بسم الله الرحمن الرحيم

Anatomical Terminology & Skeletal System

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OBJECTIVES

At the end of the lecture, students should be able to:

- Define the word “Anatomy”
- Enumerate the different anatomical fields
- Describe the anatomical position
- Describe different anatomical terms of position & movements as well different anatomical planes
- Classify bones according to shape, structure & development
- Enumerate bones of axial & appendicular skeleton

ANATOMY

It is the science which deals with the study of the **Structure** , **Shape** of the body & Body parts, and their relationships to one another

It is divided into:

Gross Anatomy: Study of human body with **Naked eye**

Microscopic Anatomy (Histology): Study of fine structures (cells & tissues) of the human body with the help of microscope

Developmental Anatomy (Embryology)

Radiological Anatomy

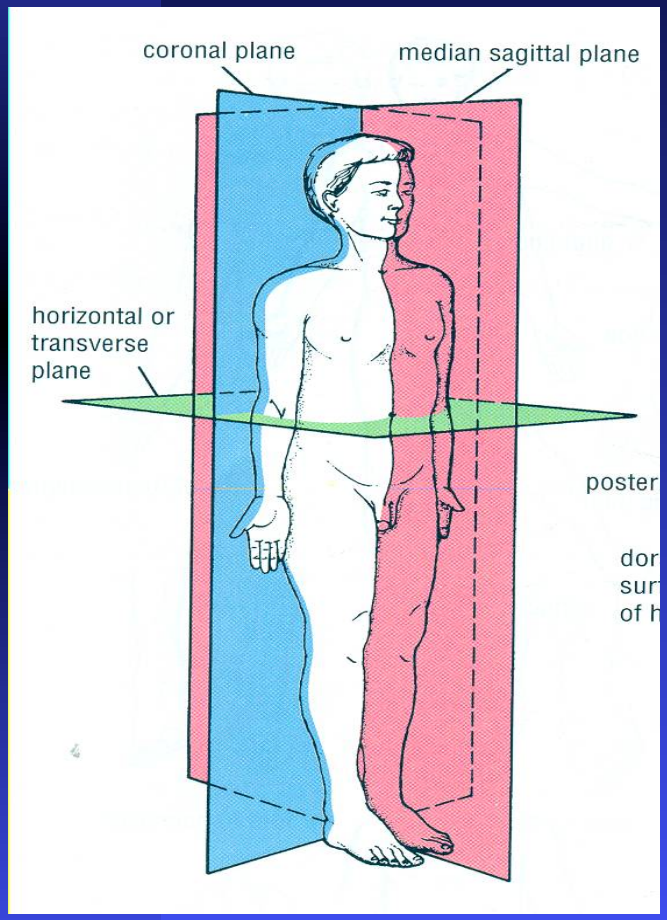
Cross-sectional Anatomy

- **Applied Anatomy (Surgical Anatomy)**

The Language of Anatomy (Anatomical Terminology)

- To prevent **misunderstanding**, a special set of terms are used to describe the Identification and Location of body structures
- To accurately describe body parts, the body is in a standard position called the **Anatomical Position**, in which:
  - Body is Erect
  - Arms hanging by the side
  - Palms facing forward
  - Feet are parallel

