Muscular System

Assist. Professor. Dr. Sangar M. AHMED

Human Anatomy

Fall Semester

Week 4

Outlines

- **Definition of Muscular system .**
- **Functions of muscular system**
- **Characteristics**
- **Types of muscle tissue**
- **Methods of Attachment to Bones**

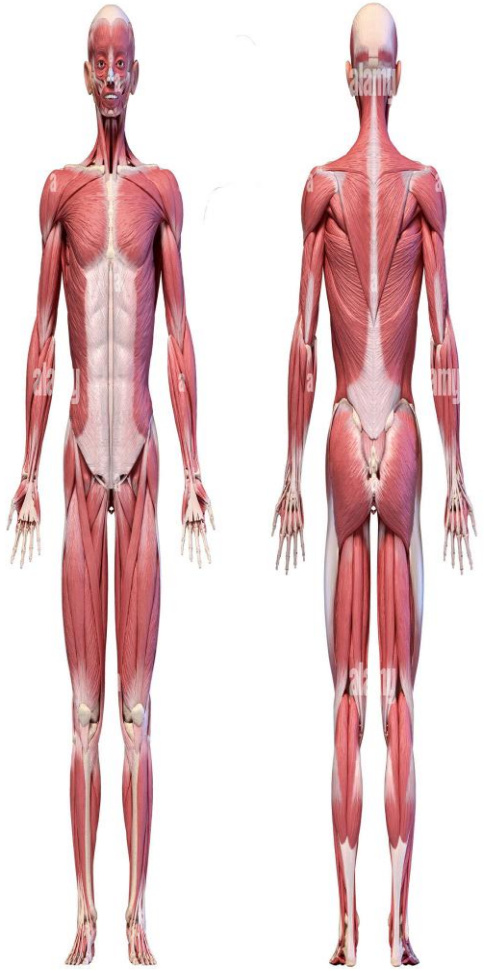
Muscular System

The **muscular system** is an organ system consisting of **skeletal**, **smooth**, and **cardiac** muscle.

It permits **movement of the body**, **maintains posture**, and **circulates blood** throughout the body.

The Muscular System

- Comprises nearly half our weight.
- Over 600 muscles.
- Each muscle is made up of hundreds or thousands of muscle fibers.

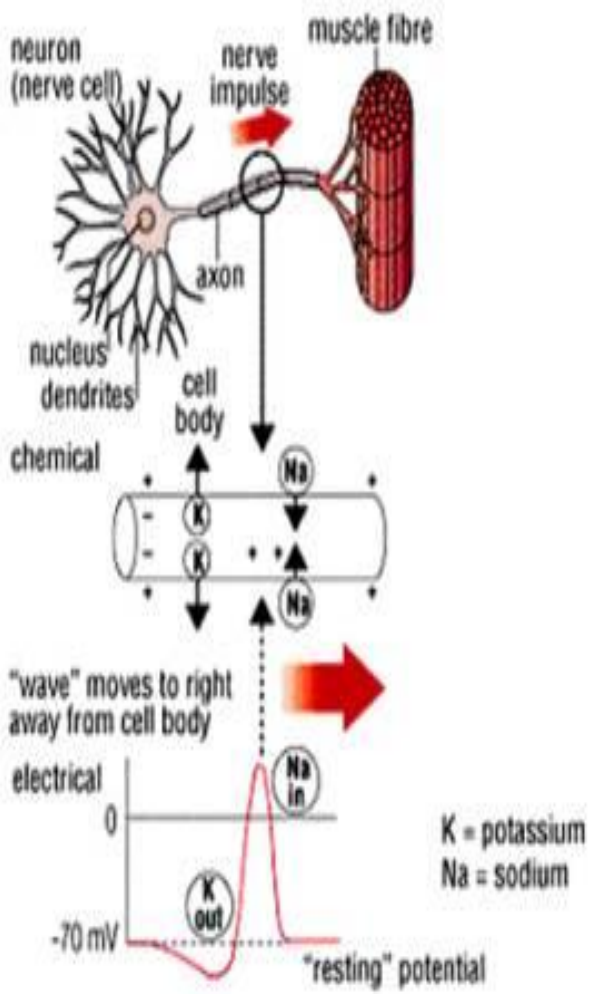


Functions of Skeletal Muscle:

1. Attach to bones to provide voluntary movement
2. Produce heat and energy
3. Help maintain posture
4. Protect internal organs

Characteristics of Muscles

1. Excitability or irritability: **ability to respond to a stimulus such as a nerve impulse.**



Characteristics of Muscles

2. Contractibility

When muscle fibers are stimulated by nerves, they contract or become short and thick. This causes movement.

