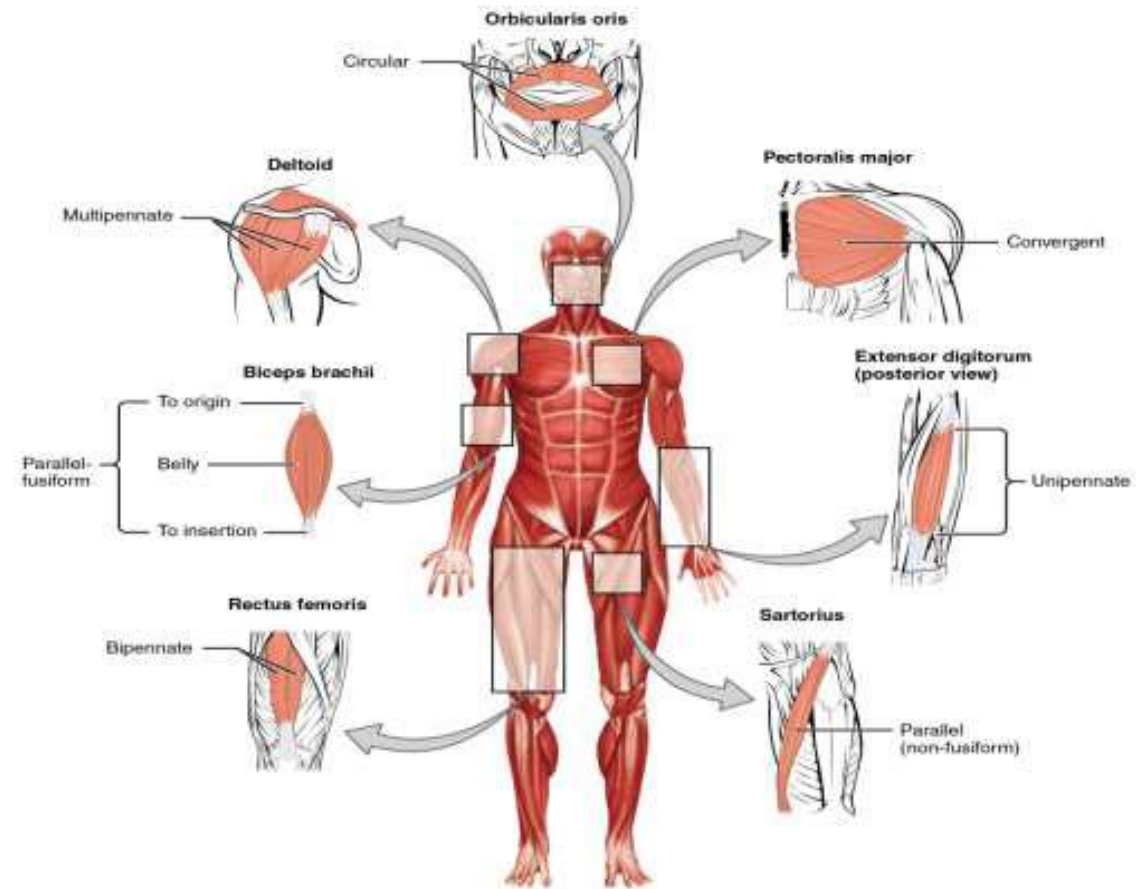


# Muscle Tissue

Dr. Priti Acharya



# Muscle

- Contractile tissue of the body which brings about movement.
- The word “muscle” is derived from the Latin word- musculus which means little mouse (mus) & their fleshy part represents the body & tendon represents the tail.
  - Muscles can be regarded as motors of the body and are derived by the mesodermal layer of embryonic germ cells.
  - It forms red flesh of the body about 40 % of the body weight.

- **Four characteristics of muscular tissue**

Contractability: ability to shorten & thicken.

