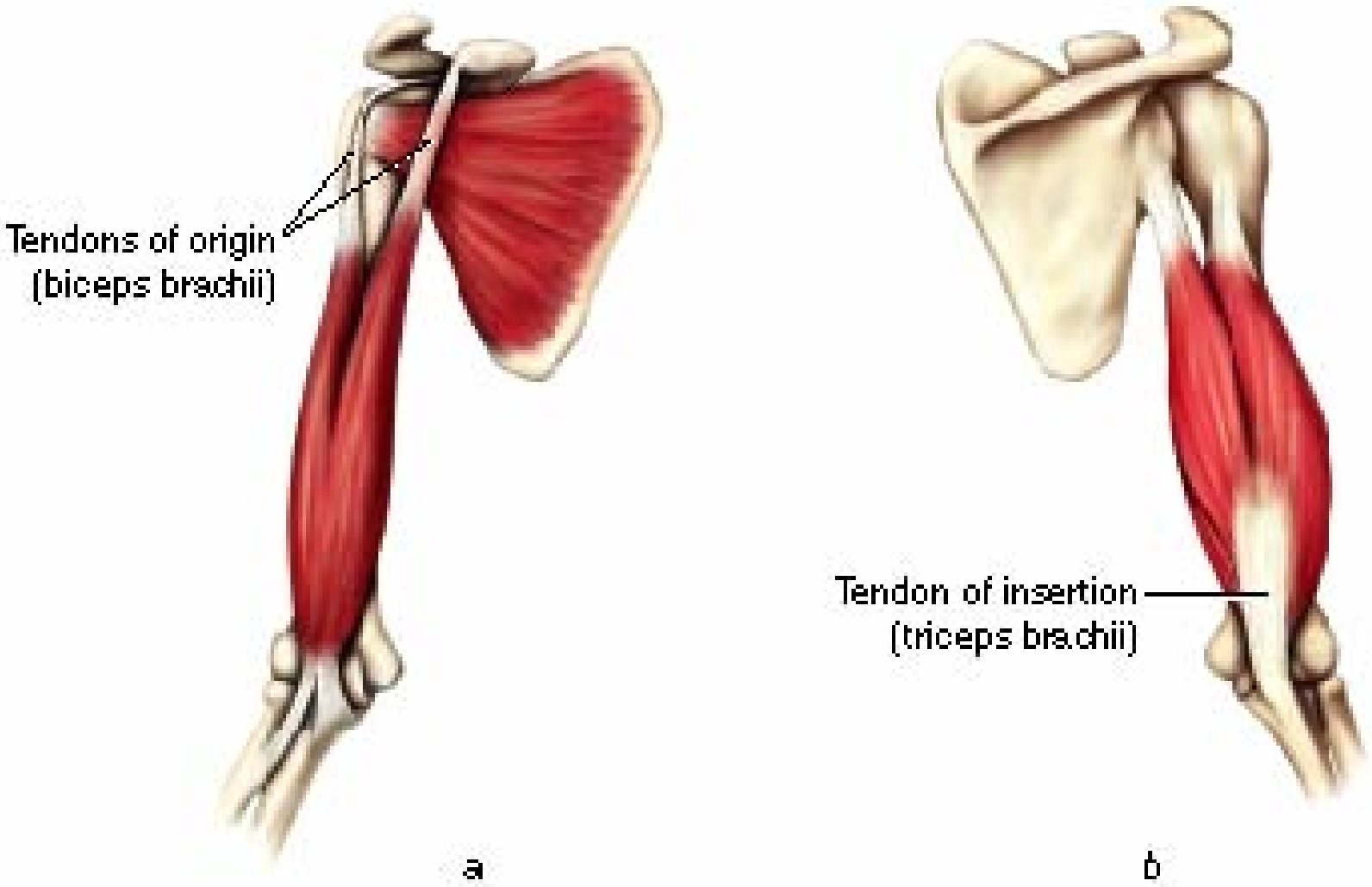

Orbicularis oris
Circular
Deltoid
Multipennate
Pectoralis major
Convergent
Biceps brachii
To origin
Belly
To insertion
Parallel-fusiform
Extensor digitorum (posterior view)
Unipennate
Rectus femoris
Bipennate
Sartorius
Parallel (non-fusiform)