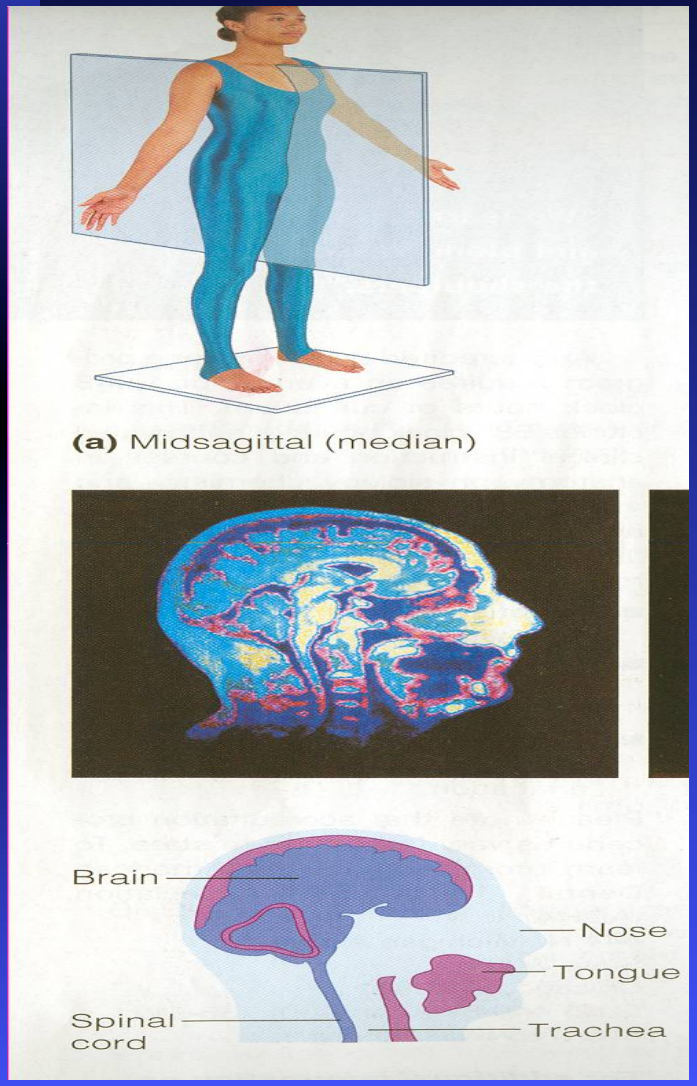
PLANES OF THE BODY



To do a Section (cut) through the body wall or an organ,

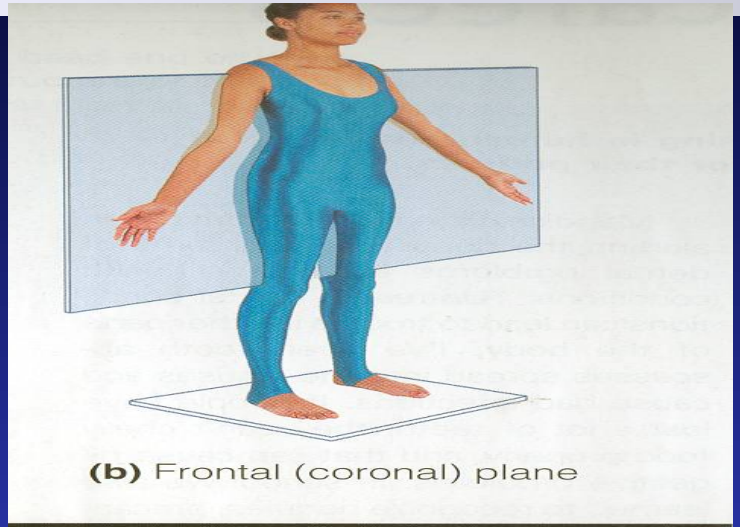
- *it is made along an **Imaginary Line** (*PLANE).
- The body has
- ***Three Imaginary Planes** (sections) that lie at right angles to one another (in the anatomical position).*
- 1. ***Median sagittal.***
- ***2. Coronal.***
- ***3.Horizontal (Transverse).***

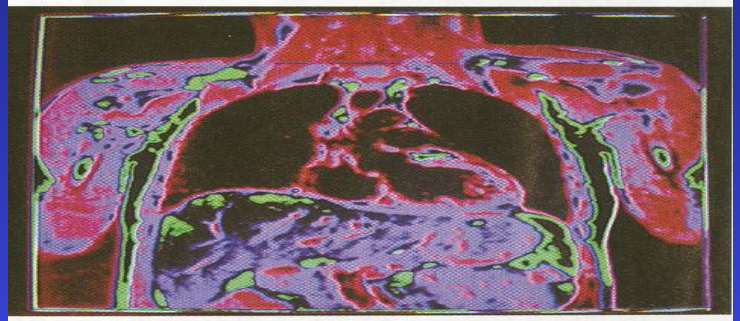
MEDIAN (Mid Sagittal)PLANE

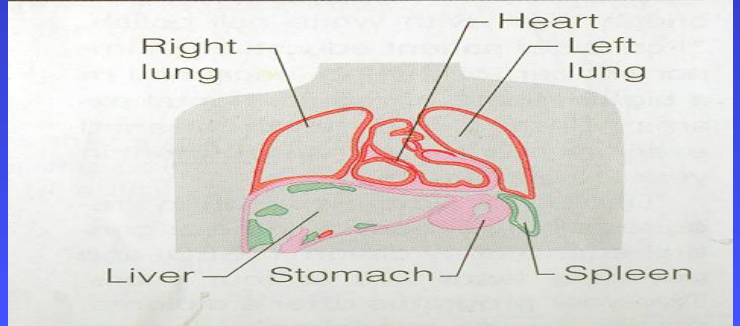


- It *is a* ***Vertical*** *plane.*
- *It passes through the* ***Center*** *of the body.*
- *It divides the body into* ***Right*** **and** ***Left*** **halves.**

CORONAL (FRONTAL) PLANE



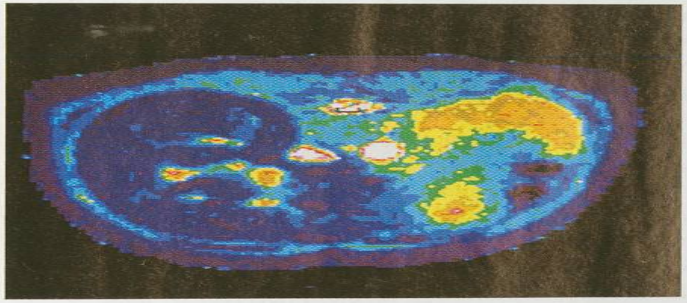


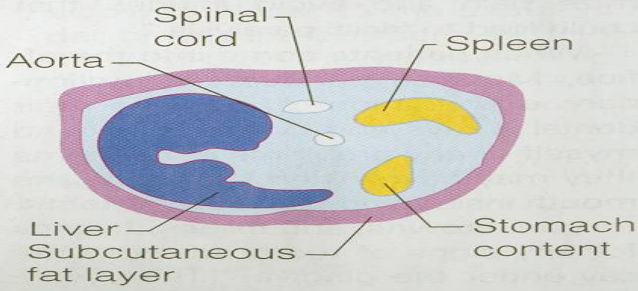


- *It is a **Vertical** plane.*
- *It divides the body into :*
- ***Anterior and Posterior** parts.*