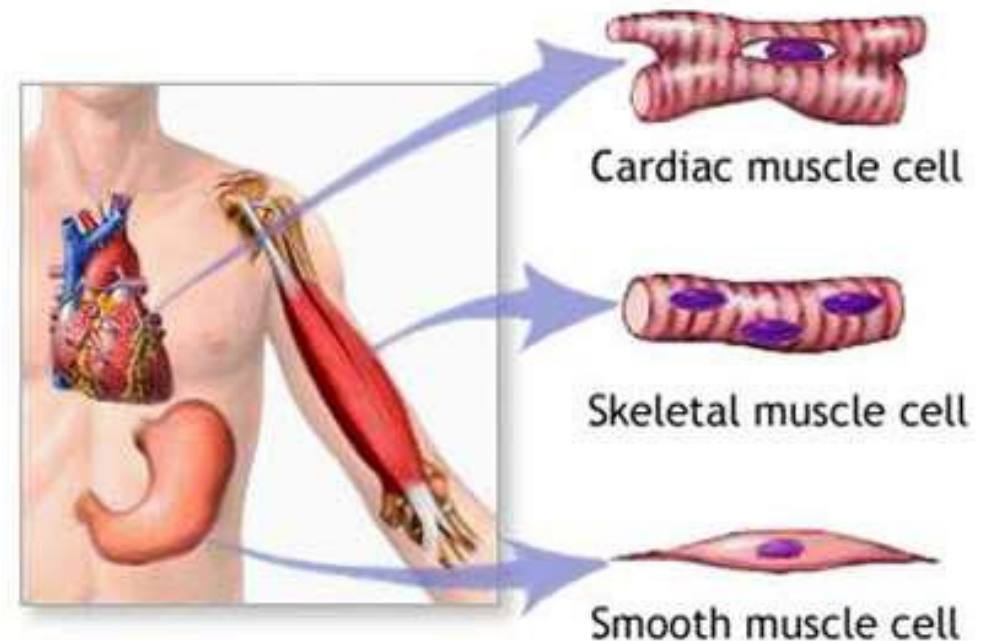
Extensibility: ability to lengthen.

Elasticity: ability to return back to normal size.

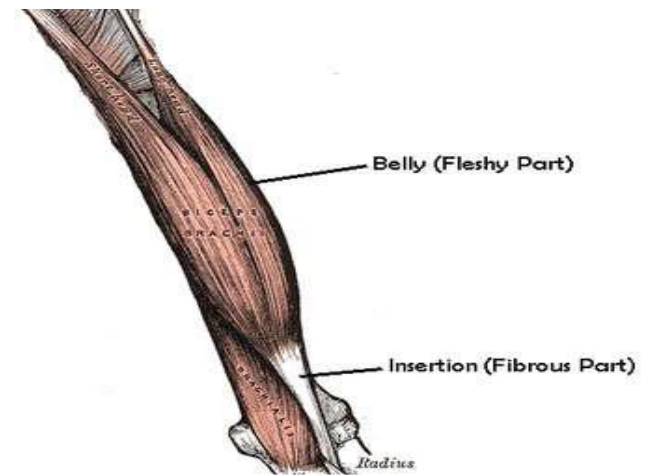
Excitability :Tissue can receive & respond to stimulation

# Types of Muscle

1. Skeletal / Somatic/ Striated / Voluntary.
2. Smooth / Non-striated / Involuntary.
3. Cardiac / Involuntary Myocardium



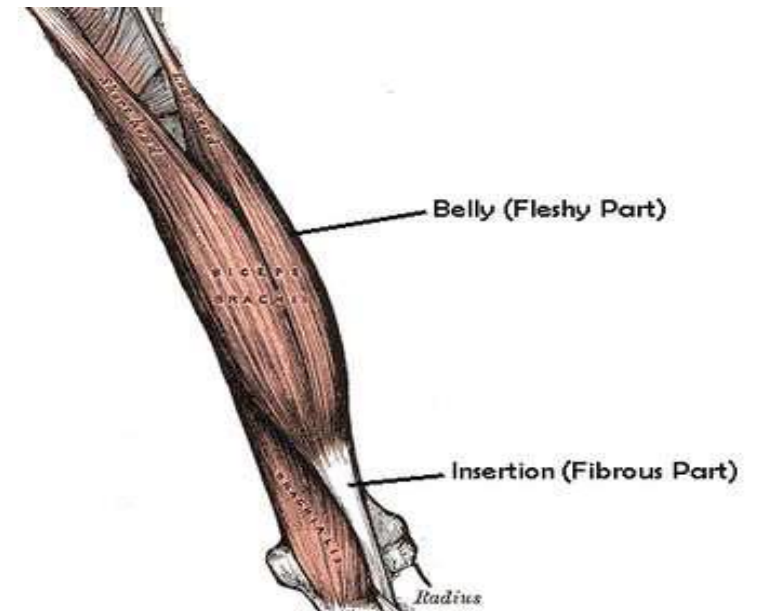
# Skeletal / Striated / Voluntary



- The skeletal muscle are more abundant & those which attach to the bones & have the main function of contracting to facilitate movement of our skeletons.
- Muscle contract rapidly & fatigue more easily
- Serve to adjust with external environment
- Distributed through out body wall, limb, head neck. Mostly used for intramuscular injections.