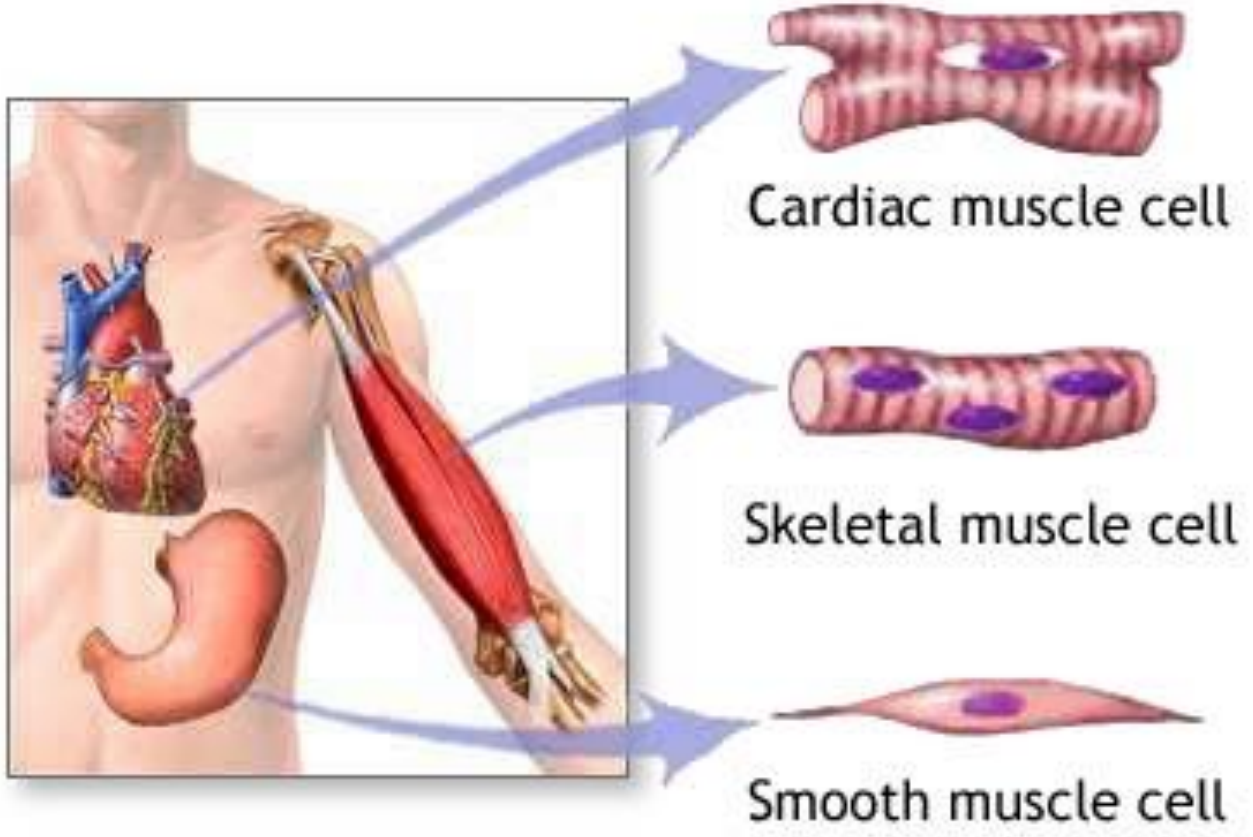
Characteristics of Muscles

3. Extensibility: ability to be stretched

Characteristics of Muscles

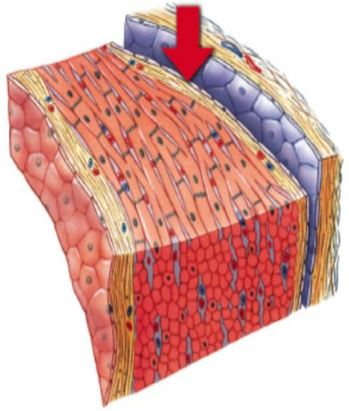
4. Elasticity: allows the muscle to return to its original shape after it has contracted or stretched.

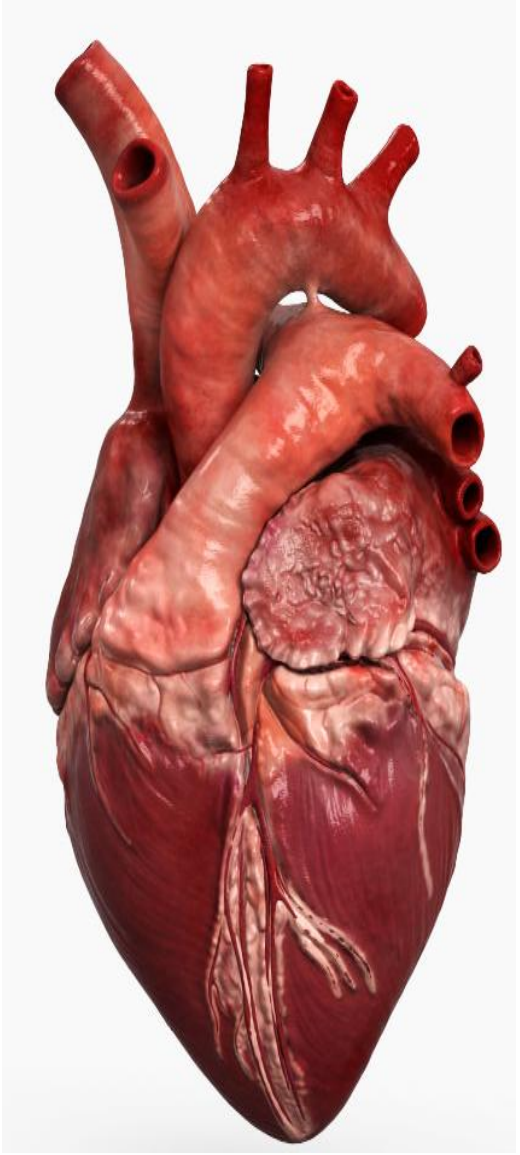
Types of Muscle Tissue:



Types of Muscle Tissue:

