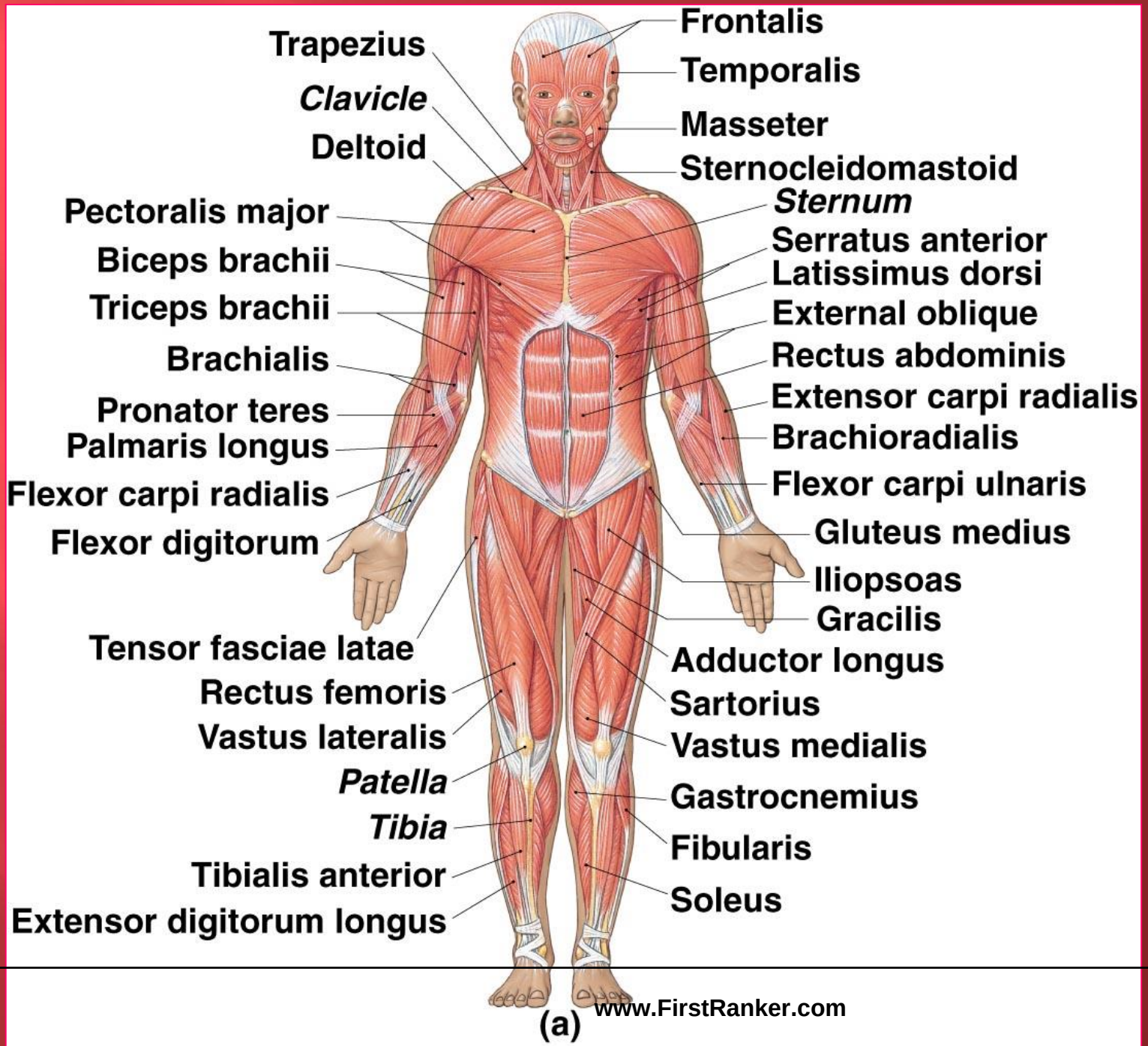
MUSCLE



(a)

MAIN CHARACTERISTICS

- **There are four characteristics associated with muscle tissue:**
  - **Excitability Tissue can receive & respond to stimulation**
  - **Contractility Tissue can shorten & thicken**
  - **Extensibility Tissue can lengthen**
  - **Elasticity After contracting or lengthening, tissue always wants to return to its resting state**

FUNCTIONS OF MUSCLES

- Movement – both voluntary & involuntary
- Maintaining posture
- Supporting soft tissues within body cavities
- Protection

STRUCTURAL CLASSIFICATION

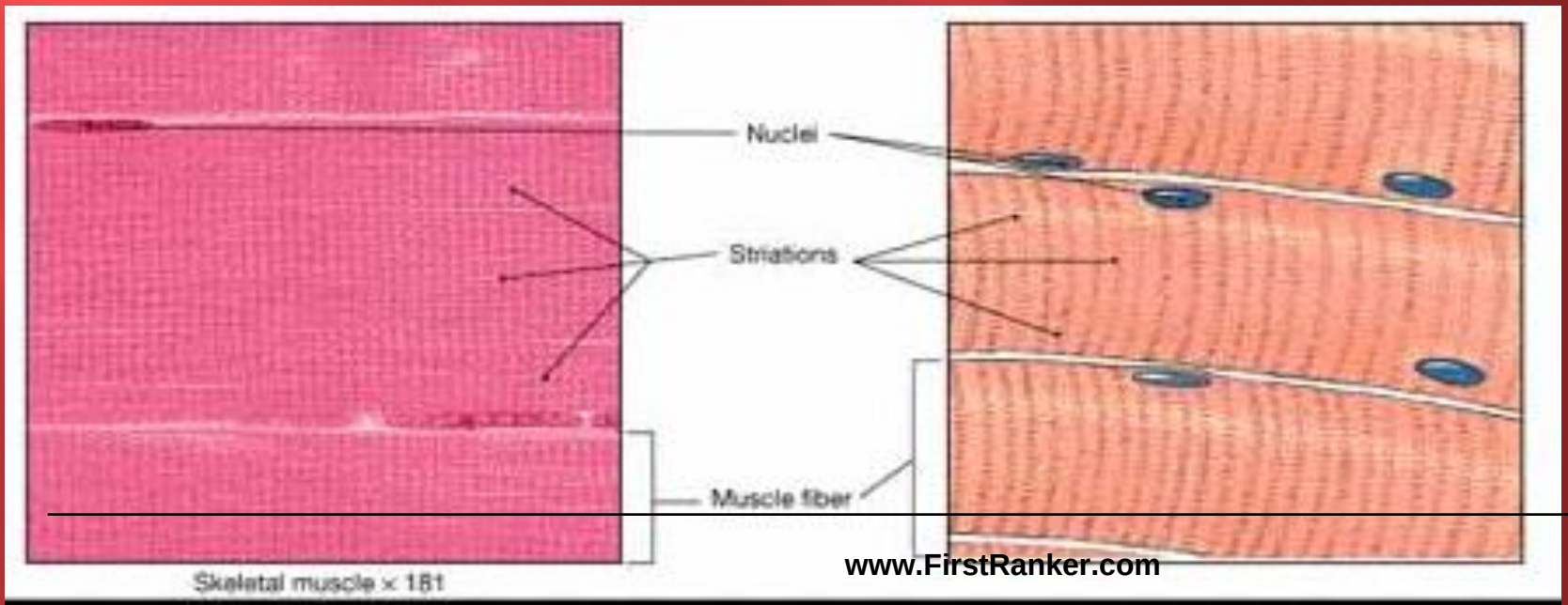
Types of muscle tissue:

- Skeletal
- Cardiac
- Smooth (Visceral)