2 parts:

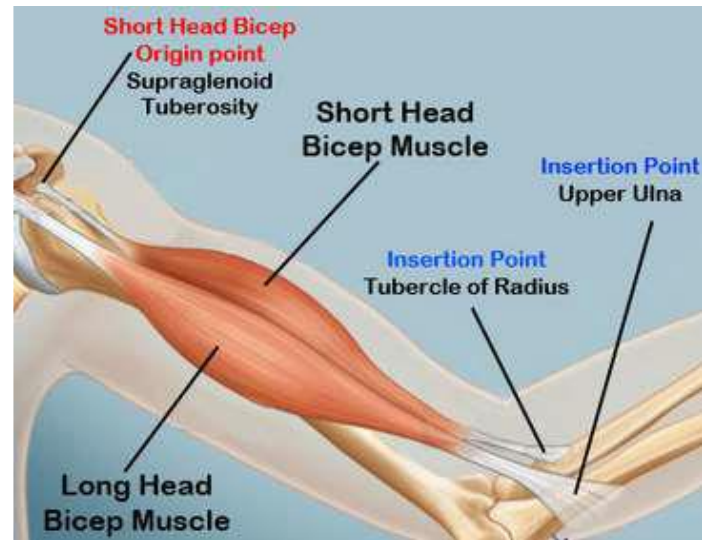
- i. Fleshy part: contractile, highly vascular called belly.
- ii. Fibrous part: non contractile, inelastic & less vascular. Tendon: cord-like or rope-like. Aponeurosis: flatten.



- 2 Ends:

I. Origin: one end of muscle which remains fixed.

II. Insertion: other end which moves.





# Classification of skeletal muscle

1. According to the direction of muscle fibres:

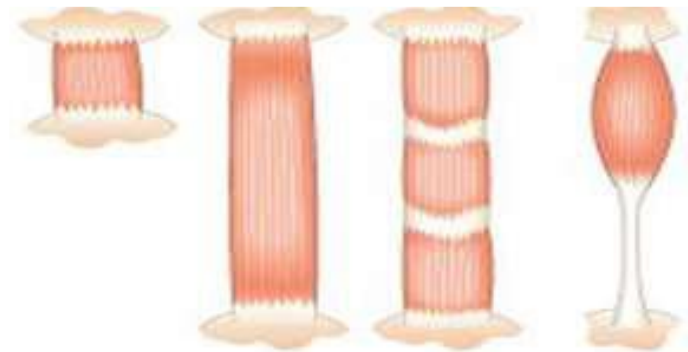
a) Parallel: muscle fibres are parallel to the line of pull. sub-types;

i. quadrilateral (e.g. thyrohyoid)

ii. Strap muscle: e.g. sternohyoid

iii. strap like with tendinous intersections (e.g. rectus abdominis).

iv. Fusiform: biceps brachii.



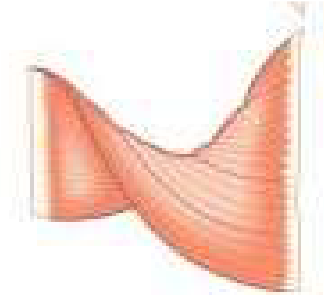
b) Pennate muscle: fleshy fibres are oblique to line of pull.

- Sub-type; i. Unipennate: all fleshy fibres slope into one side of the tendon. Eg; flexor pollicis longus, extensor digitorum longus.
- ii. Bipennate: rectus femoris, dorsal interossei
- iii. Multipennate: deltoid
- iv. Circumpennate: tibialis anterior



c) Spiral muscle: twisted close to their insertion.

Eg; pectoralis major and latissimus dorsi



d) Cruciate muscle: Fibres are arranged in superficial & deep plane crossing like 'X'.

Eg; masseter & sternocleidomastoid.



## 2. According to the colour:

### I. Red Muscles:



- abundant myo-haemoglobin.
- Found in deep muscles.