1.Cardiac



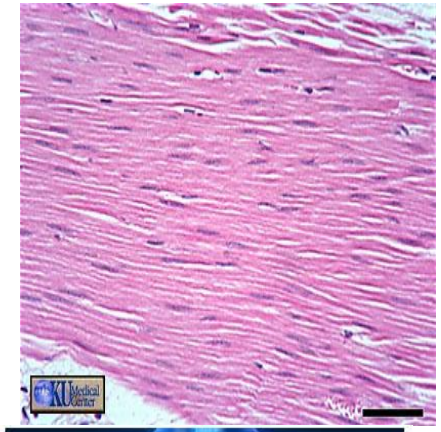


- Form walls of heart
- Contract to circulate blood
- Involuntary: function without conscious thought or control

Types of Muscle Tissue:

2. Visceral (Smooth)

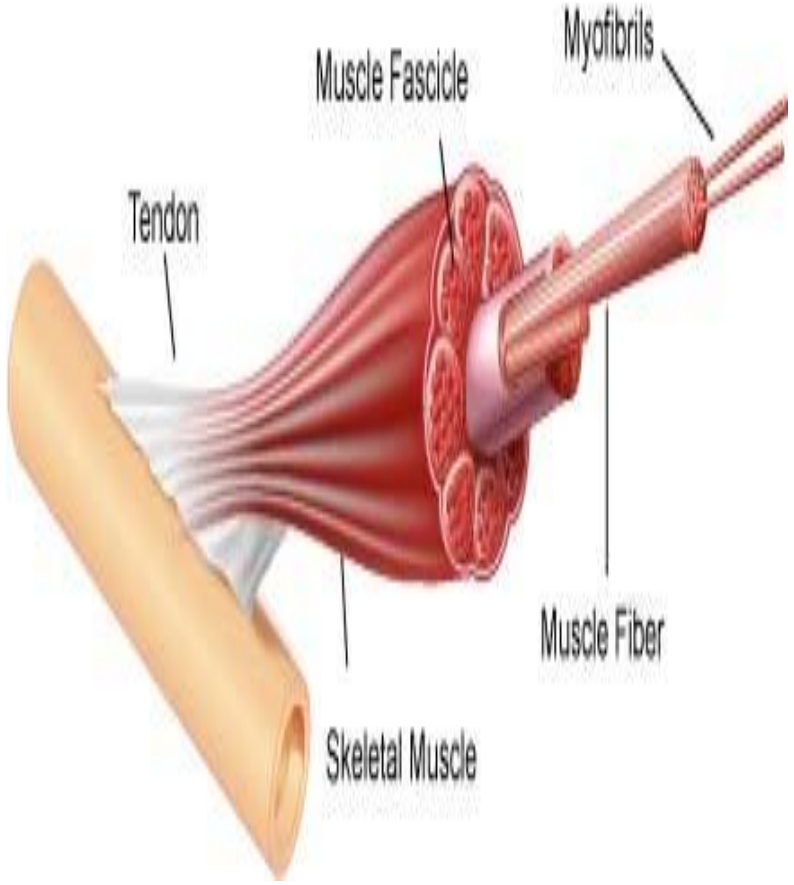
- Found in the **internal organs of the body** such as the digestive system, respiratory system, blood vessels, and eyes.
- Contract to cause movement in these systems
- **Involuntary**: function without conscious thought or control



Types of Muscle Tissue:

3. Skeletal

- Attached to bones
- Makes up 40% of body weight
- Responsible for **locomotion**, **facial expressions**, **posture**, **respiratory movements**, other types of body movement
- **Voluntary in action; controlled by somatic motor neurons**



Methods of Attachment to Bones:

1. Tendon

- Strong, tough connective tissue cord
- **Example**: Achilles tendon which attaches the gastrocnemius muscle on the calf of the leg to the heel bone.

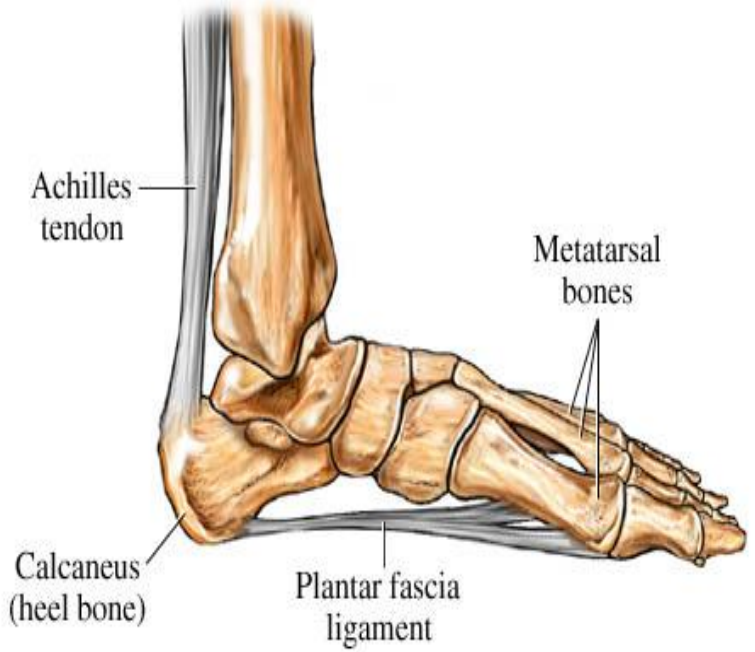
Methods of Attachment to Bones:

2. Fascia

- Tough, sheet like membrane

Function: Covers and protects tissue

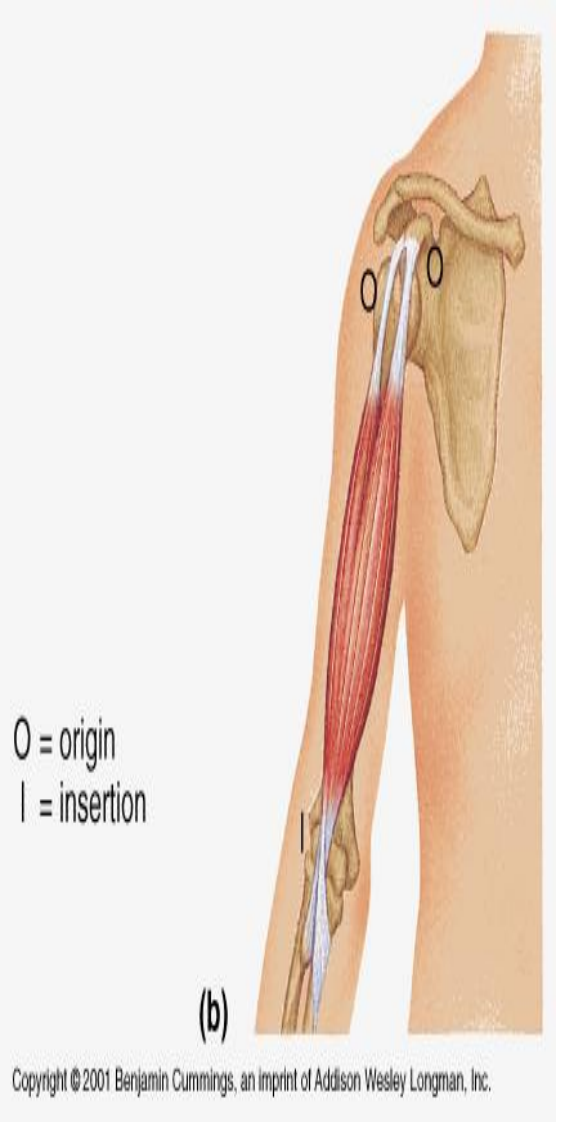
Location : lumbodorsal fascia which surrounds the deep muscles of the trunk and back



Methods of Attachment to Bones:

3. Origin and Insertion

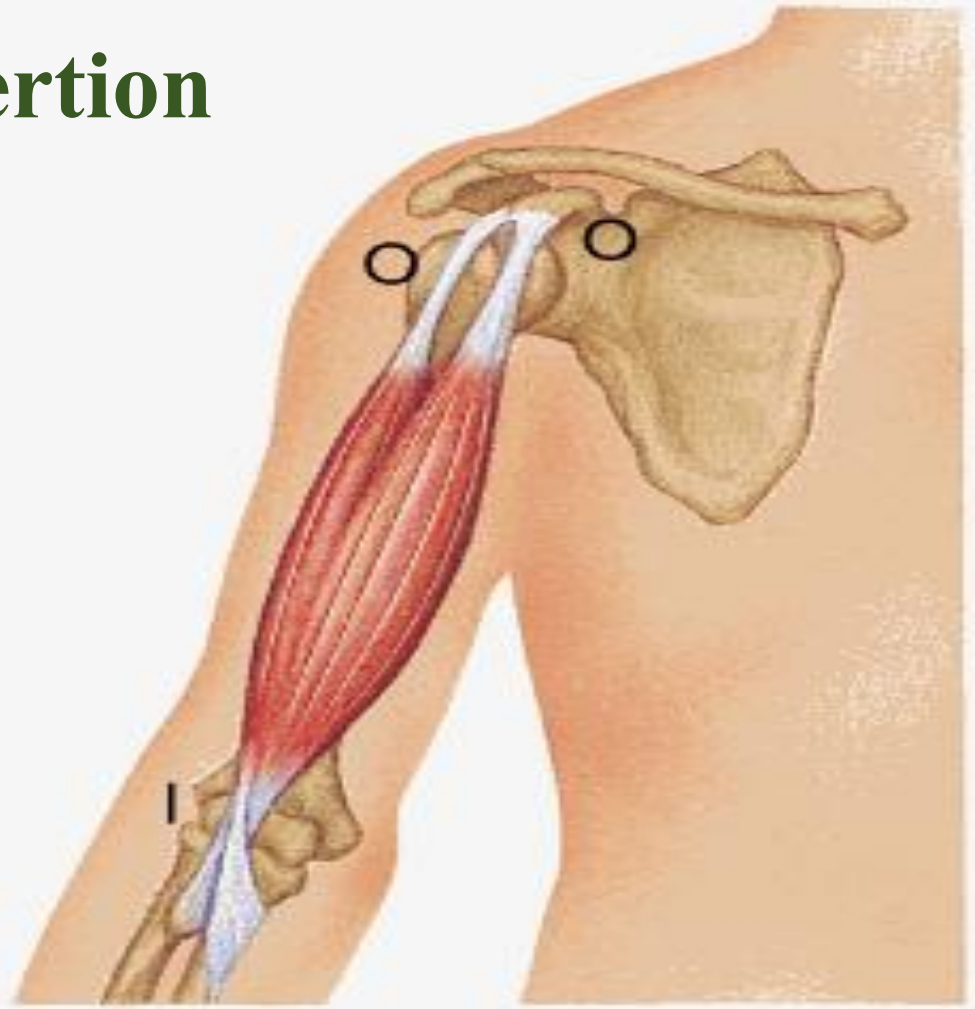
- When muscles attach to bones, one end becomes the origin and one end the insertion
- Origin: end that does not move
- Insertion: end that moves when muscle contracts



Methods of Attachment to Bones:

3. Origin and Insertion

O = origin
I = insertion



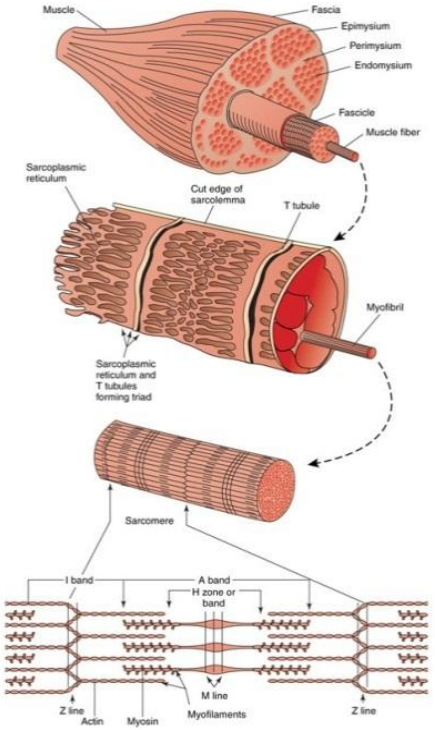
(b)

Muscle Fibers

Bundles of threadlike structures called myofibrils Composed of:

1. Myosin
2. Actin

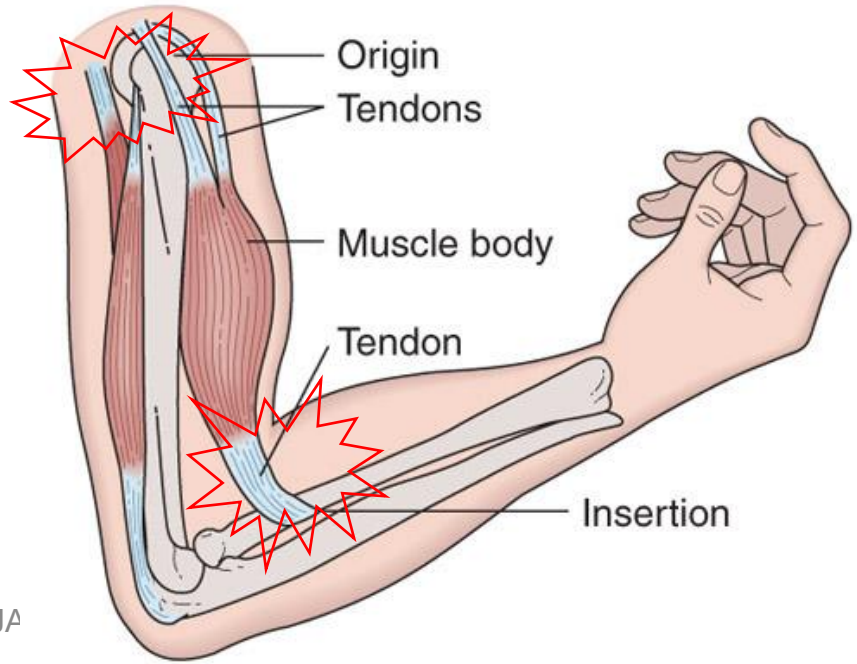
Myofibrils form an overlapping pattern called **sarcomere**



Connective tissue

1. Tendons:

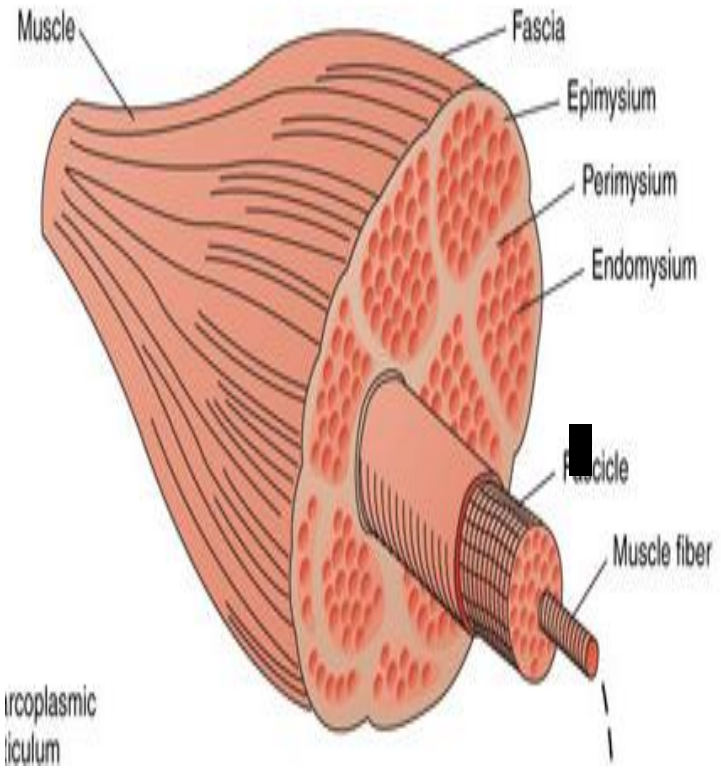
dense bands that connect skeletal muscle to the bone



