

The Muscular System



**or “Everything you ever
wanted to know about
Muscles, but were afraid to
ask” !!!**

The Skeletal Muscles

There are about 650 muscles in the human body. They enable us to move, maintain posture and generate heat. In this section we will only study a sample of the major muscles.

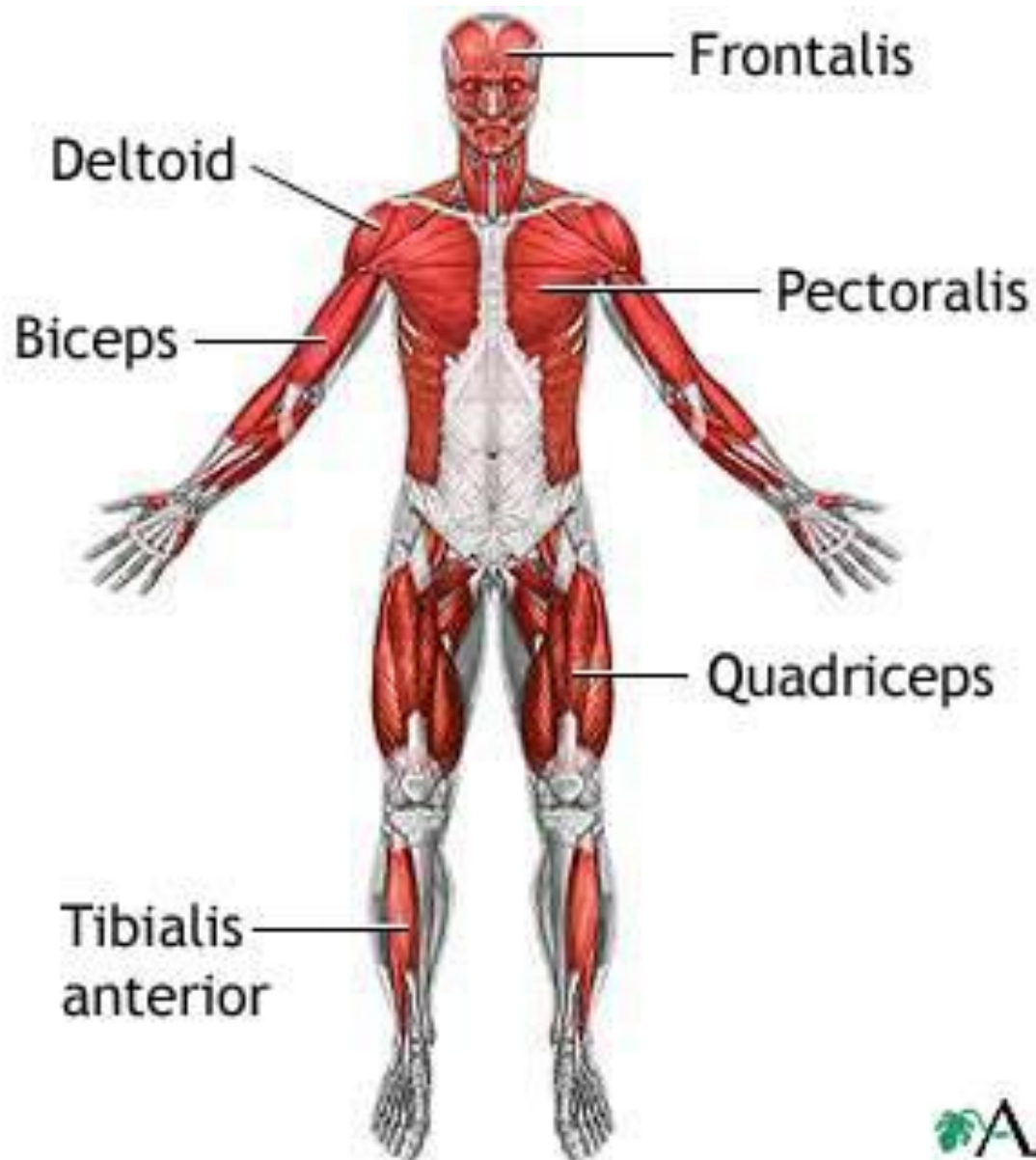
Did you know that ?