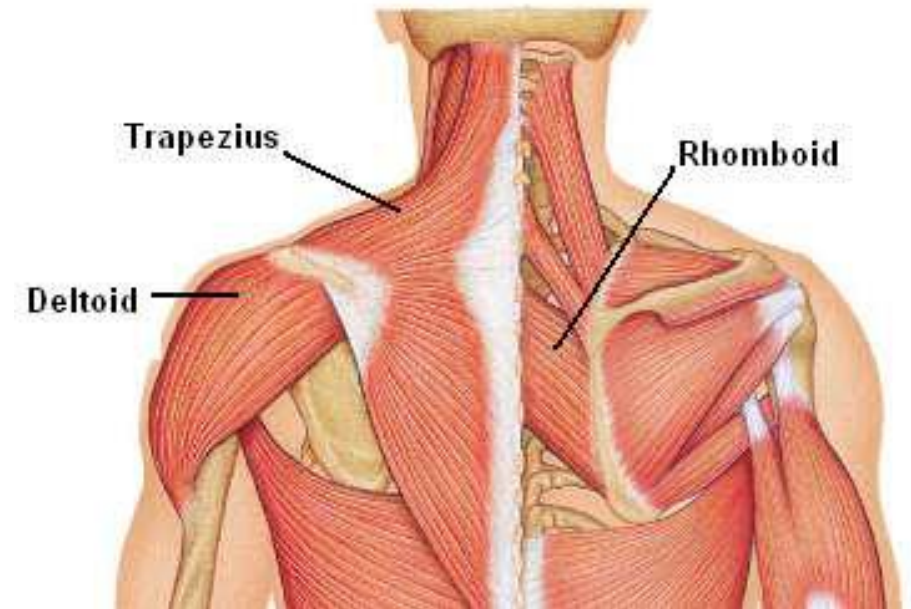
Eg; soleus, brachialis.

### II. White Muscles: Less myo-haemoglobin.

- Found in superficial muscles.
- Eg; Biceps brachii, hamstring muscle, gastrocnemii

# Nomenclature of muscles

- According to the shape:
- Deltoid =  $\Delta$
- Trapezius = 
- Serratus = saw-toothed 
- Rhomboideus = rhomboid shape
- Teres =  $\circ$



## 2. Acc to the number of head of origin

- **BICEPS** = Two

- *Biceps Brachii*

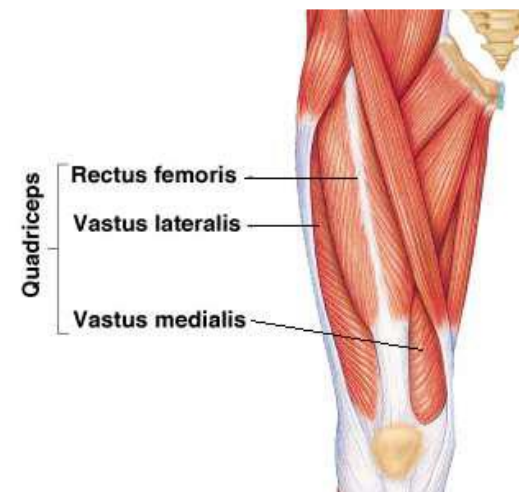
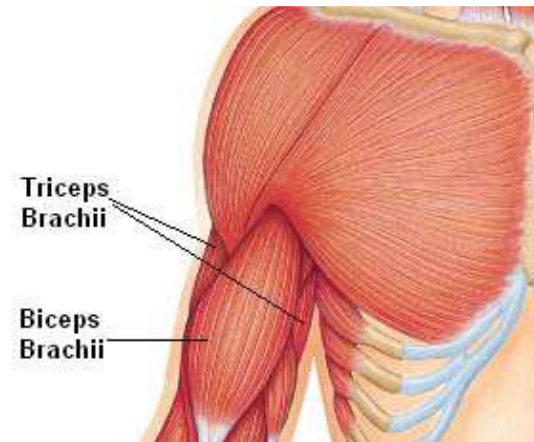
- *Biceps Femoris*