SKELETAL MUSCLE

Associated with & attached to the skeleton

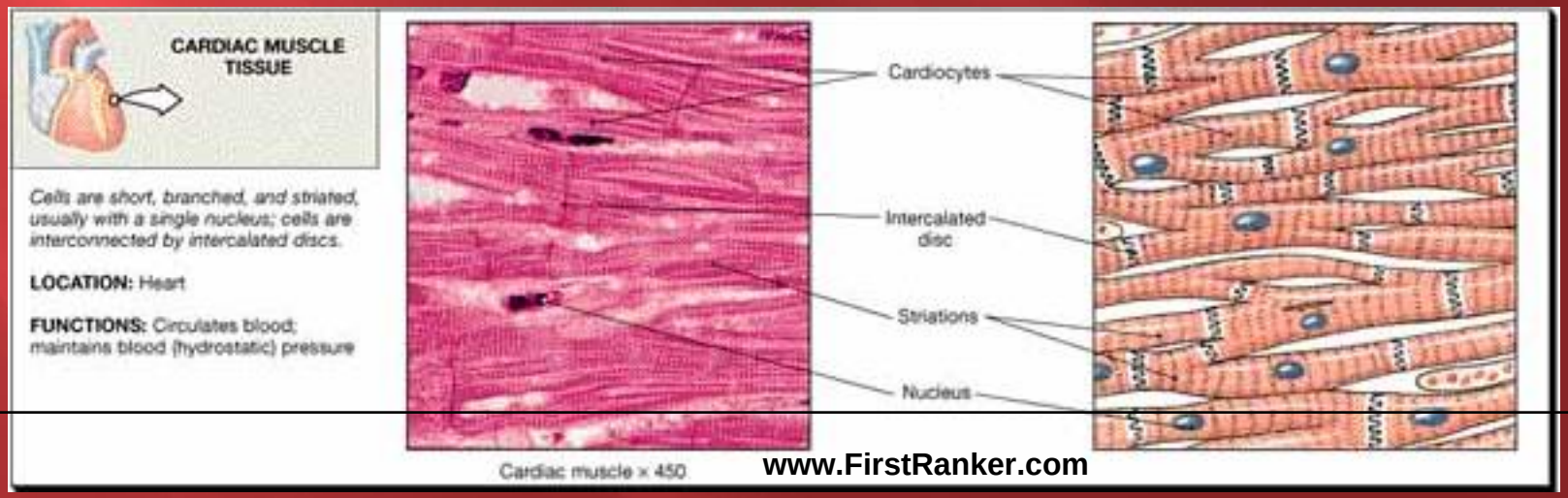
- **Under our conscious (*voluntary*) control**
- **Microscopically the tissue appears *striated***
- **Cells are long, cylindrical & multinucleate**



CARDIAC MUSCLE

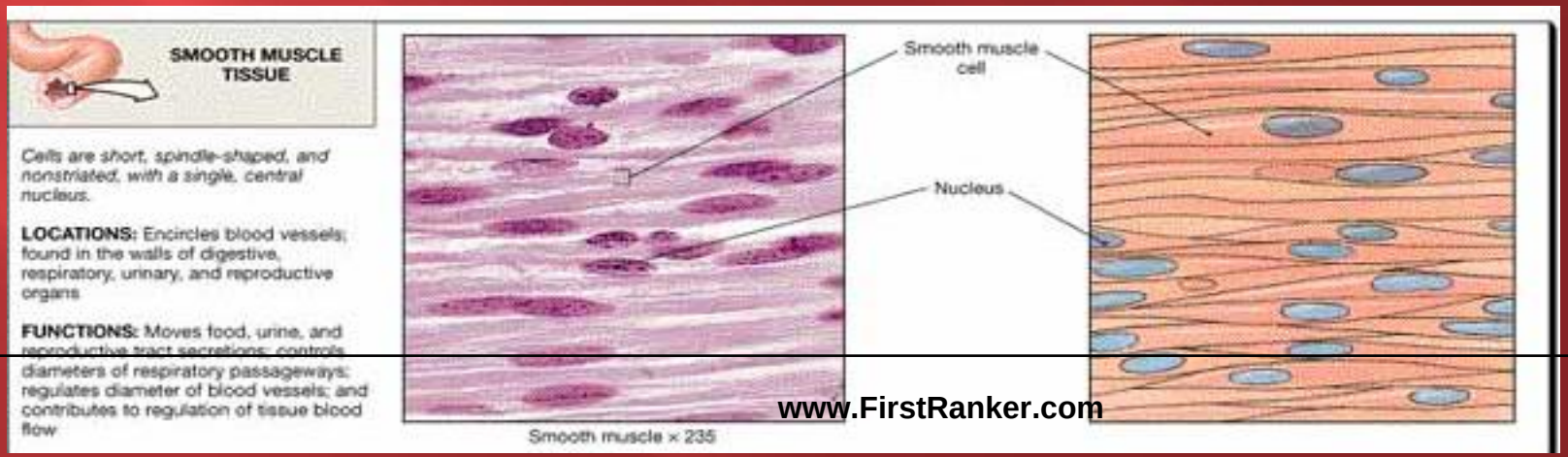
Makes up myocardium of heart

- Unconsciously (*involuntarily*) controlled
- Microscopically appears *striated*
- Cells are short, branching & have a single nucleus
- Cells connect to each other at *intercalated discs*

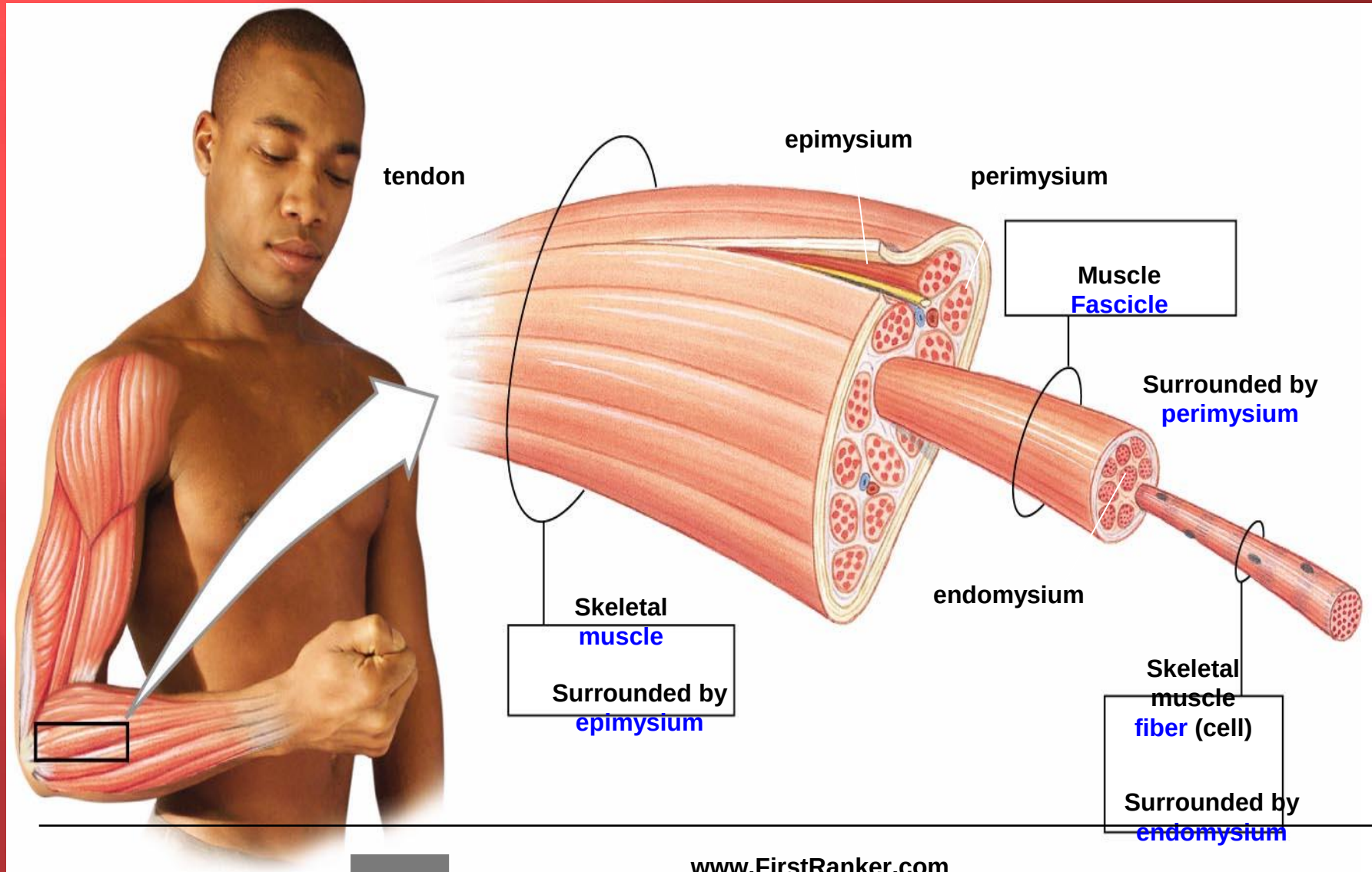


SMOOTH MUSCLE

- Makes up walls of organs & blood vessels
- Tissue is *non-striated* & *involuntary*
- Cells are short, spindle-shaped & have a single nucleus
- Tissue is extremely extensible, while still retaining ability to contract