HORIZONTAL (TRANSVERSE) PLANE

(c) Transverse plane

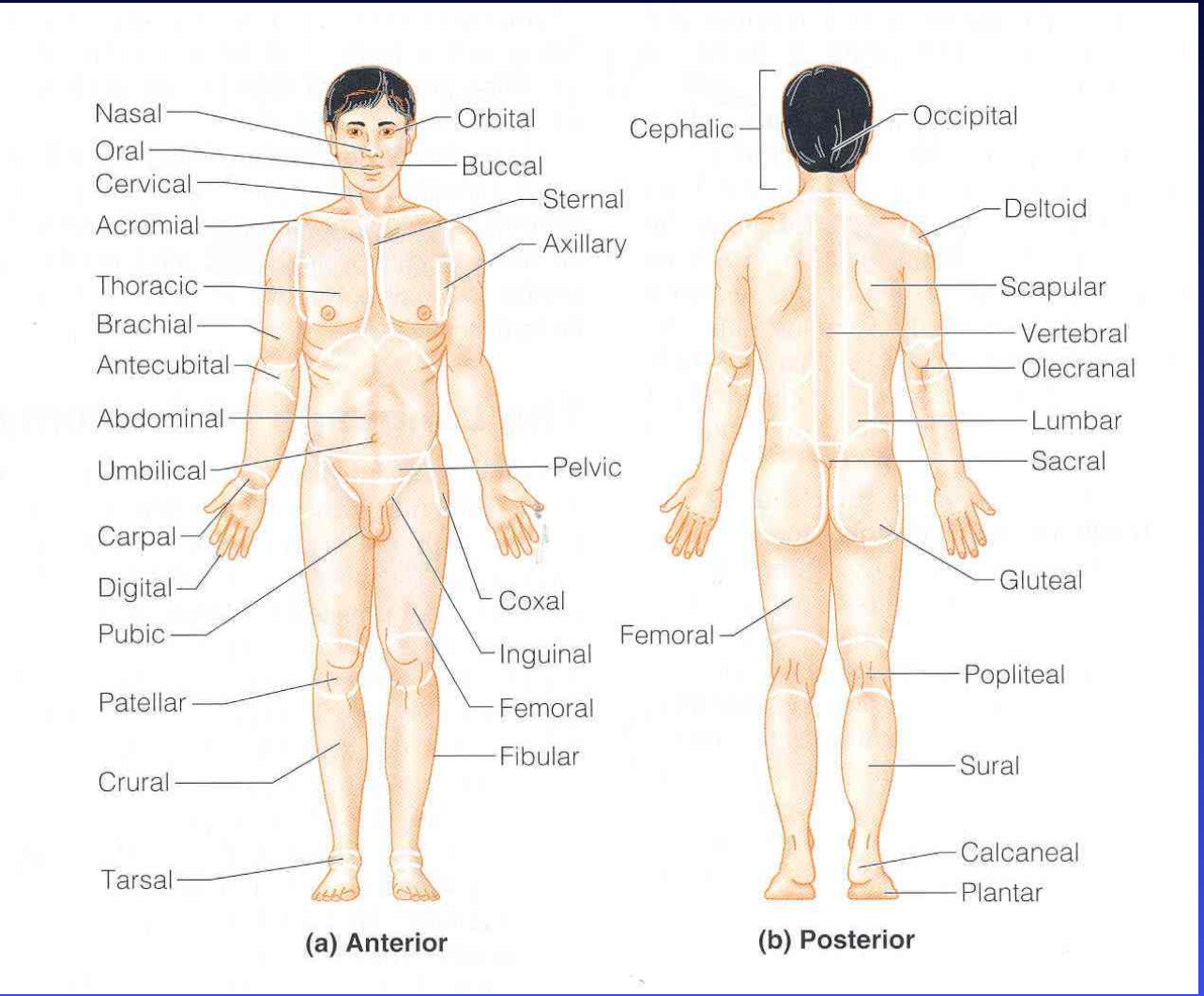




- It is also called Cross Section.
- It divides the body into :
- Upper and Lower parts.

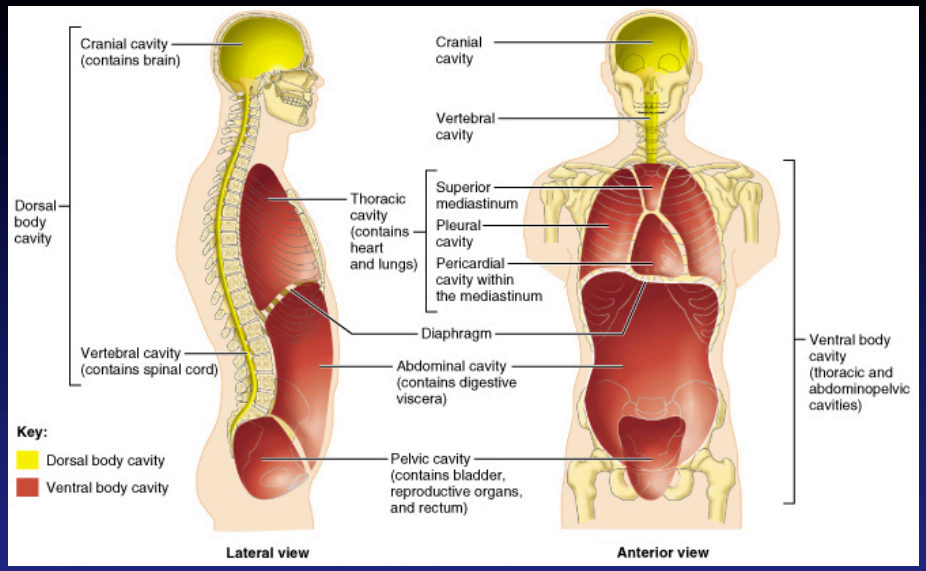
Terms of Regions

- Cranial (Cephalic)
- Cervical
- Thoracic
- Abdominal
- Pelvic
- Planter
- Palmer



Body Cavities

The body has two sets of internal cavities that lodge and protect the organs. These are Dorsal & Ventral.