Connective tissue

2. Fascia:

Fibrous connective tissue sheets that wrap around muscle bundles

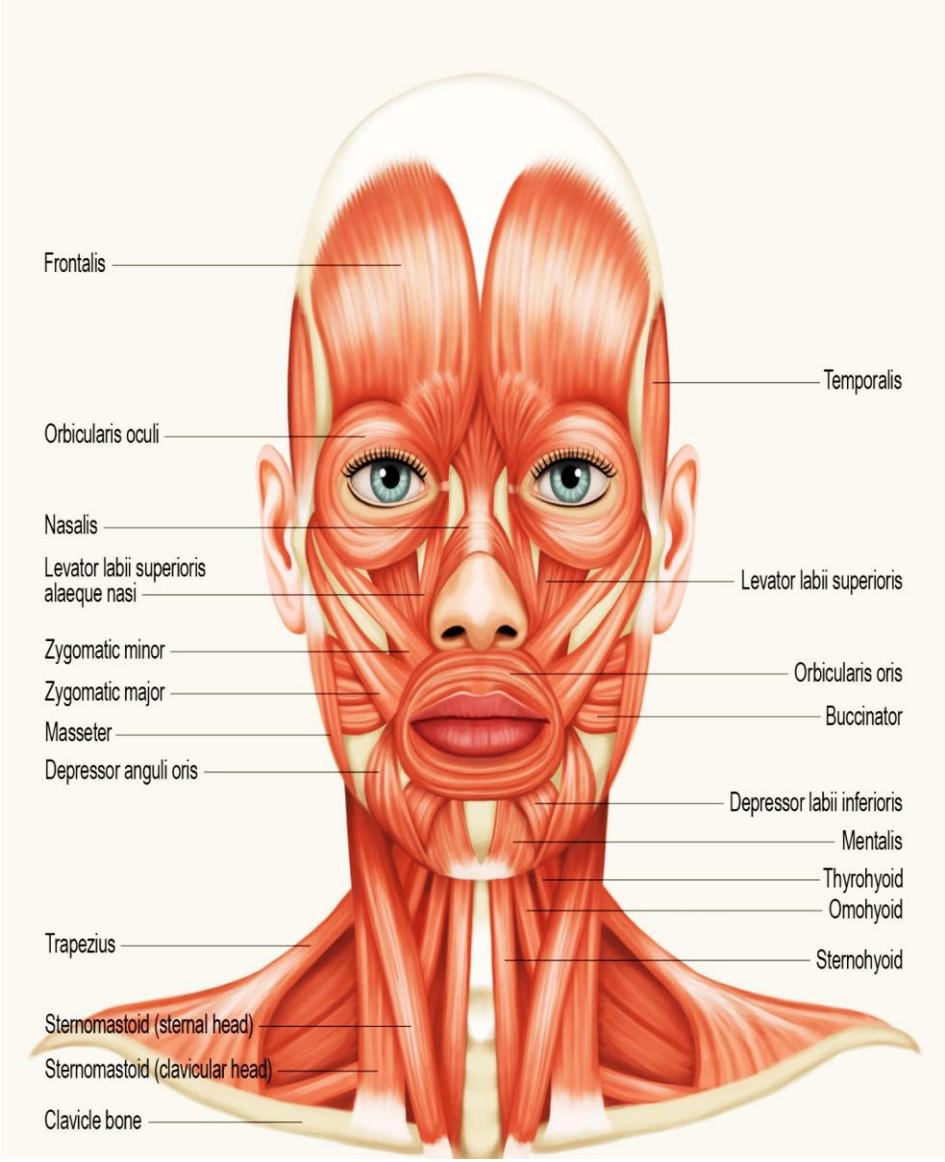


How do skeletal muscles get their names?

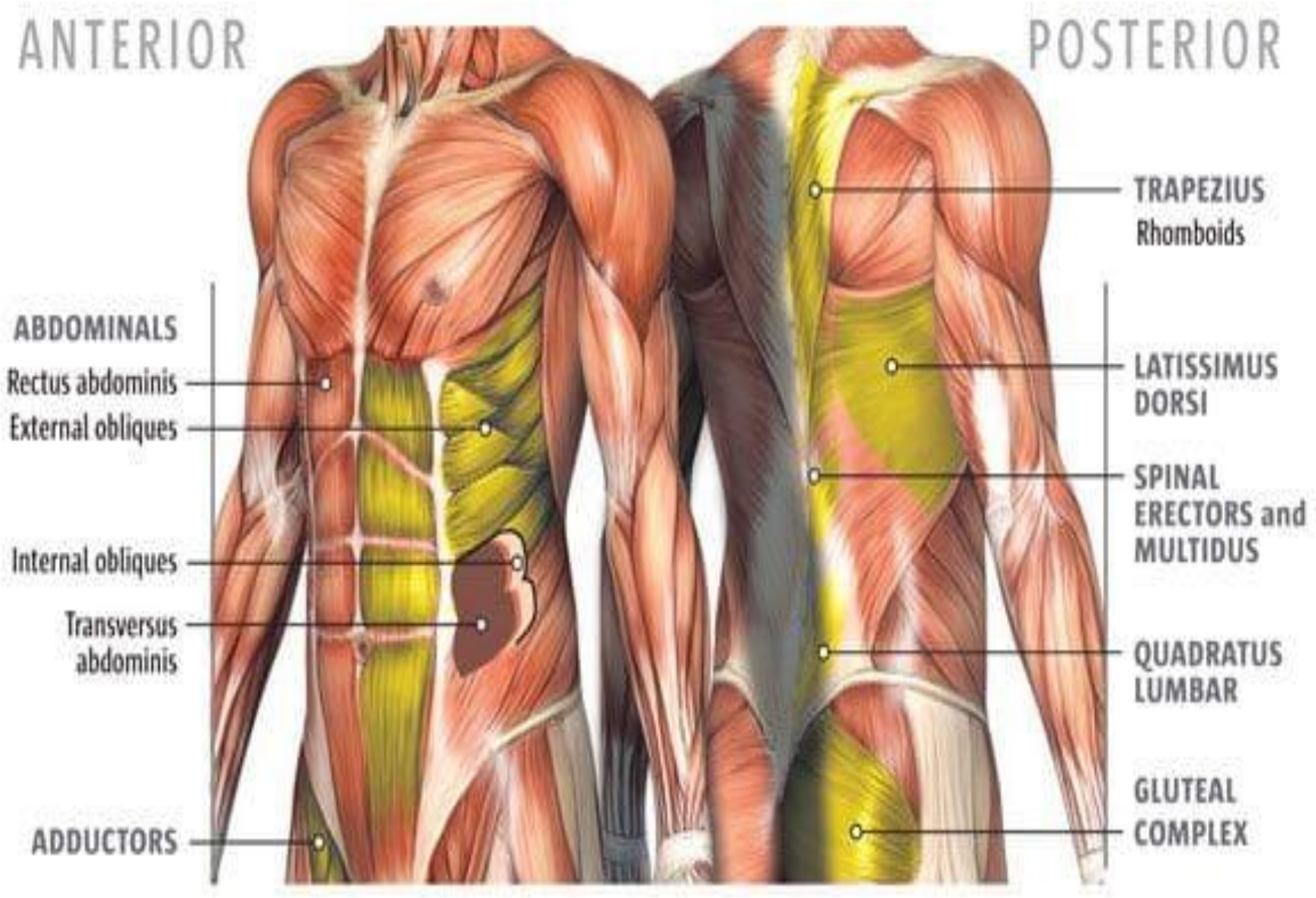
- **Location**
- **Size**
- **Direction**
- **Number of origins**
- **Location of origin and insertion**
- **Action flexor**
- **Extensor**
- **Depressor**