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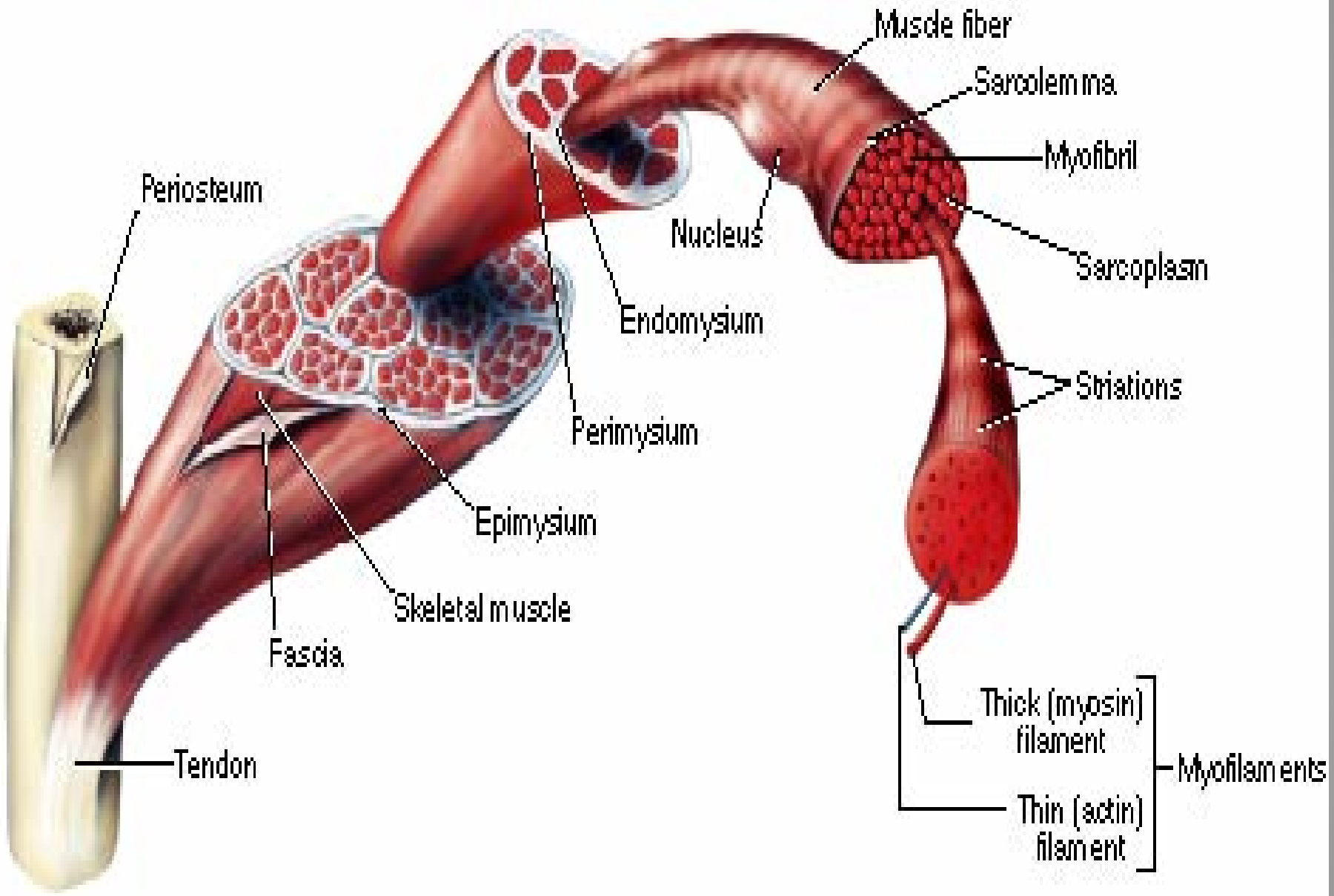

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Muscle Nomenclature

- Muscles are usually named due to
  - visual appearance
  - anatomical location
  - function
- Shape – deltoid, rhomboid
- Size – gluteus maximus, teres minor
- Number of divisions – triceps brachii
- Direction of its fibers – external abdominal oblique

Muscle Nomenclature

- Location - rectus femoris, palmaris longus
- Points of attachment - coracobrachialis, extensor hallucis longus, flexor digitorum longus
- Action - erector spinae, supinator, extensor digiti minimi
- Action & shape – pronator quadratus

Muscle Tissue Properties

- *Irritability* or *Excitability* - property of muscle being sensitive or responsive to chemical, electrical, or mechanical stimuli
- *Contractility* - ability of muscle to contract & develop tension or internal force against resistance when stimulated

Muscle Tissue Properties

- *Extensibility* - ability of muscle to be passively stretched beyond it normal resting length
- *Elasticity* - ability of muscle to return to its original length following stretching

Role of Muscles

- *Agonist* muscles
  - Primary or prime movers, or muscles most involved
    - Some agonist muscles, because of their relative location, size, length, or force generation capacity, are able to contribute significantly more to the joint movement than other agonists
  - Assisters or assistant movers
    - Agonist muscles that contribute significantly less to the joint motion
  - Consensus among all authorities regarding which muscles are primary movers and which are weak assistants does not exist in every case