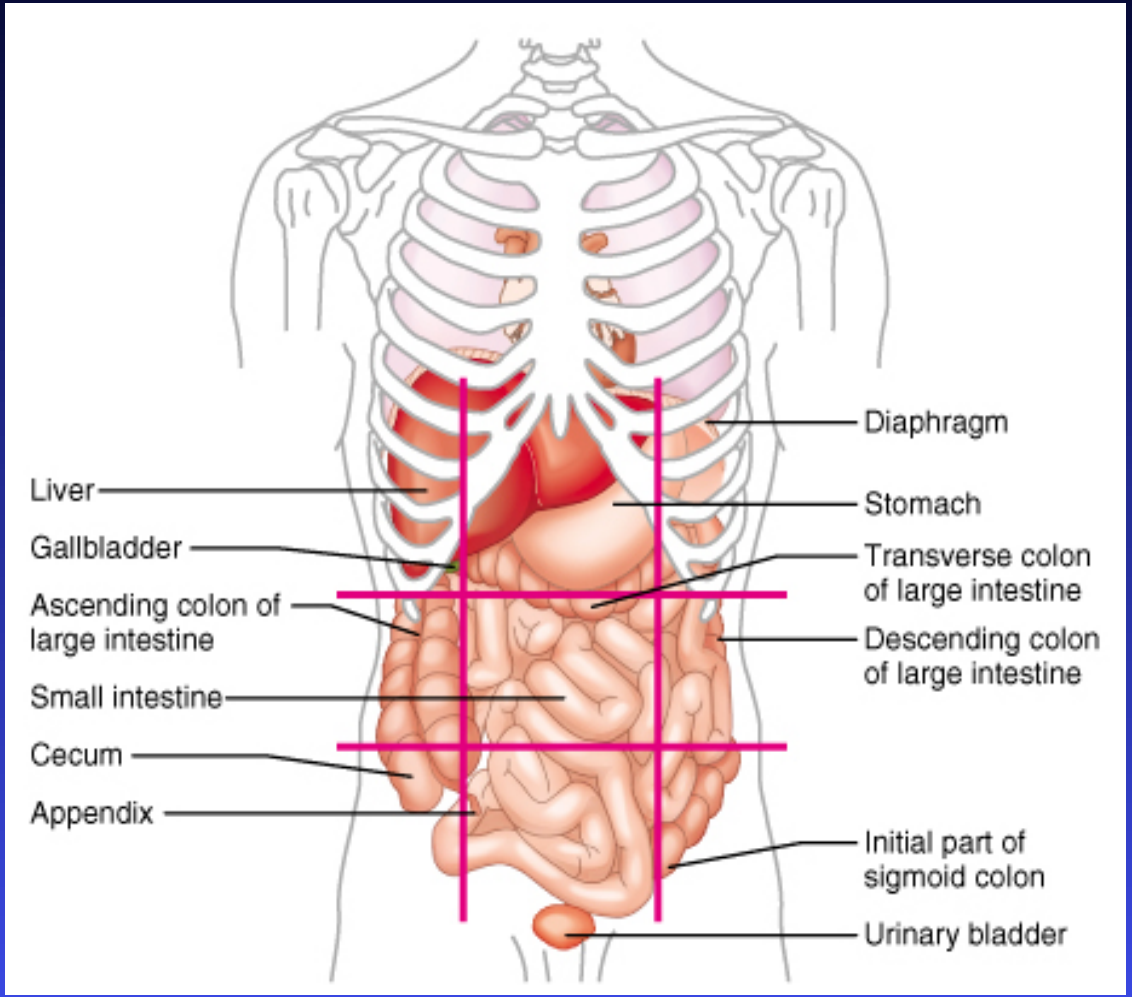
- **Dorsal body cavity**
- has two subdivisions, which are continuous with each other:
  - **Cranial cavity**: space inside the bony skull, contains brain
  - **Spinal cavity**: space inside the vertebral column, contains spinal cord

- **Ventral body cavity**
- has two subdivisions, which are separated from each other by the diaphragm.
  - **Thoracic cavity**: lies superior to diaphragm, contains heart and lungs
  - **Abdominopelvic cavity:** lies below the diaphragm, contains stomach, intestine, urinary bladder, liver, reproductive organs, rectum, etc.