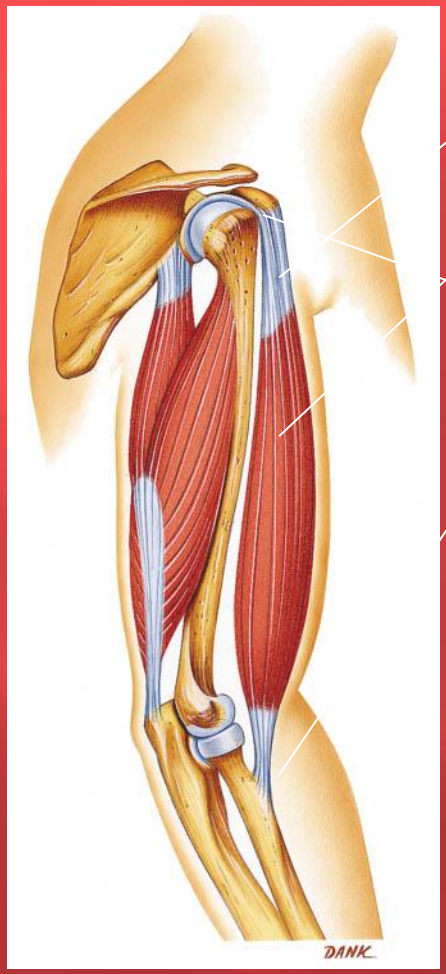
Anatomy of skeletal muscles



ASSOCIATED TERMS

- Origin
- Insertion
- Belly
- Tendon
- Aponeurosis
- Raphe

ASSOCIATED TERMS



- *Tendon*

  cord of fibrous tissue

- *Belly*

  Fleshy part of muscle

- *Origin*

  Muscle attachment that remains fixed

- *Insertion*

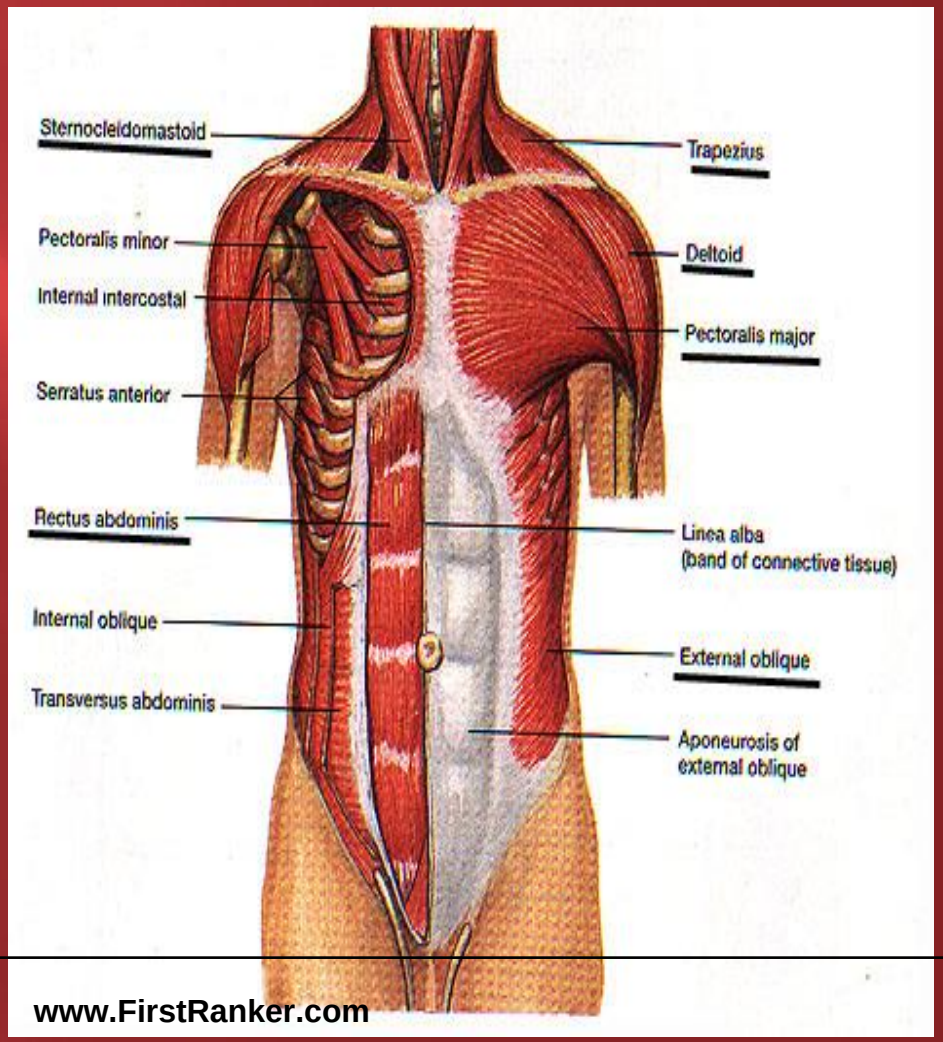
  Muscle attachment that moves

- *Action*

  What joint movement a muscle produces
  i.e. flexion, extension, abduction, etc.

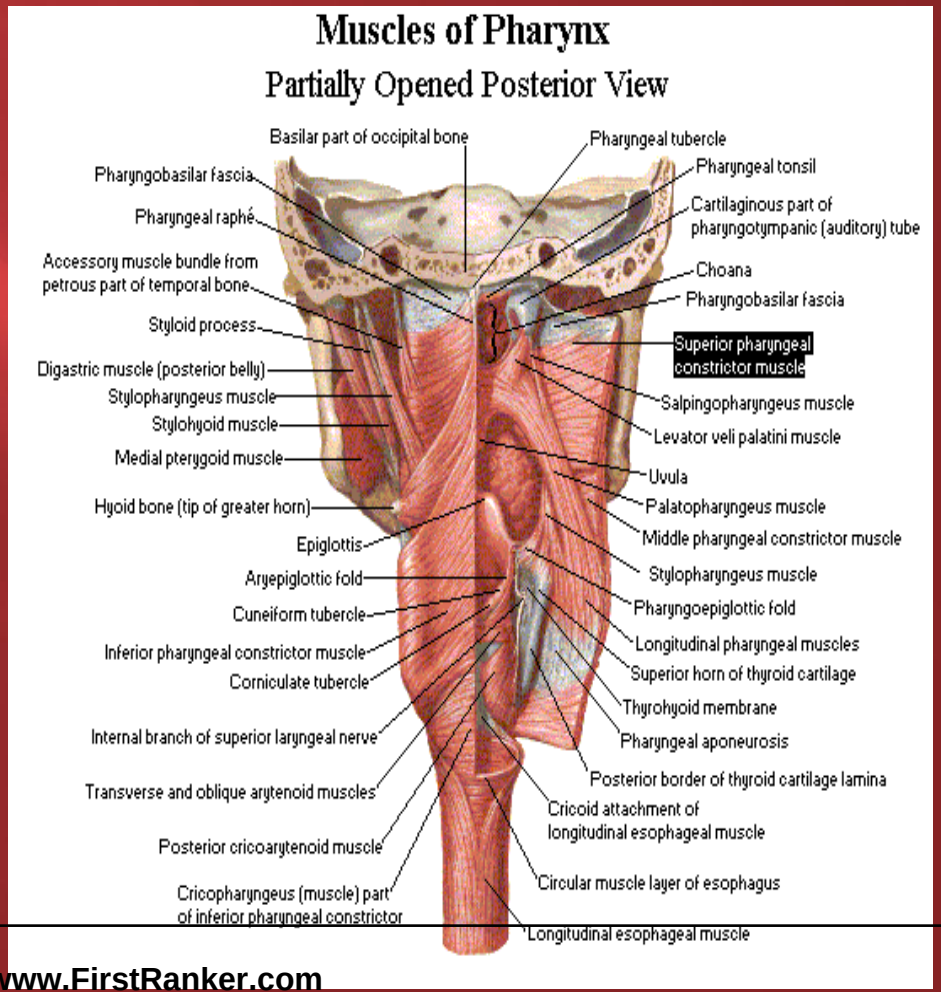
APONEUROSIS

- A strong , thin and flat sheet of fibrous tissue providing attachment to muscles