Role of Muscles

- *Antagonist* muscles
  - located on opposite side of joint from agonist
  - have the opposite concentric action
  - known as contralateral muscles
  - work in cooperation with agonist muscles by relaxing & allowing movement
  - when contracting concentrically perform the opposite joint motion of agonist
  - Ex. quadriceps muscles are antagonists to hamstrings in knee flexion

Role of Muscles

- *Stabilizers*
  - surround joint or body part
  - contract to fixate or stabilize the area to enable another limb or body segment to exert force & move
  - known as fixators
  - essential in establishing a relatively firm base for the more distal joints to work from when carrying out movements
  - Ex. biceps curl
    - muscles of scapula & glenohumeral joint must contract in order to maintain shoulder complex & humerus in a relatively static position so that the biceps brachii can more effectively perform curls

Role of Muscles

- *Synergist*
  - assist in action of agonists
  - not necessarily prime movers for the action
  - known as guiding muscles
  - assist in refined movement & rule out undesired motions
  - helping synergists & true synergists

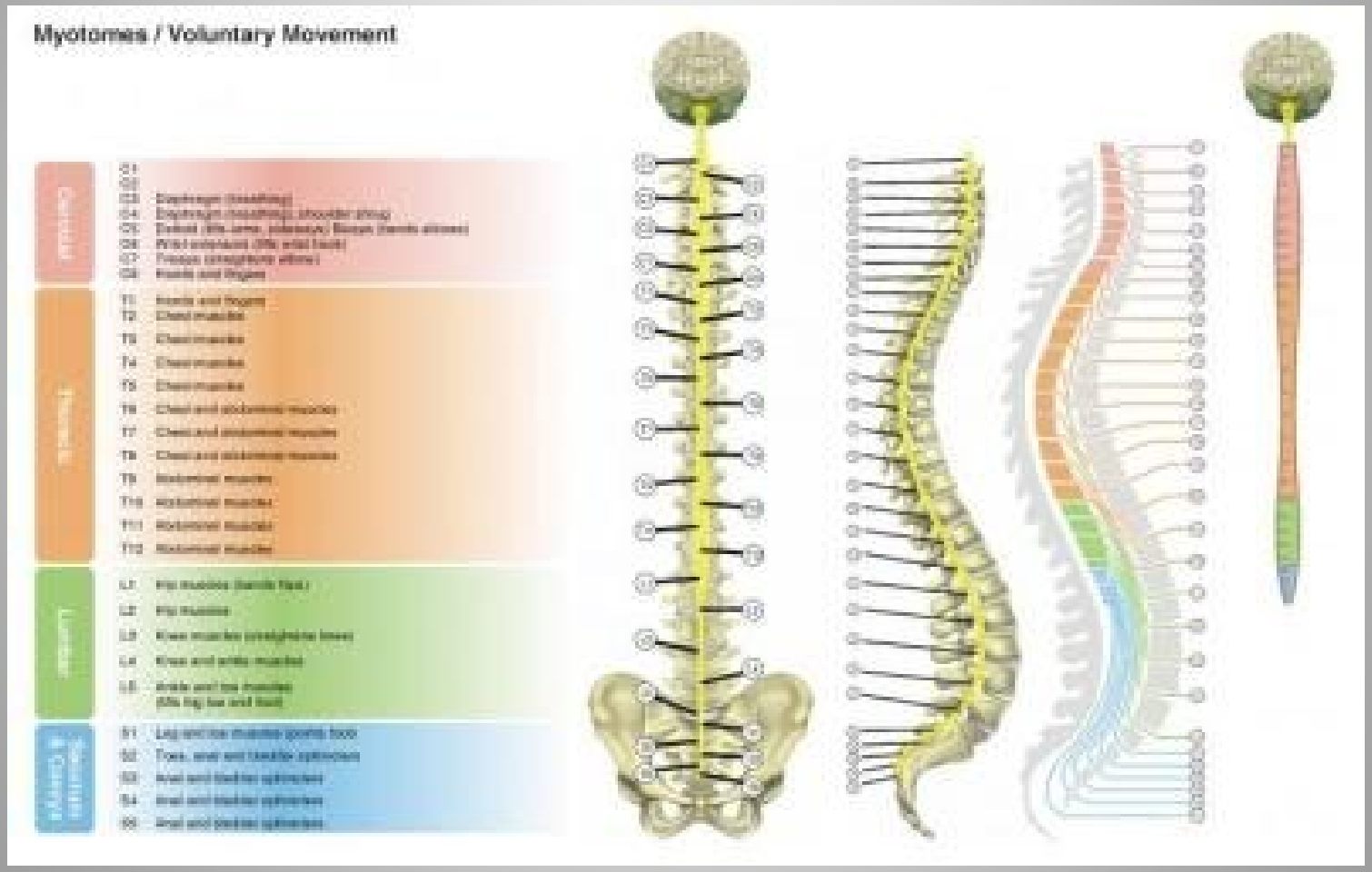
Uniarticular, biarticular, and multiarticular muscles