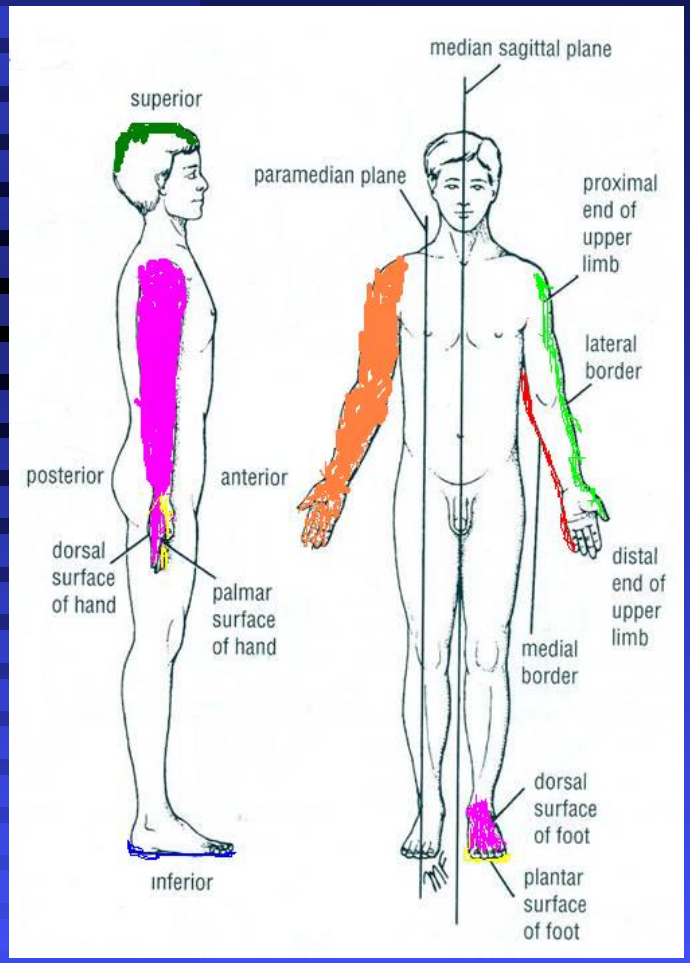
Abdominopelvic regions

The **Abdominopelvic** area is divided into 9 regions by 2 vertical & 2 horizontal lines or planes

Objective: To locate the different organs in each region



TERMS OF POSITION

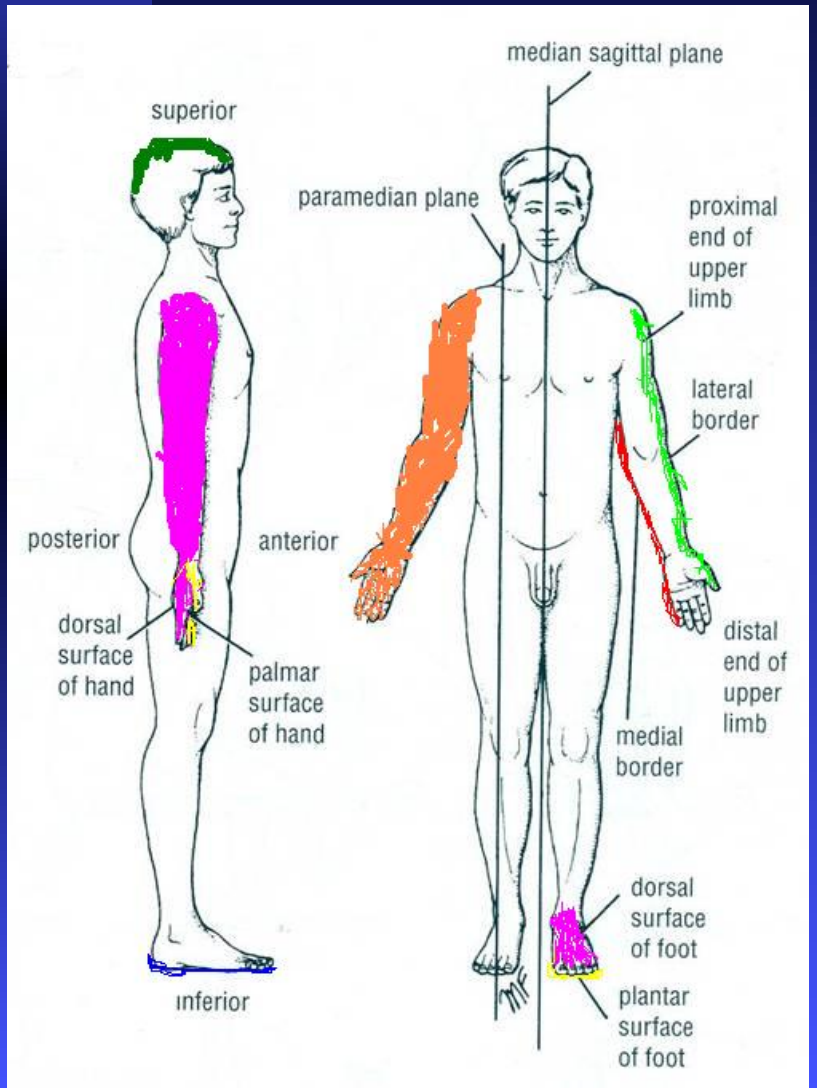


- ***Anterior* : Front of the body.**
- ***Posterior* : Back of the body.**
- ***(HAND) :***
- ***Anterior: Palmar.***