RAPHE

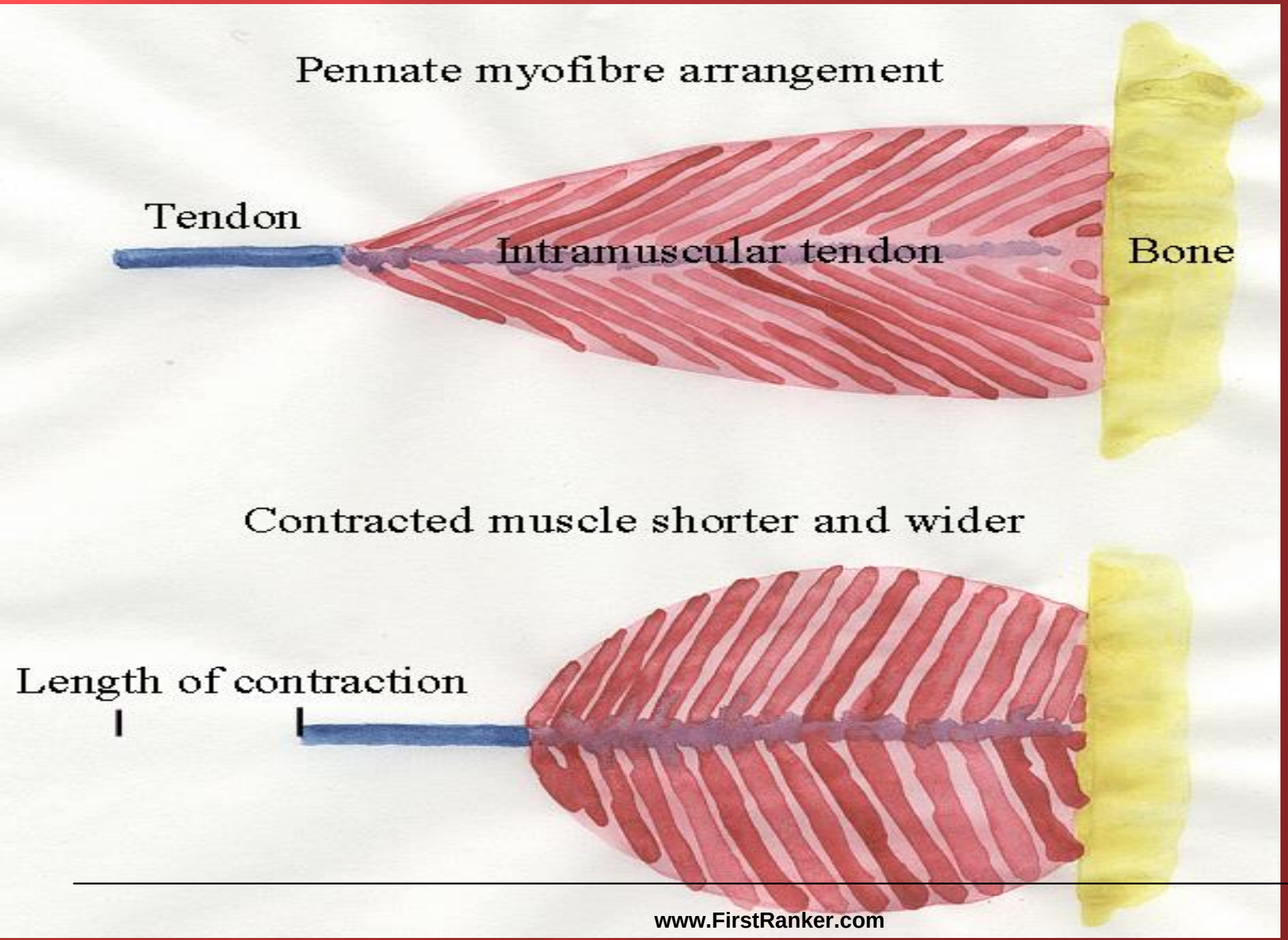
- An interdigitation of the tendinous ends of fibers of flat muscles