- more than 50% of body weight is muscle !
- And muscle is made up of proteins and water

A Few Fun Facts About Your Muscular System

- There are muscles in the root of your hair that give you goose bumps.
- It takes 17 muscles to smile and 42 muscles to frown.
- The hardest working muscle is in the eye.
- The largest muscle in your body is the Gluteus Maximus.





The Muscular System

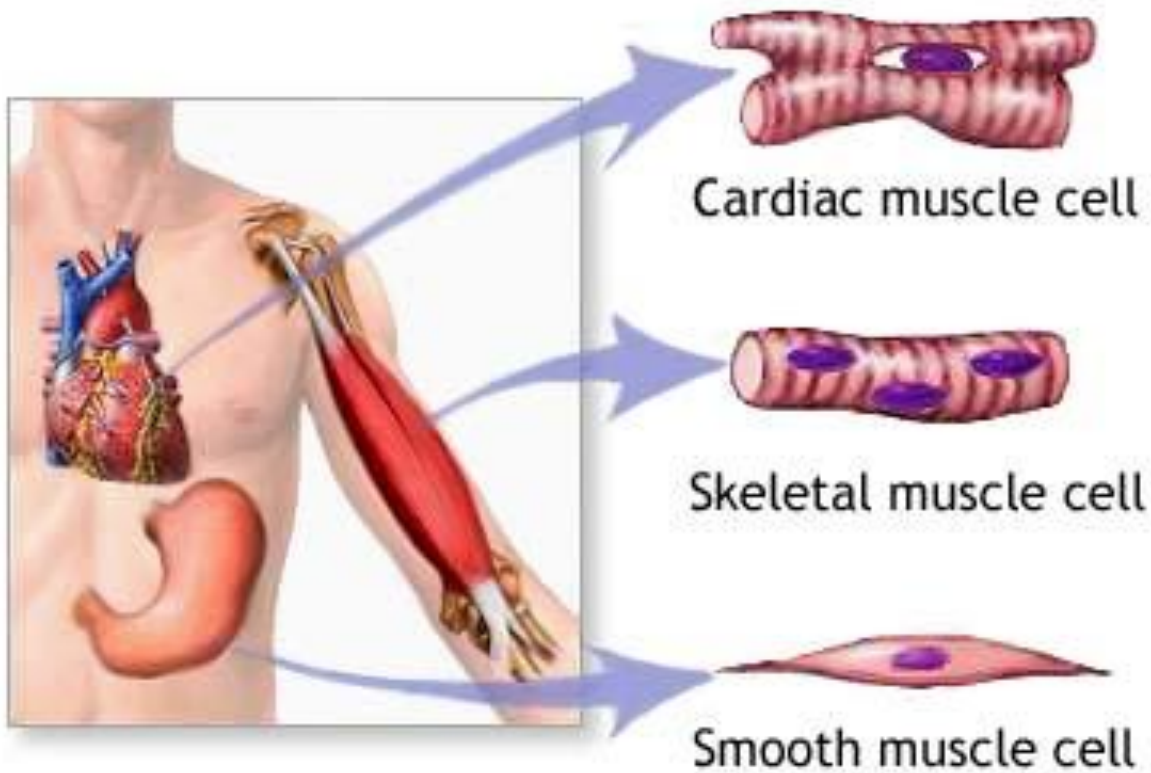
- Muscles are responsible for all *movement* of the body
- There are three basic types of muscle
 - *Skeletal*
 - *Cardiac*
 - *Smooth*