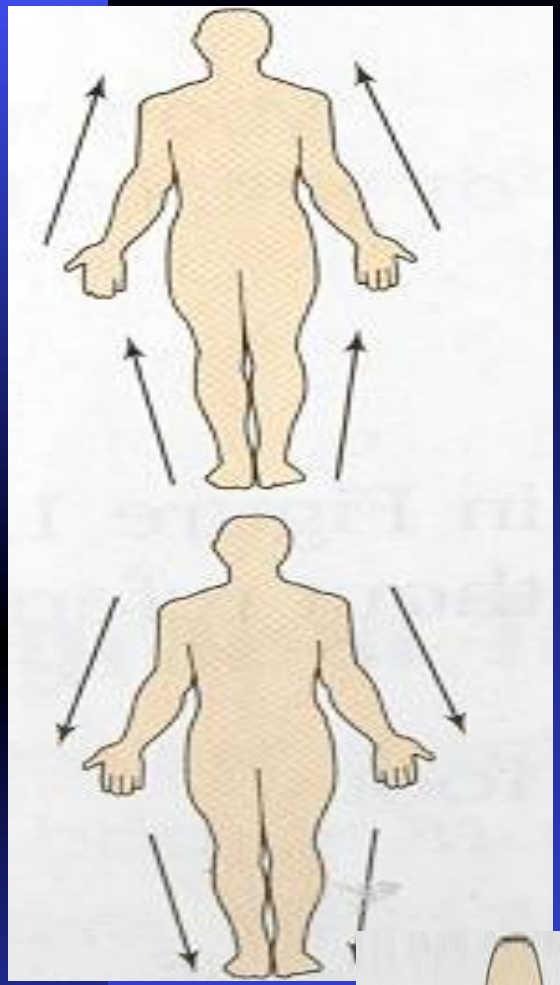
Posterior: Dorsal .

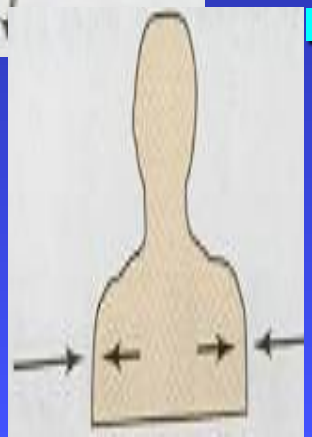
- **(FOOT) :**
- ***Anterior*: *Planter* .**
- **Posterior: Dorsal.**
- ***Medial :* Nearer to the median plane of the body.**
- ***Lateral* : Away from the median plane.**

TERMS OF POSITION

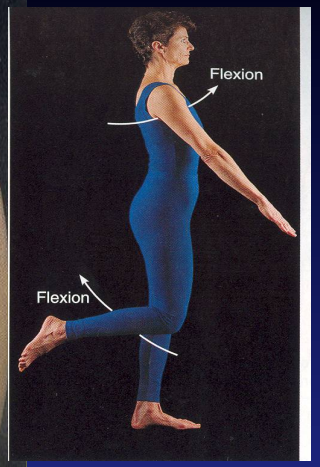


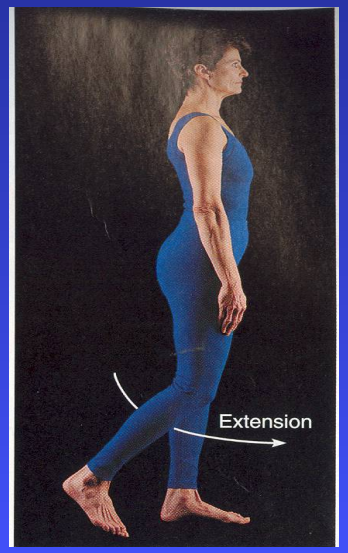
- ***Superior (Above):*** *Toward the head end (upper) part of the body.*
- ***Inferior (Caudal) :*** *Toward the lower part of the body.*
- ***Supine :***
- *The body lies on the back.*
- ***Prone :***
- *The face is downwards.*
-





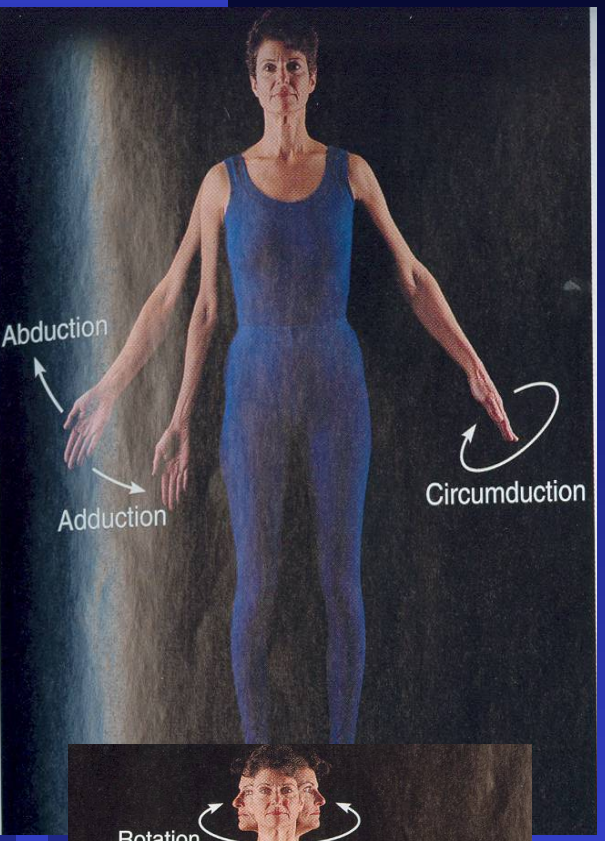
- ***Proximal :*** *Close to the point of attachment of a limb to the body trunk.*
- ***Distal :*** *Farther from the the point of attachment of a limb to the body trunk.*
- ***Superficial (External) :*** *Toward or at the body surface.*
- ***Deep (Internal):*** *Away from the body surface or the center of a cavity.*
- .