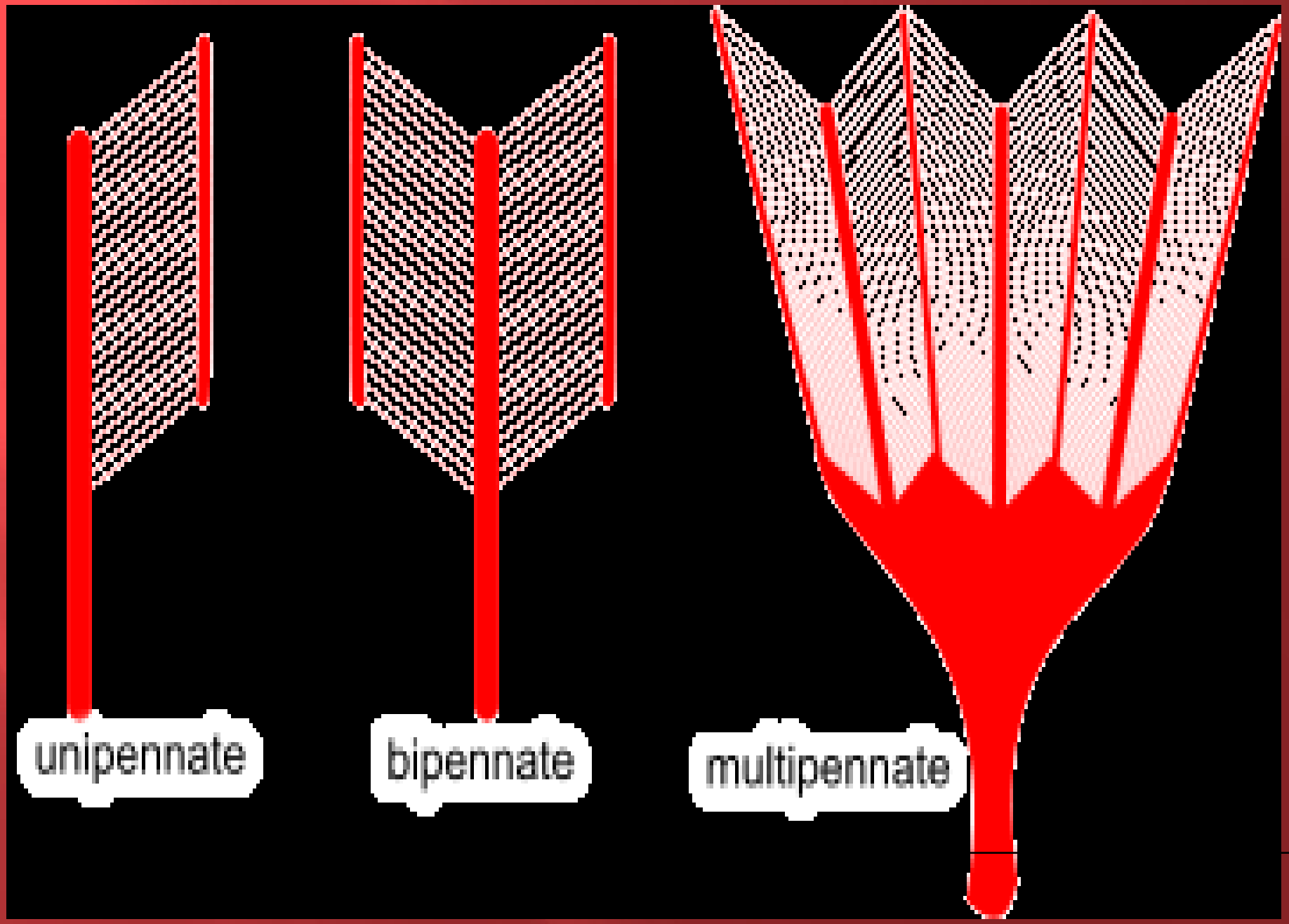


ARCHITECTURAL CLASSIFICATION

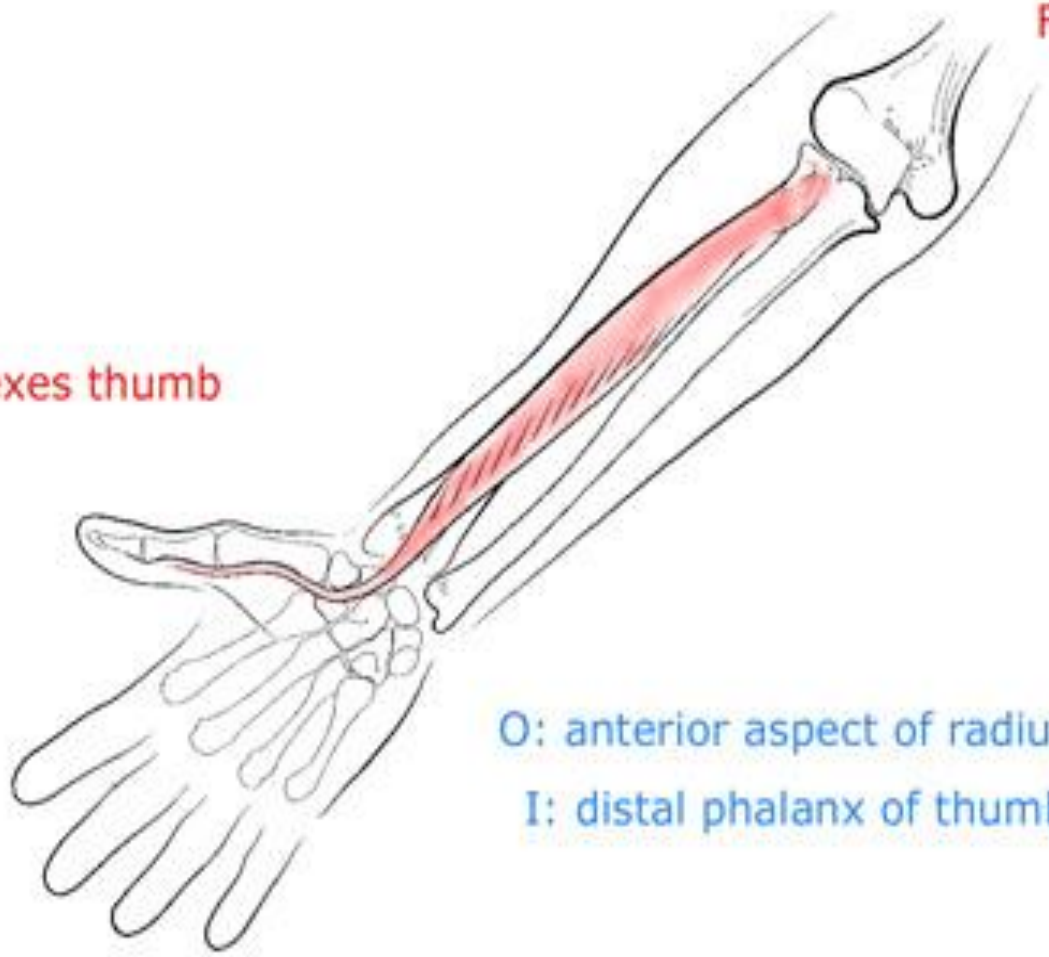
- Pennate muscles

  fibers run obliquely to line of pull
- On basis of shape





Flexor Pollicis Longus

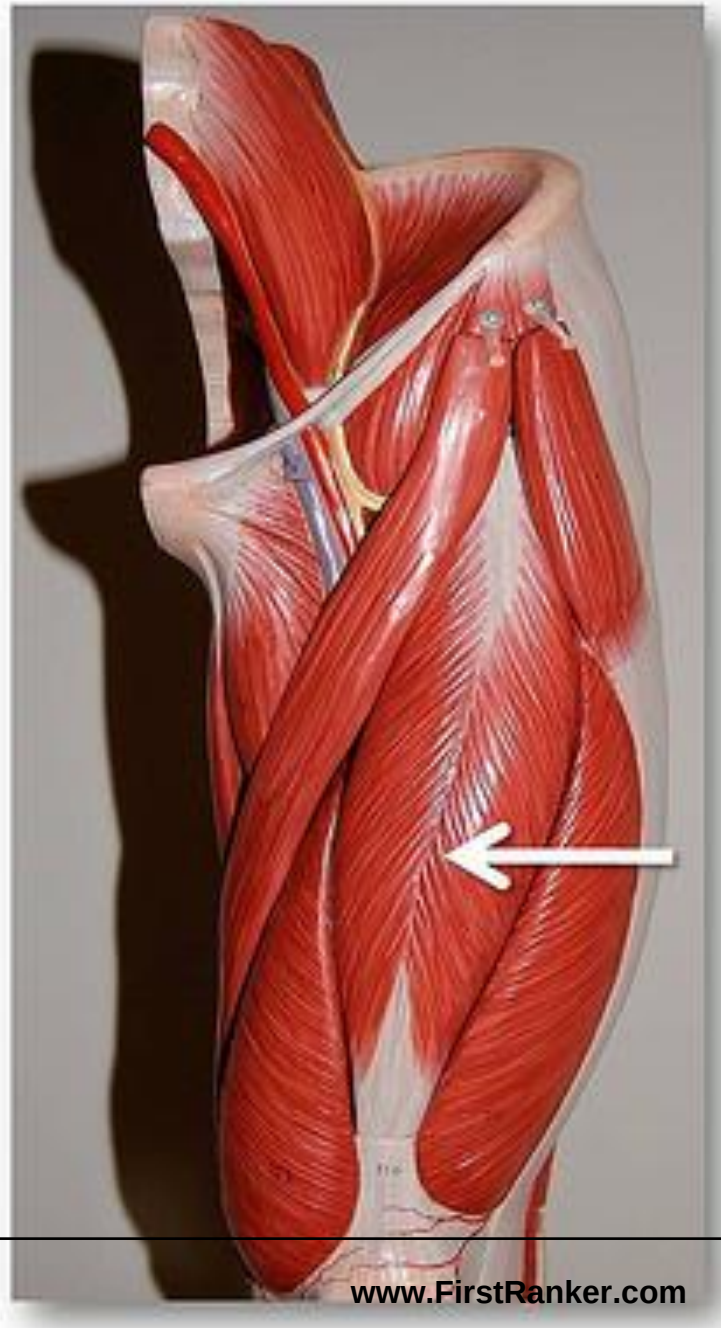


Flexes thumb

O: anterior aspect of radius and interosseus membrane

I: distal phalanx of thumb

Rectus femoris



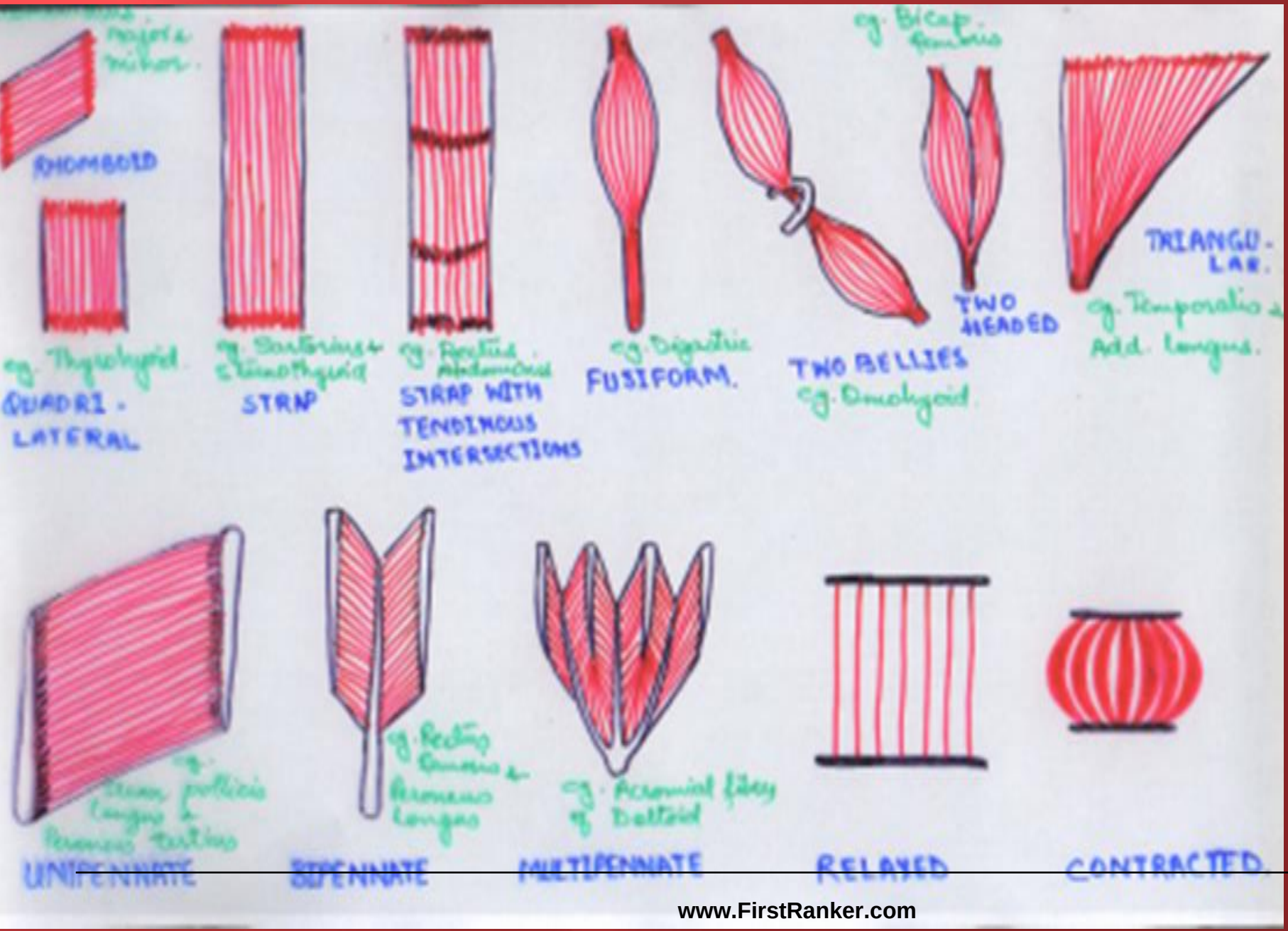
Extends leg at knee and flexes thigh at hip; part of the quadriceps group