Info About Muscles

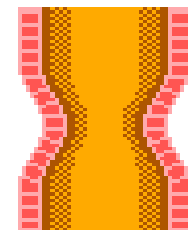
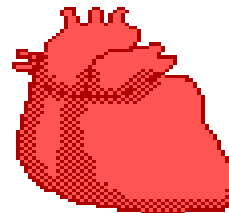
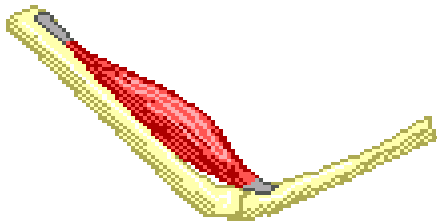
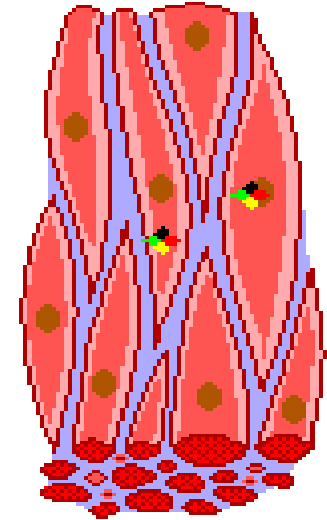
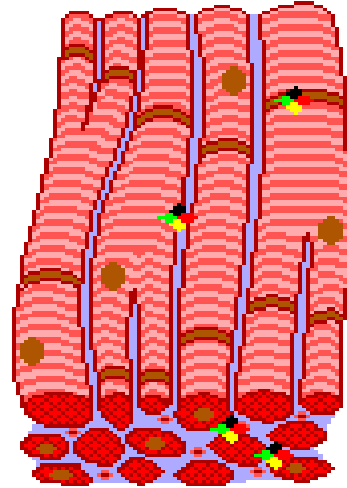
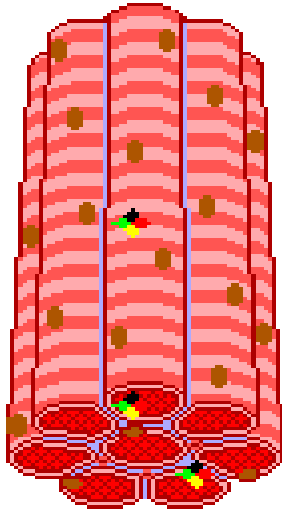
- Only body tissue able to *contract*
- create movement by *flexing* and *extending* joints
- Body *energy* converters (many muscle cells *contain many mitochondria*)



3 Types of Muscles



Three types of muscle



Skeletal

Cardiac

Smooth

Classification of Muscle

Skeletal- found in limbs	Cardiac- found in heart	Smooth- Found in internal organs
voluntary	involuntary	involuntary