- Uniarticular muscles
  - Cross & act directly only on the joint that they cross
  - Ex. Brachialis
    - Can only pull humerus & ulna closer together

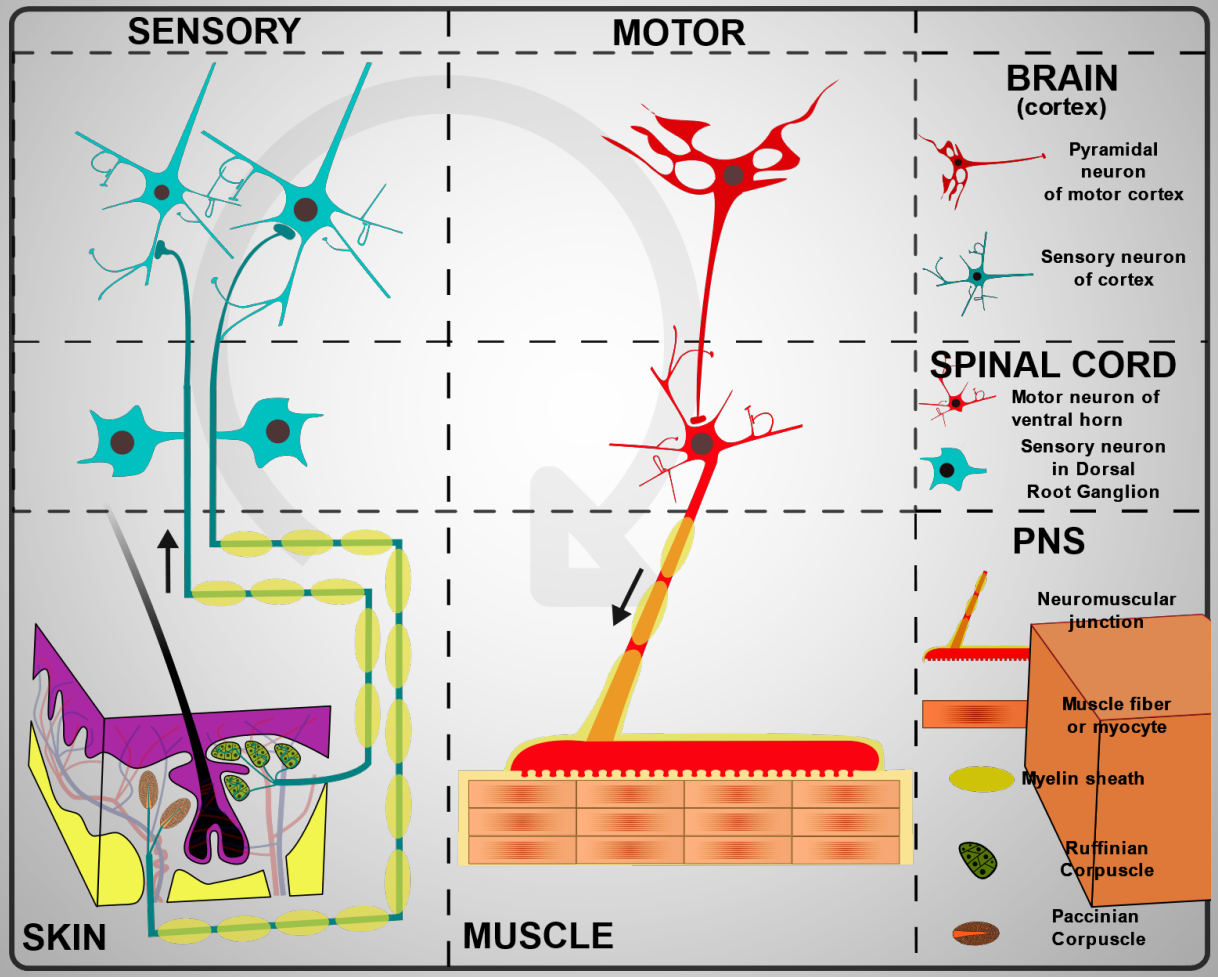
Uniarticular, biarticular, and multiarticular muscles

- Multiarticular muscles act on three or more joints due to the line of pull between their origin & insertion crossing multiple joints
- Principles relative to biarticular muscles apply similarly to multiarticular muscles

Spinal Nerves and Plexuses



Motor and Sensory Neurons



Blood Vessels