- **TERMS OF MOVEMENT.**

- **Flexion:**
- Usually an **Anterior** movement (Except.
- in the knee joint).
- **It Decreases** the angle of the joint (brings two
- bones closer together).
- **Extension:**
- Usually a **Posterior** movement.
- Straightening of the joint.
- **It Increases** the angle or distance between two bones.



- ***Abduction:***
- ***Movement of a limb Away from the midline of the body***
- ***Adduction:***
- ***Movement of a limb Toward the midline of the body.***

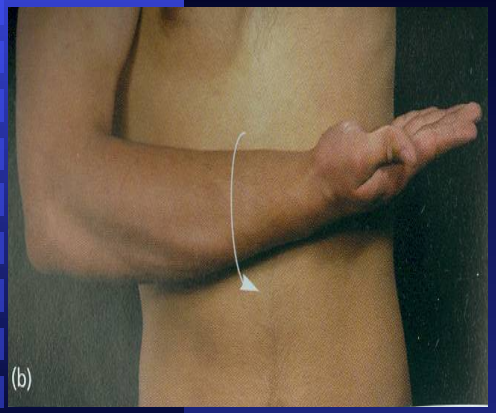
Lateral flexion:

Side Movement of the trunk

Circumduction

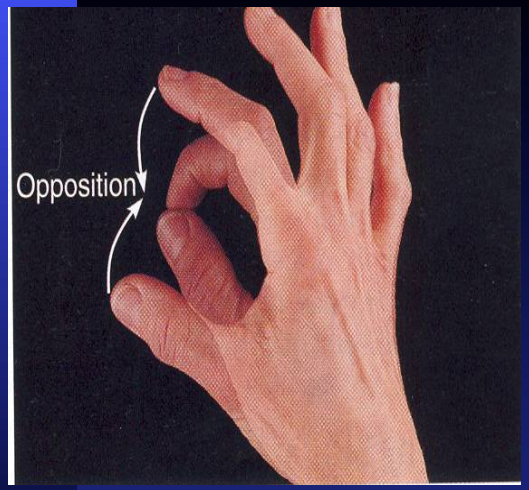
- ***It is Combination of:***
- ***Flexion.***
- ***Extension.***
- ***Abduction & Adduction***

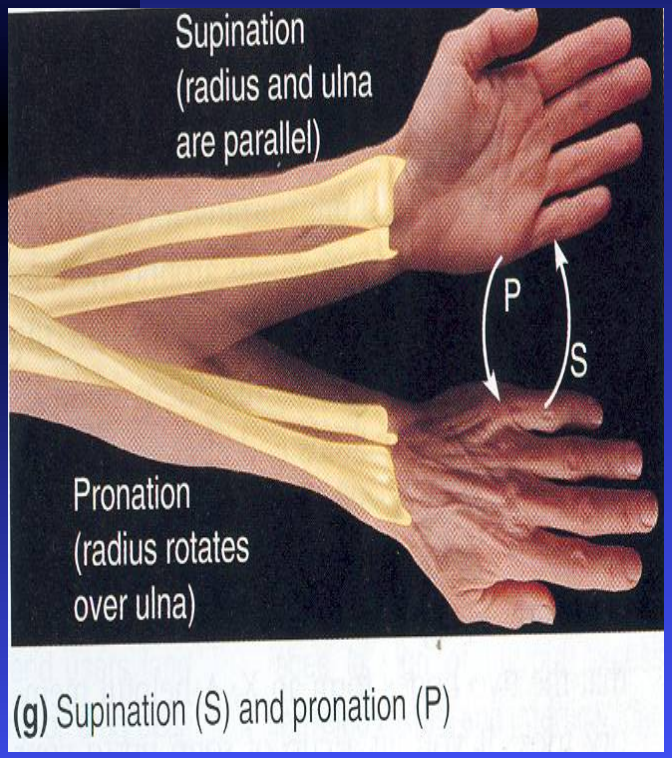
ROTATION



- ***Medial:***
- ***The anterior surface of the part faces medially.***
- ***Lateral :***
- ***The anterior surface of the part faces laterally.***

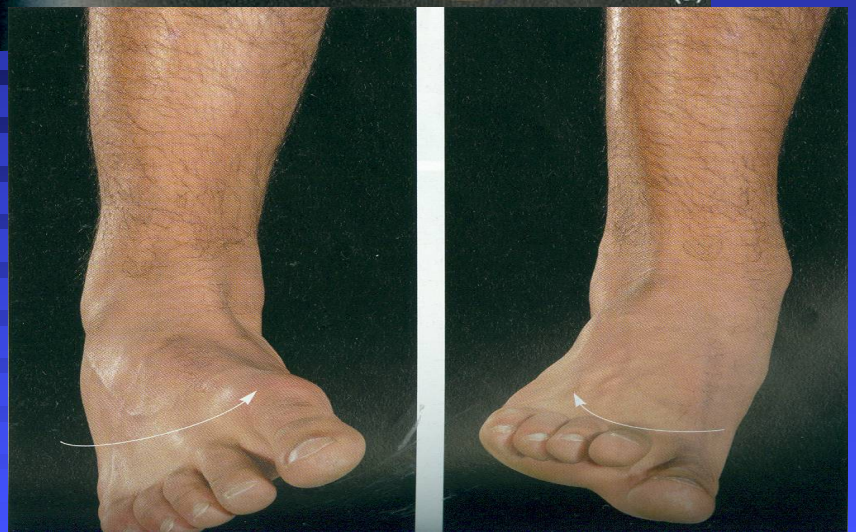
MOVEMENTS OF HAND





(g) Supination (S) and pronation (P)