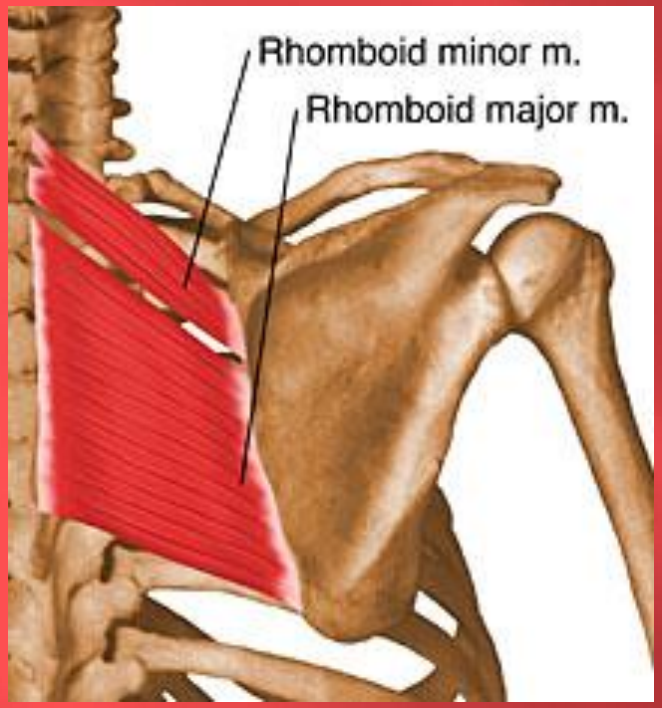
Deltoid

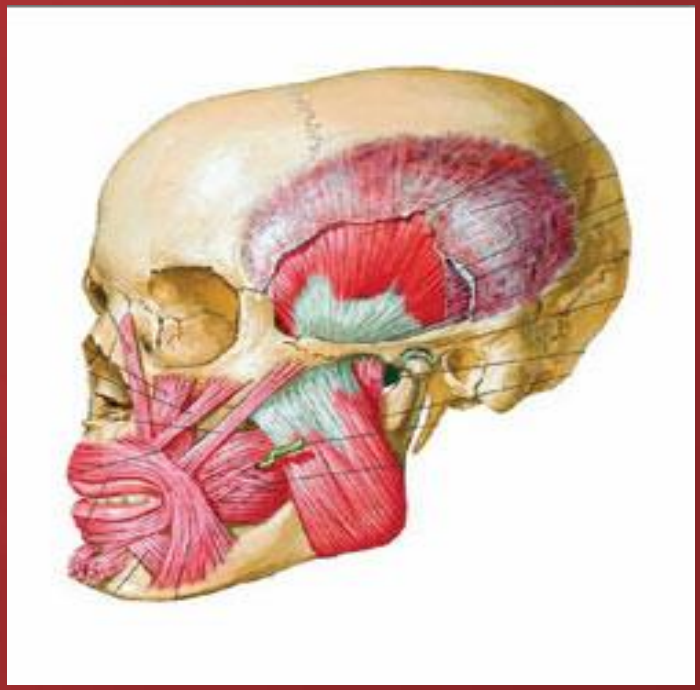
Adducts,flexes,extends medially and laterally rotates the arm

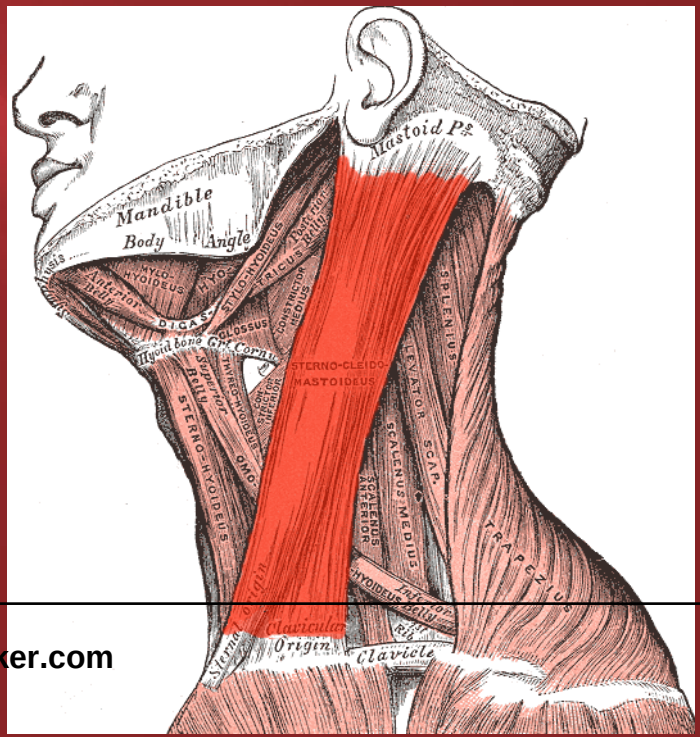
O: clavicle,acromion,and spine of scapula