- **TRICEPS** = Three

- *Triceps Brachii*

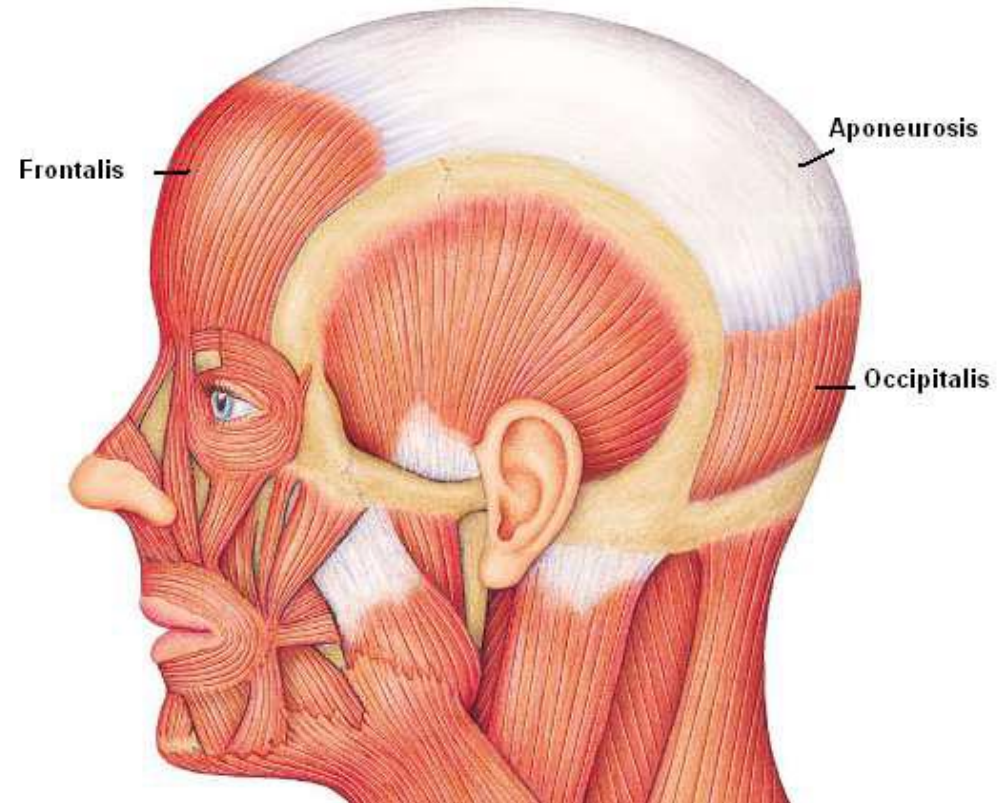
- **QUADRICEPS** = Four

- *Quadriceps Femoris*



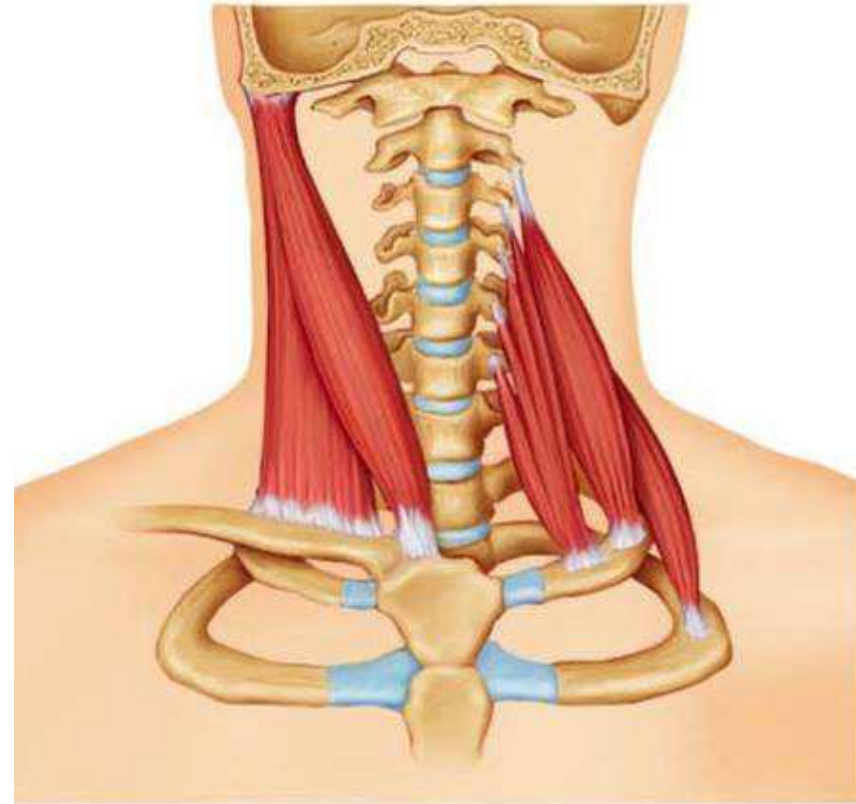
### 3. Acc to the location

- –**Frontalis**= near frontal bone
- –**Occipitalis**= near occipital bone



## 4. Acc to the Attachments

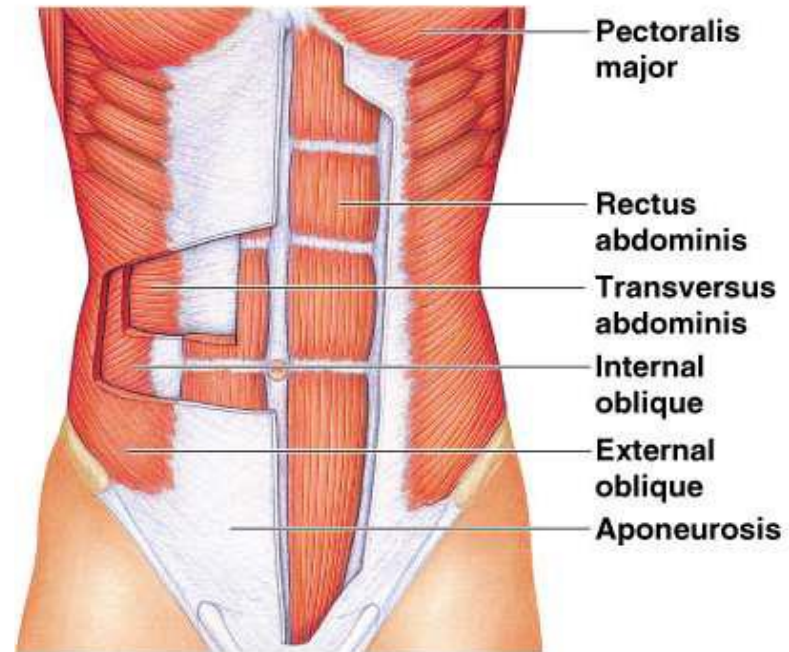
- Sternocleidomastoid
- Stylohyoid
- Cricothyroid





## 5. Acc to the action

- Flexor carpi radialis  
– flexes wrist
- Abductor magnus  
– abducts thigh
- Extensor digitorum  
– extends fingers



## **6. Acc to the direction of muscle fibres**

- Rectus : parallel to the midline eg; Rectus Abdominis
- Transverse: perpendicular to midline eg; Transverse Abdominis
- Oblique= diagonal to midline eg; External Oblique

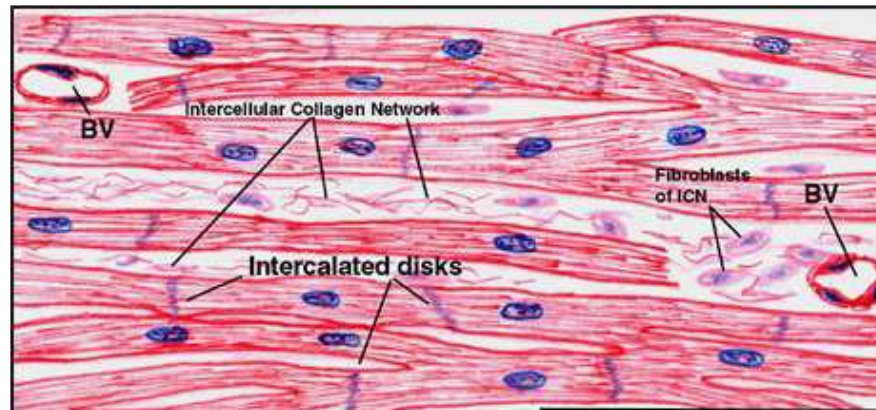
# Smooth Muscle / Non-striated / Involuntary

- Present in the walls of hollow tubular & saccular viscera, duct of exocrine glands, blood vessels, tracheobronchial tree, iris & ciliary body, & sweat gland of the skin.
- Development: splanchnic mesoderm, except the muscles of the iris & **arrectore spilorum** of skin which are ectodermal origin.
- Function in the movement of viscera






# Cardiac Muscle

- Located in heart & large vessels attached to heart.
- Function to pump the blood from heart.



# Type of Muscle Tissue

## Three Types of Muscular Tissue

	Location	Function	Appearance	Control
<b>Skeletal</b> 	skeleton	movement, heat, posture	<b>striated</b> , multi- nucleated (eccentric), fibers parallel	<b>voluntary</b>
<b>Cardiac</b> 	heart	pump blood continuously	<b>striated</b> , one central nucleus	<b>involuntary</b>
<b>Visceral (smooth muscle)</b> 	G.I. tract, uterus, eye, blood vessels	Peristalsis, blood pressure, pupil size, erects hairs	<b>no striations</b> , one central nucleus	<b>involuntary</b>