- **However,**
- ***not all muscles are named by the above methods!***

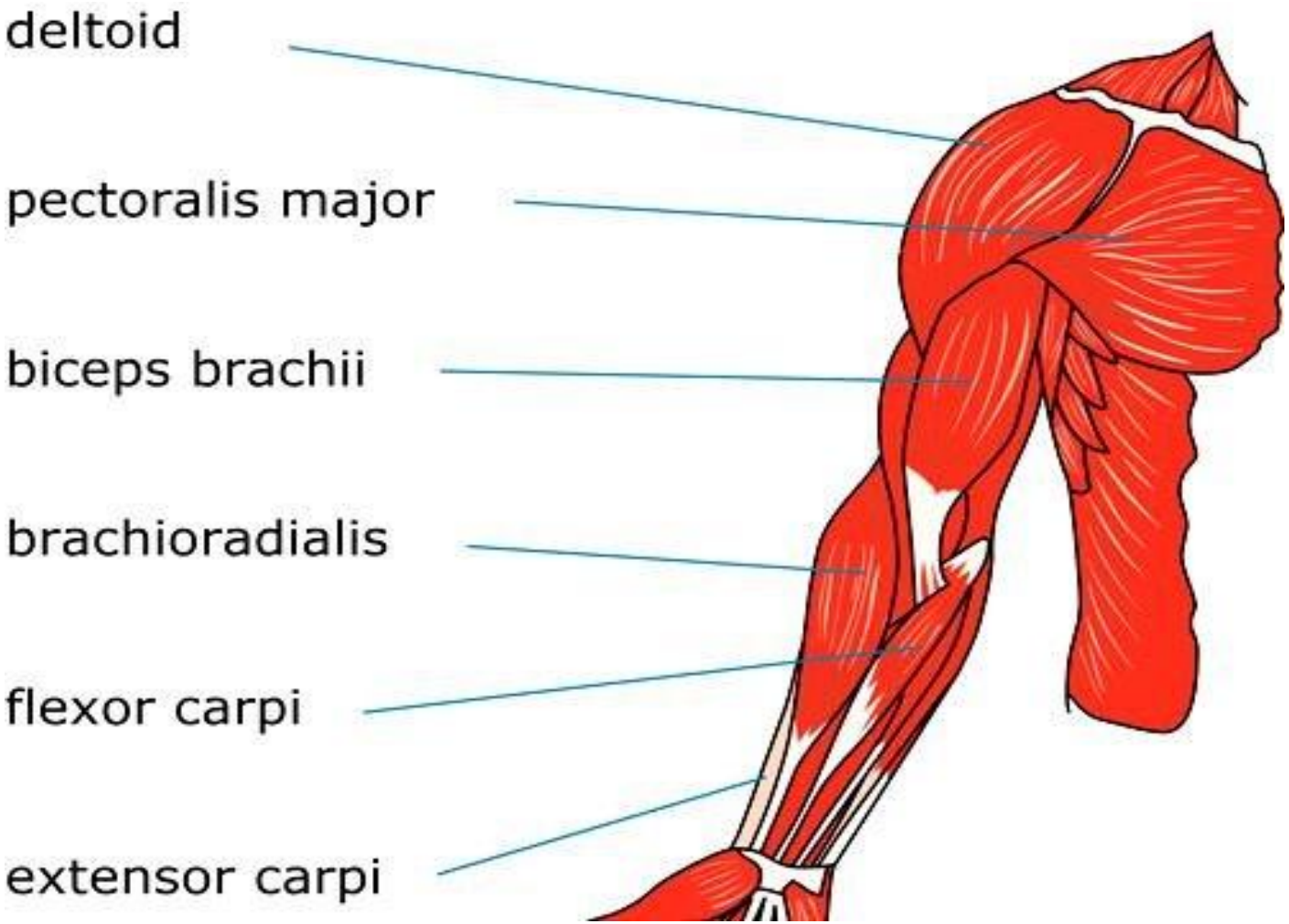
Head & Neck Muscles



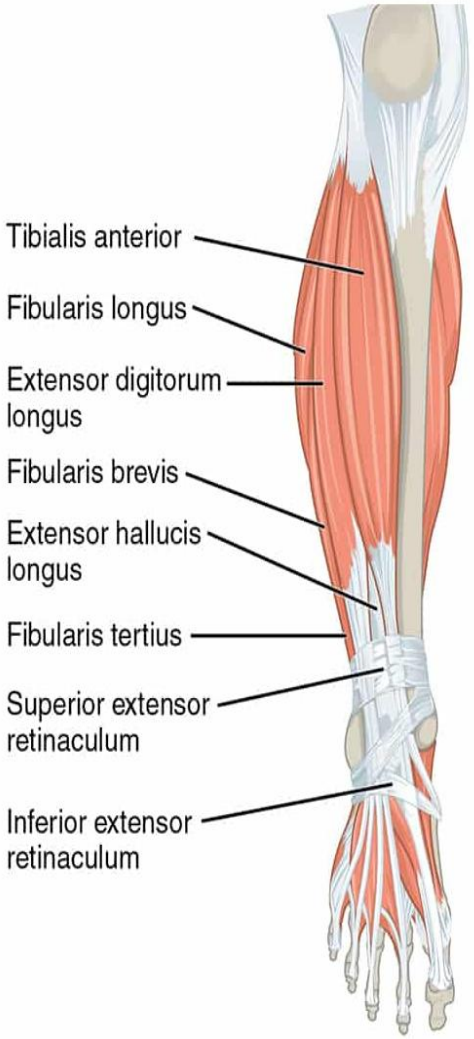
Torso/Trunk


ANTERIOR
POSTERIOR
ABDOMINALS
Rectus abdominis
External obliques
Internal obliques
Transversus abdominis
ADDUCTORS
TRAPEZIUS
Rhomboids
LATISSIMUS DORSI
SPINAL ERECTORS and MULTIDUS