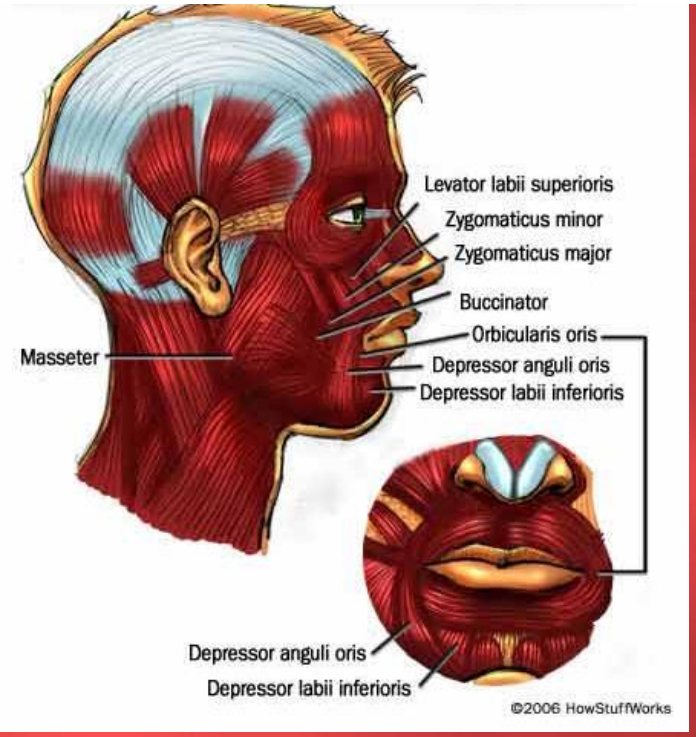
I:Deltoid tuberosity

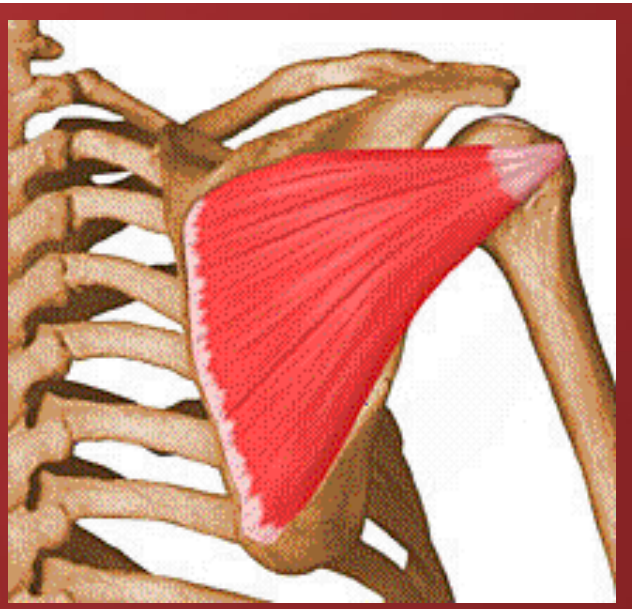


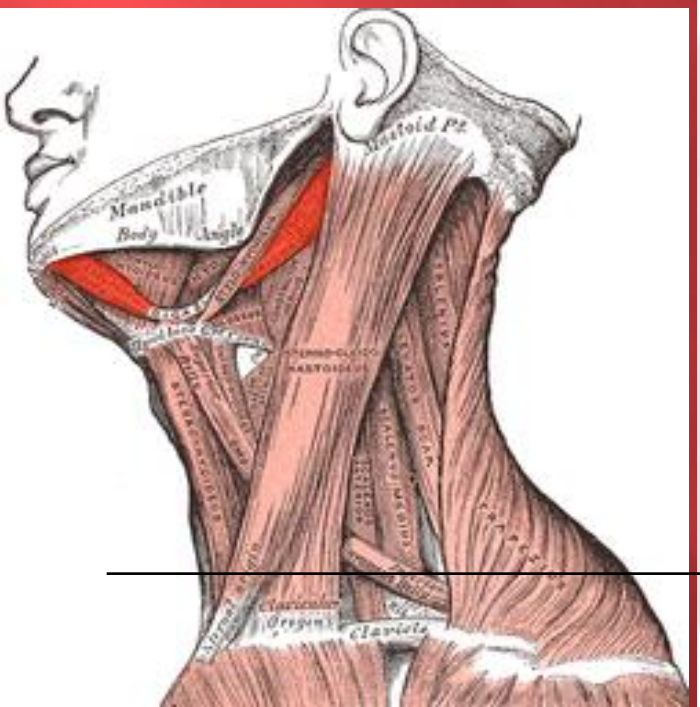


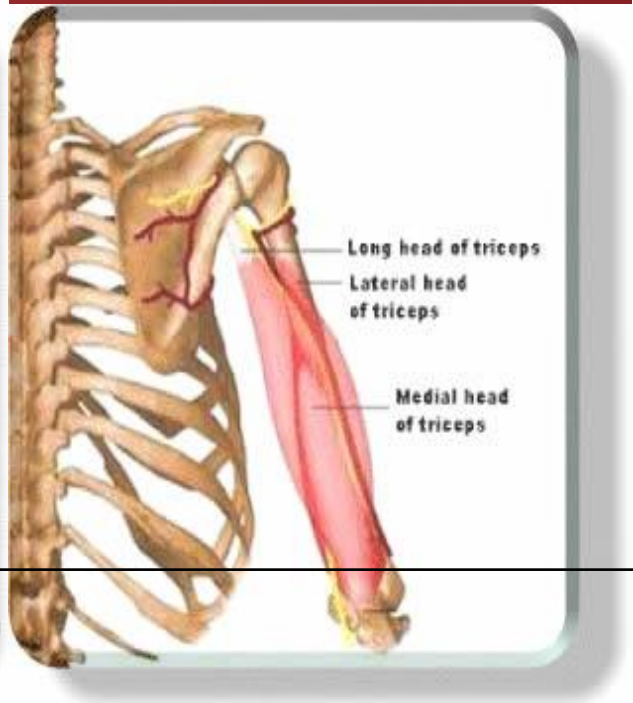










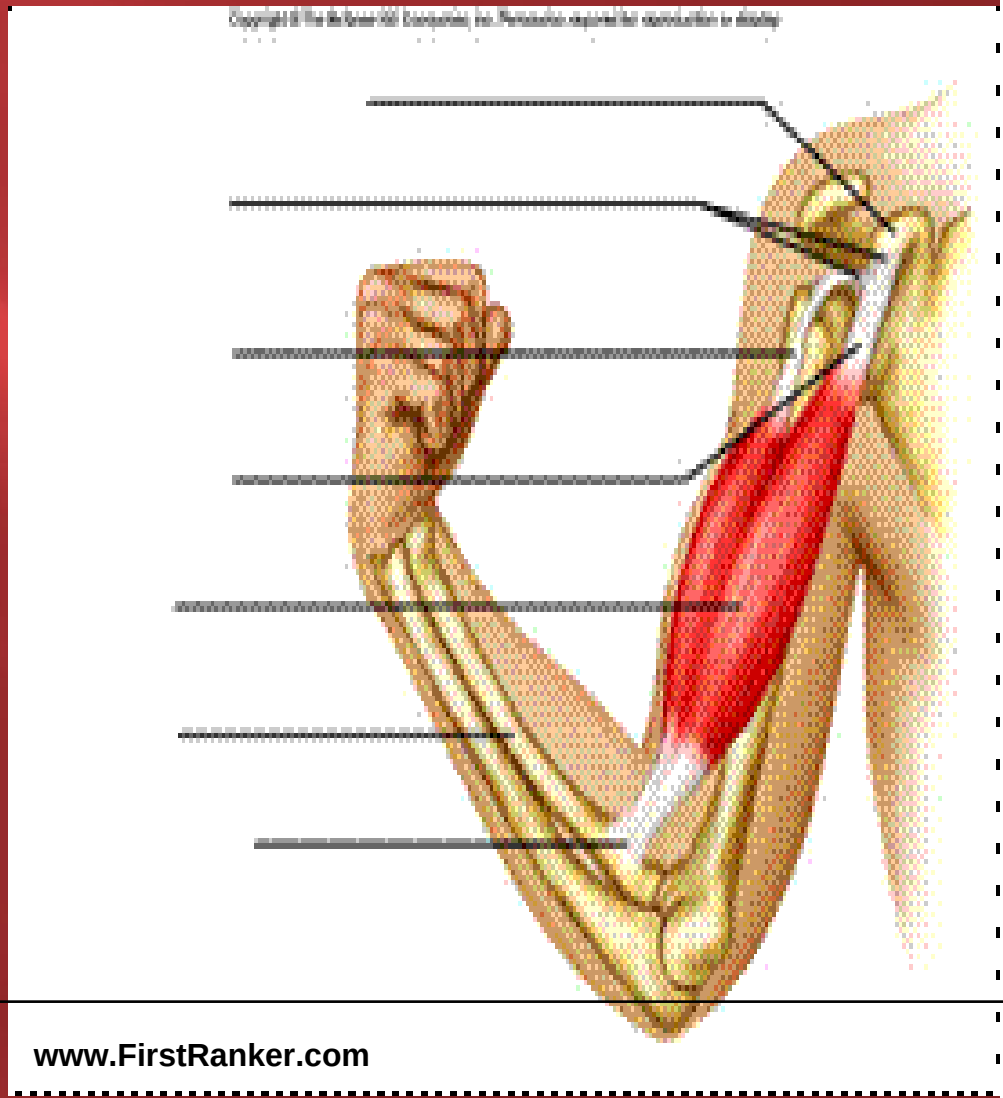


CLASSIFICATION ON BASIS OF ACTION

- Prime movers
- Antagonists
- Fixator
- Synergist

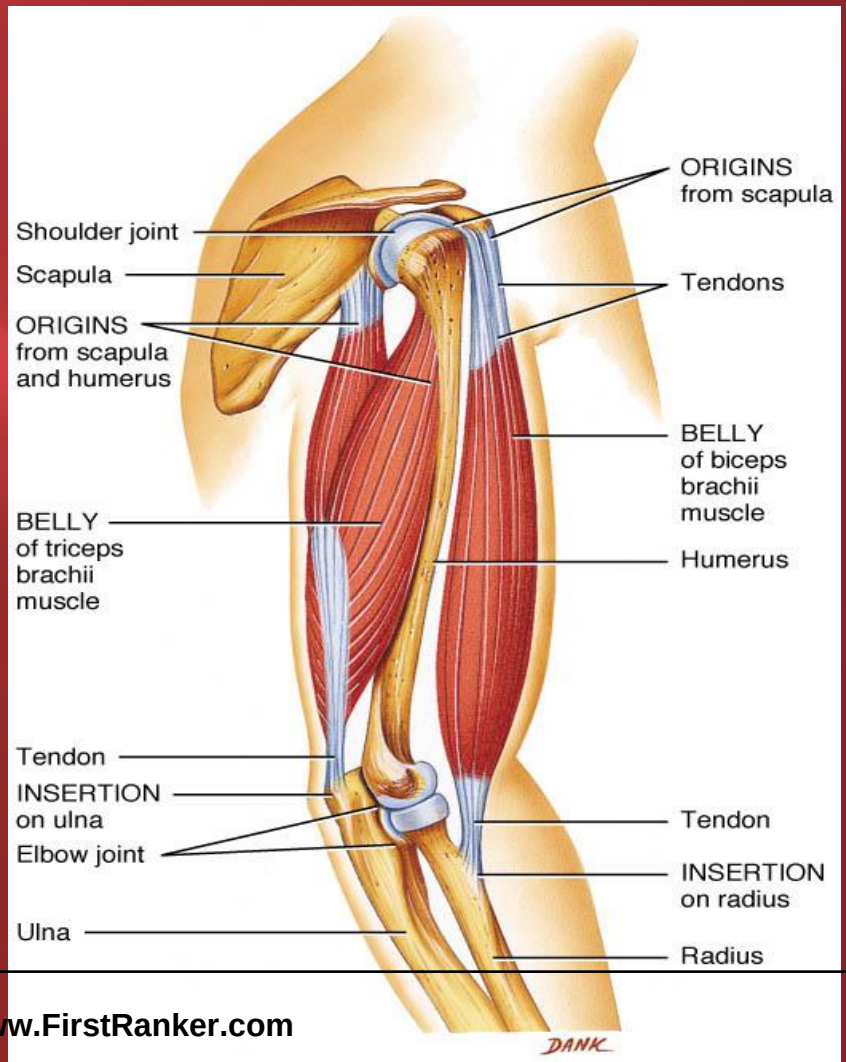
PRIME MOVERS

- Chief muscle responsible for a particular movement

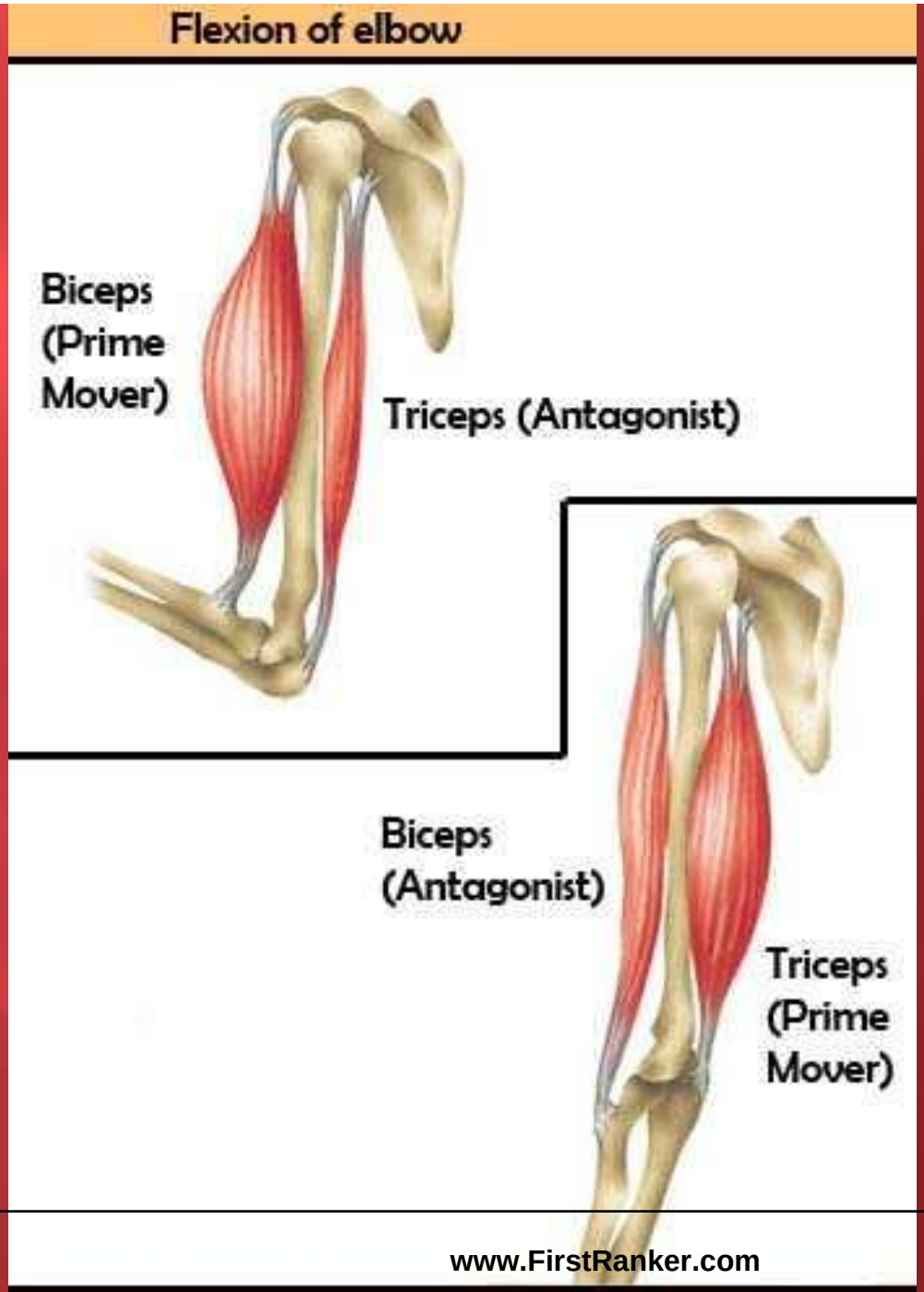


ANTAGONISTS

