

## HUMAN LOCOMOTION

Human locomotion involves the interaction of **bones, cartilage, muscles, tendons, and ligaments**

### HUMAN LOCOMOTIVE SYSTEM

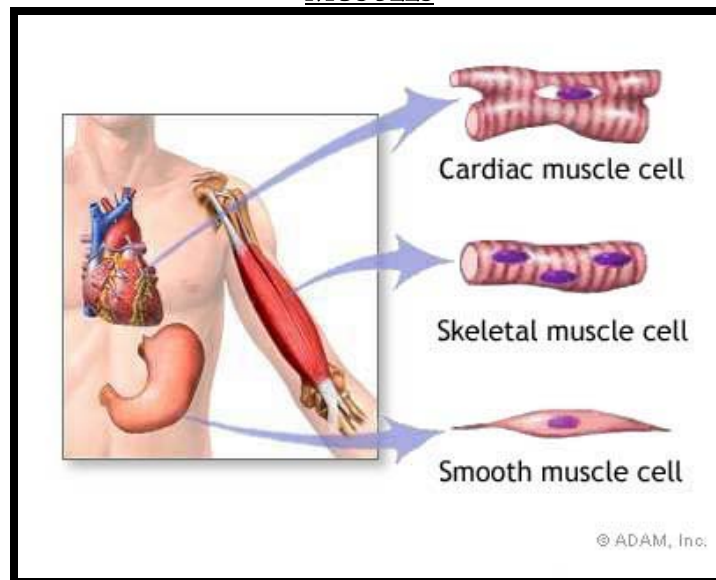
#### BONES

- ◆ There are 206 bones in the human body
- ◆ Made up of bone tissue, which is hard and rigid
- ◆ Arrange in an internal skeleton (endoskeleton)
- ◆ **Functions:**
  - provide support and protection of the soft parts of the body
  - sites of attachments for the muscles
  - at joints, bones act as levers, enabling the body to move when the attached muscles contract
  - production of blood cells in the bone marrow of certain long bones

#### CARTILAGE

- ◆ a flexible, fibrous, elastic connective tissue (almost as strong as bone, but more flexible)
- ◆ found at the ends of ribs, between vertebrae, at the ends of bones, and in the nose, ears, and trachea
- ◆ Functions:
  - cushions joints (reduces wear and tear)
  - makes joints more flexible
  - Lightweight support
- ◆ in embryos, most of the skeleton is made of cartilage After birth, the cartilage is slowly replaced by bone,, so that by adulthood, almost all of the cartilage has been replaced

#### MUSCLES

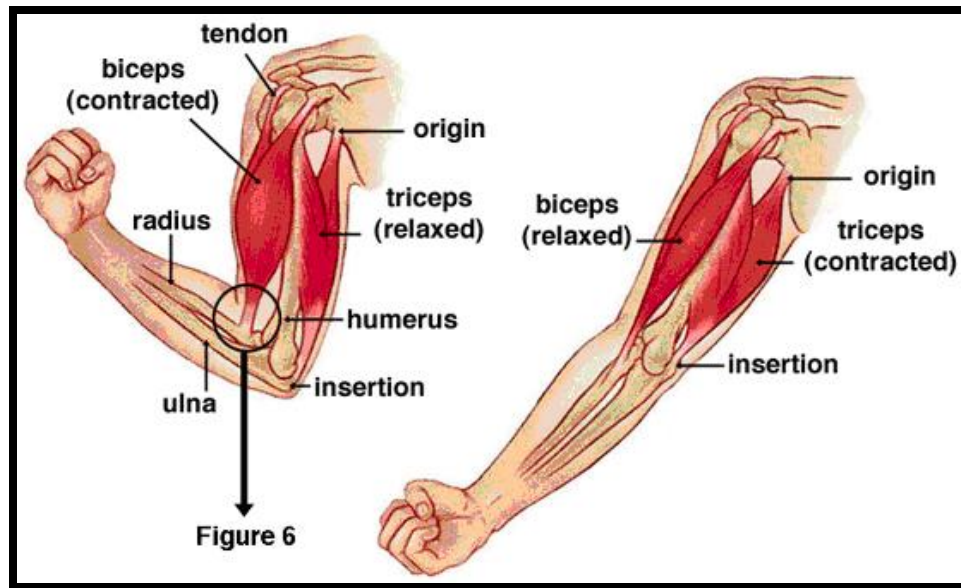


- ◆ muscle tissue has the capacity to contract or shorten
- ◆ all movements in this body involve muscle tissue
- ◆ there are 3 types of muscle tissue
  - **SKELETAL MUSCLE** (also known as **VOLUNTARY** or **STRIATED** muscle)
    - \*striped or striated in appearance
    - \*contraction of skeletal muscle is controlled by the nervous system, which makes coordinated movements possible
    - \*generally move in **ANTAGONISTIC** pairs – the contraction of one muscle of the pair extends

the limb, while the contraction of the other muscles flexes the limb

\***FLEXORS** – muscle contracts, flexing the bones

\***EXTENSORS** – muscle relaxes, extending the bones



--**SMOOTH MUSCLES** (also known as **INVOLUNTARY** or **VISCERAL** muscle)

\*these muscles are under the control of the **MEDULLA**, they are not under voluntary control

\*found in the walls of the digestive organs, arteries, diaphragm, muscles of the ribs

\*the medulla controls the involuntary muscle actions such as peristalsis, arterial pulse, breathing (diaphragm & rib cage muscles, & digestion.

--**CARDIAC MUSCLE**

\* found only in the heart

\*involuntary, under the control of the medulla, appears to be striated

### **TENDONS & LIGAMENTS**

- ◆ **TENDONS**: connect muscles to bones by  
--tough, **INELASTIC** fibrous cords of connective tissue
- ◆ **LIGAMENTS** connect bone to bone at movable joints such as the elbow, fingers, knees  
--tough **ELASTIC** connective tissue

## **DISORDERS OF THE HUMAN LOCOMOTIVE SYSTEM**

### **ARTHRITIS**

- ◆ inflammation of the joints; can be quite painful

### **TENDONITIS**

- ◆ an inflammation of the tendon, usually at the point where the muscle meets the bone
- ◆ very common in athletes