QUADRATUS LUMBAR
GLUTEAL COMPLEX

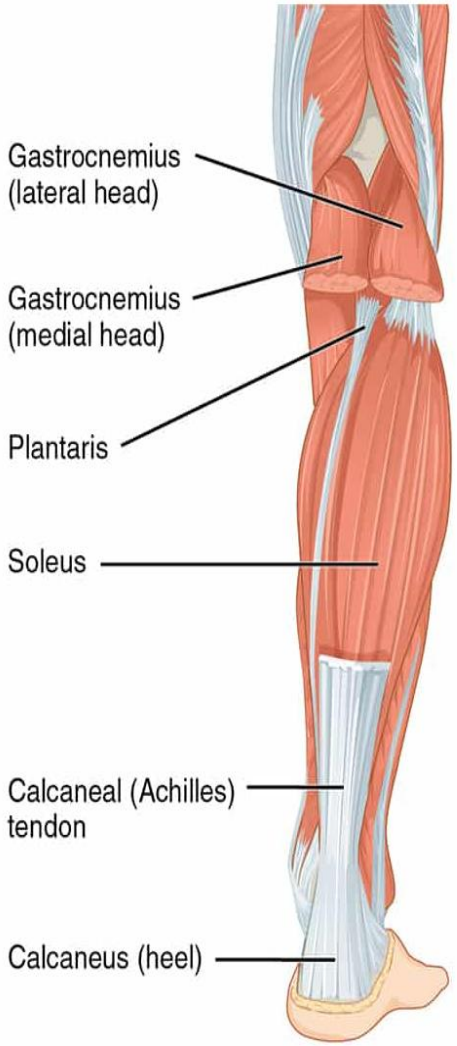
Upper extremities



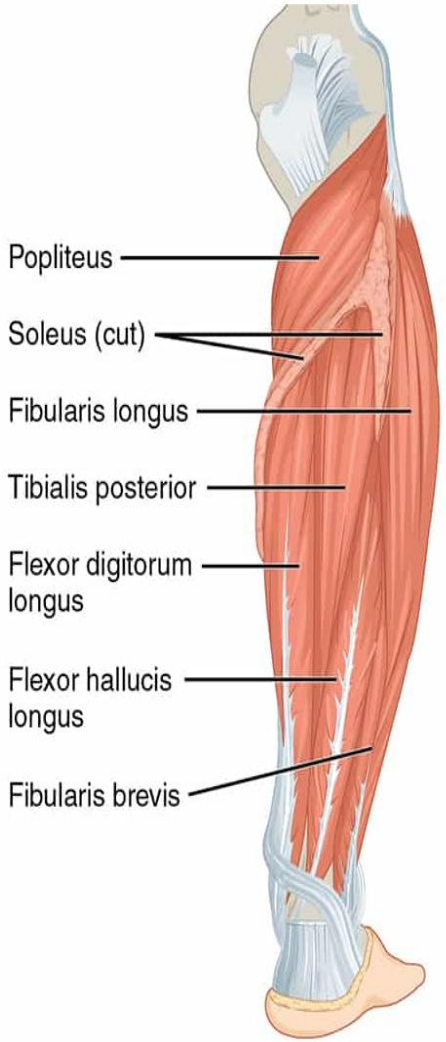
Lower extremities



Superficial muscles of the right lower leg (anterior view)



Superficial muscles of the right lower leg (posterior view)



Deep muscles of the right lower leg (posterior view)


QUESTIONS?
COMMENTS?
CONCERNS?