- Any muscle that opposes the action of prime mover

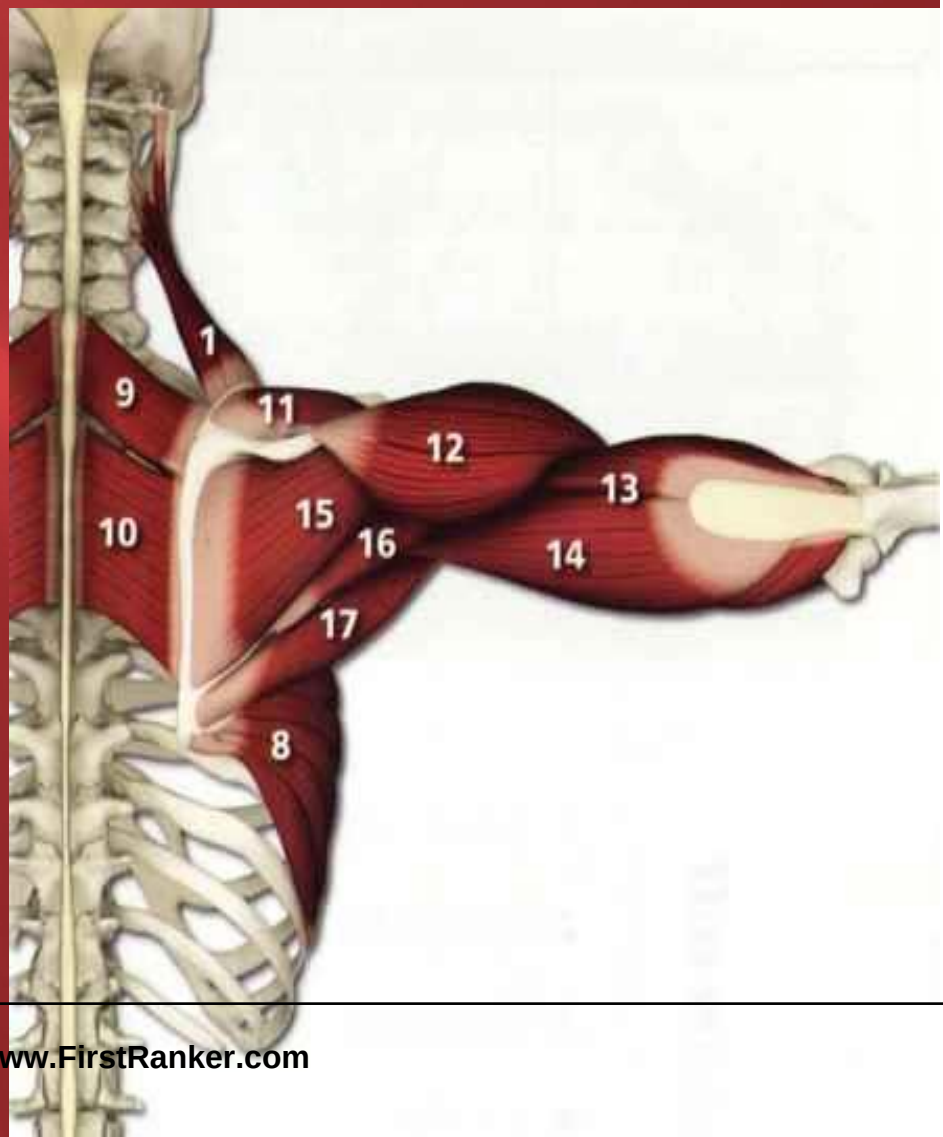


Origin and insertion of a skeletal muscle



FIXATOR

- A fixator contracts isometrically (contraction increases tone but does not itself produce movement)
- Muscles of shoulder girdle act as fixators for deltoid



SYNERGIST

- Prime movers cross several joints.
- Synergist contract to prevent unwanted movement on intermediate joints
- Long tendons of carpal muscles act as synergist for long finger tendons