Shapes of Muscles

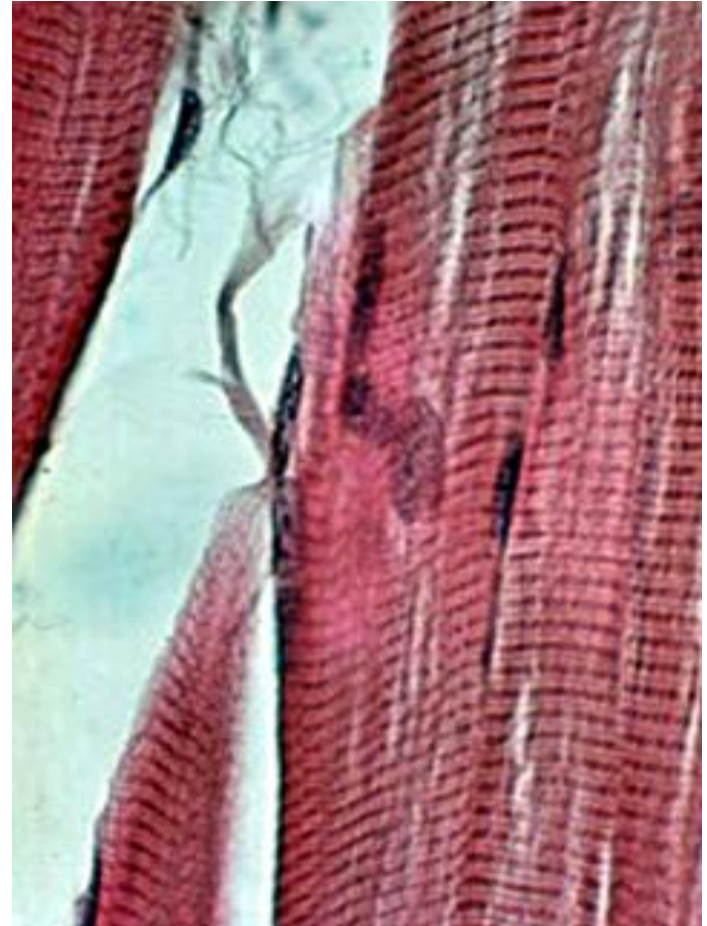
- *Triangular-* shoulder, neck
- *Spindle-* arms, legs
- *Flat-* diaphragm, forehead
- *Circular-* mouth, anus

Skeletal Muscle

- Most are attached by *tendons* to bones
- Cells have more than one nucleus (*multinucleated*)
- *Striated*- have stripes, banding
- *Voluntary*- subject to conscious control
- Tendons are mostly made of *collagen* fibers
- Found in the limbs
- Produce movement, maintain posture, generate heat, stabilize joints

Skeletal muscle - Summary

- Voluntary movement of skeletal parts
- Spans joints and attached to skeleton
- Multi-nucleated, striated, cylindrical fibres



Smooth Muscle

- *No striations*
- *Spindle* shaped
- *Involuntary*- no conscious control
- Found mainly in the walls of hollow organs

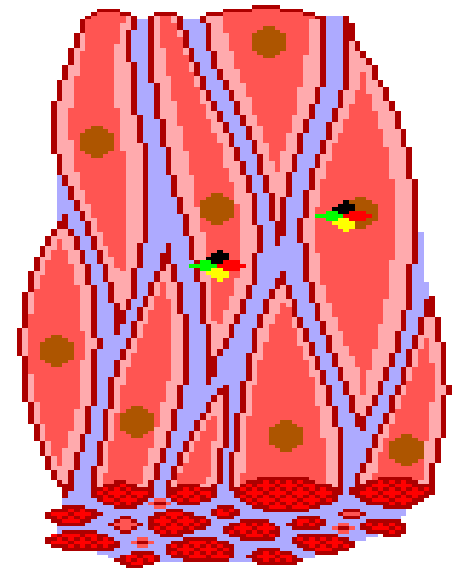
Smooth muscle

- Lines walls of viscera
- Found in longitudinal or circular arrangement
- Alternate contraction of circular & longitudinal muscle in the intestine leads to peristalsis



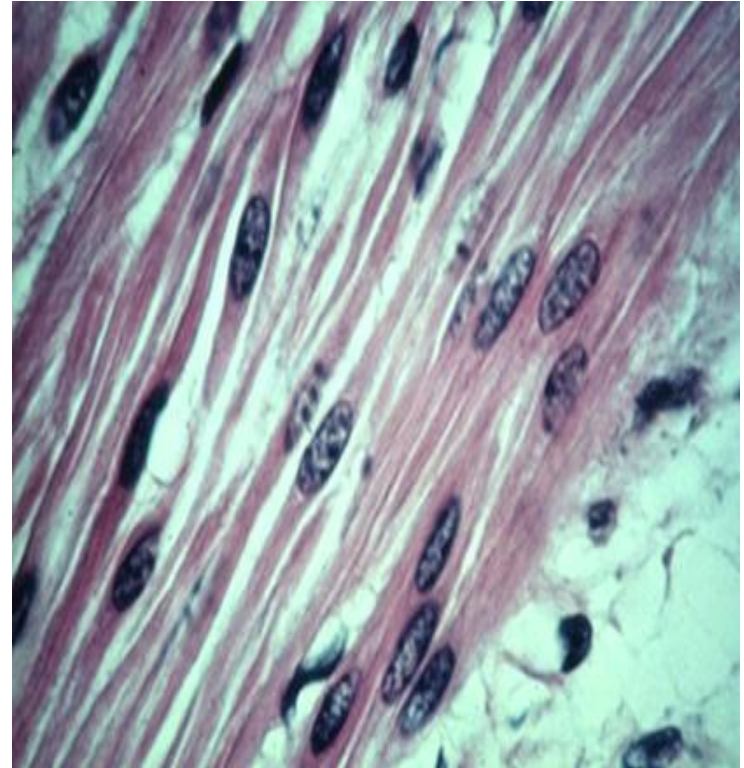
Structure of smooth muscle

- Spindle shaped uni-nucleated cells
- Striations not observed
- Actin and myosin filaments are present(protein fibers)



Smooth muscle - Summary

- Found in walls of hollow internal organs
- Involuntary movement of internal organs
- Elongated, spindle shaped fibre with single nucleus

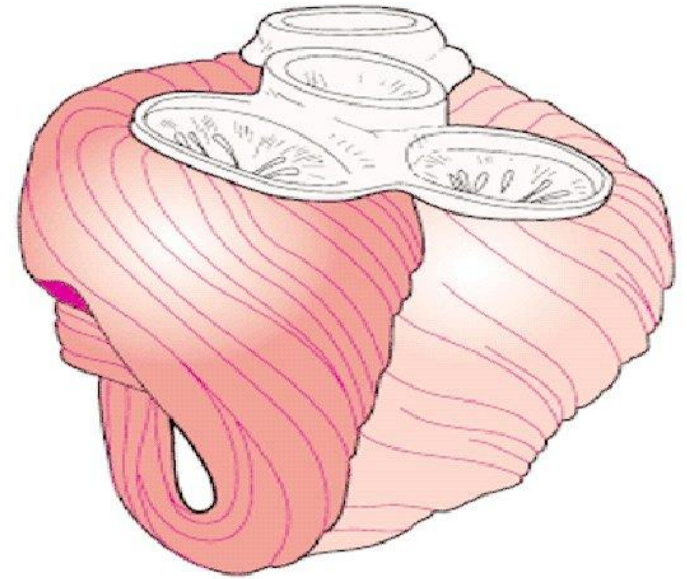


Cardiac Muscle

- *Striations*
- *Involuntary*
- Found only in the *heart*
- Usually has a single nucleus, but can have more than one

Cardiac muscle

- Main muscle of heart
- Pumping mass of heart
- Critical in humans
- Heart muscle cells
 behave as one unit
- Heart always contracts
 to it's full extent



Muscle Control

Type of muscle	Nervous control	Type of control	Example
Skeletal	Controlled by CNS	Voluntary	Lifting a glass
Cardiac	Regulated by ANS	Involuntary	Heart beating
Smooth	Controlled by ANS	Involuntary	Peristalsis

Face Muscles & 6 Major Muscles

<http://kidshealth.org/kid/htbw/muscles.html#>

Types of Responses

- ***Twitch-***

- A single brief contraction
- Not a normal muscle function

- ***Tetanus***

- One contraction immediately followed by another
- Muscle never completely returns to a relaxed state
- Effects are compounded

More Types of Movement.....

- *Inversion*- turn sole of foot medially
- *Eversion*- turn sole of foot laterally
- *Pronation*- palm facing down
- *Supination*- palm facing up
- *Opposition*- thumb touches tips of fingers on the same hand