- **Opposition:** bringing tips of fingers and thumb together as in picking something up
- ***Supination:***
- *Lateral rotation of the forearm.*
- *The palm faces Anteriorly.*
- *The radius and ulna are Parallel.*
- ***Pronation:***
- *Medial rotation of the forearm.*
- *The palm faces Posteriorly*
- *The radius Crosses the ulna and the two bones form an X.*



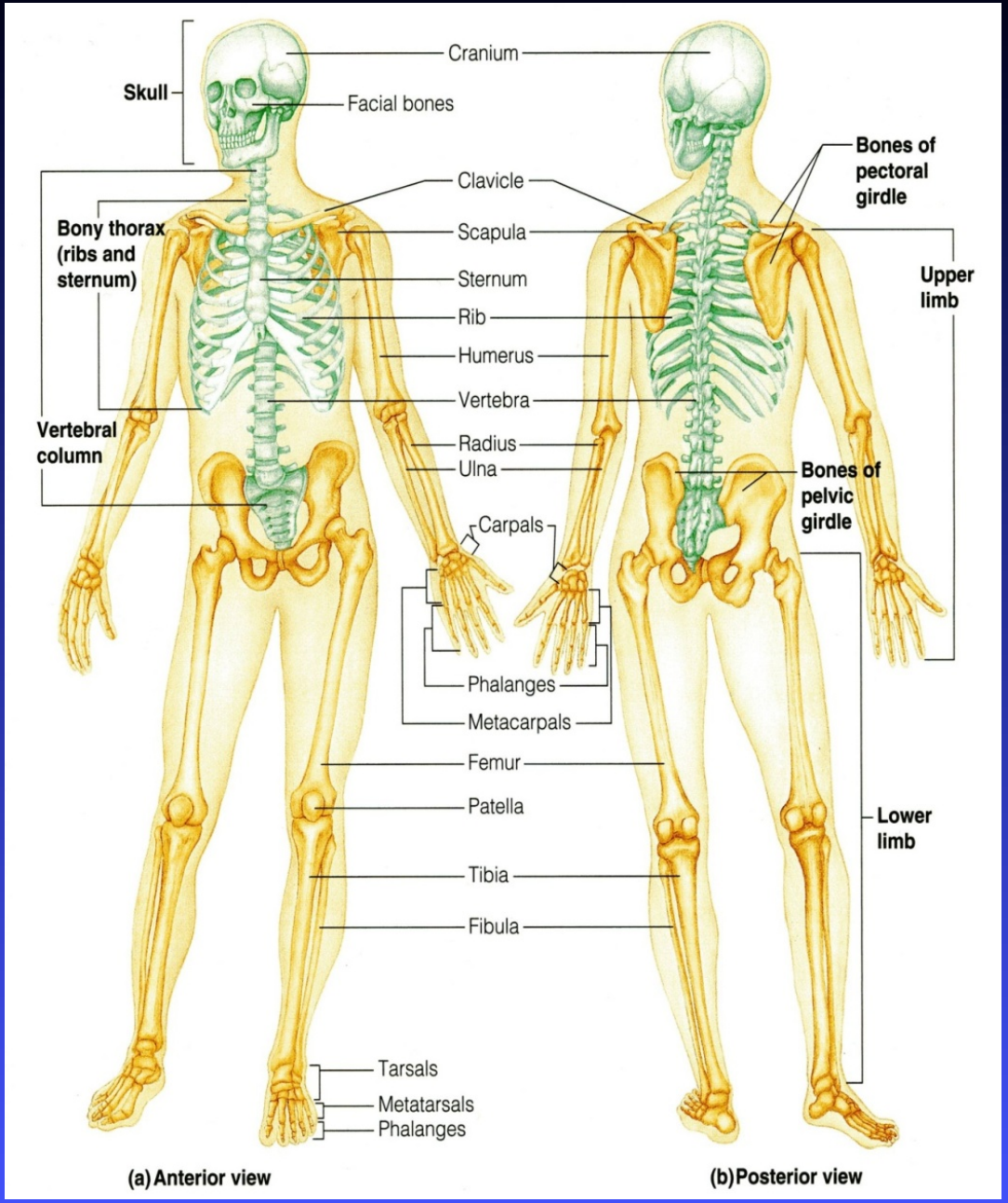
MOVEMENTS OF FOOT

- ***Planter Flexion:***
- *Depressing the foot (down).*
- *Movement with pointing the toes.*
- ***Dorsiflexion***
- *Up movement of the foot*
- *(Standing on the heels)*
- ***Inversion :***
- *The sole faces in a Medial direction.*
- ***Eversion :***
- *The sole faces in a Lateral direction.*

Skeletal System

COMPOSED OF:

- Bones
- Joints (articulations)

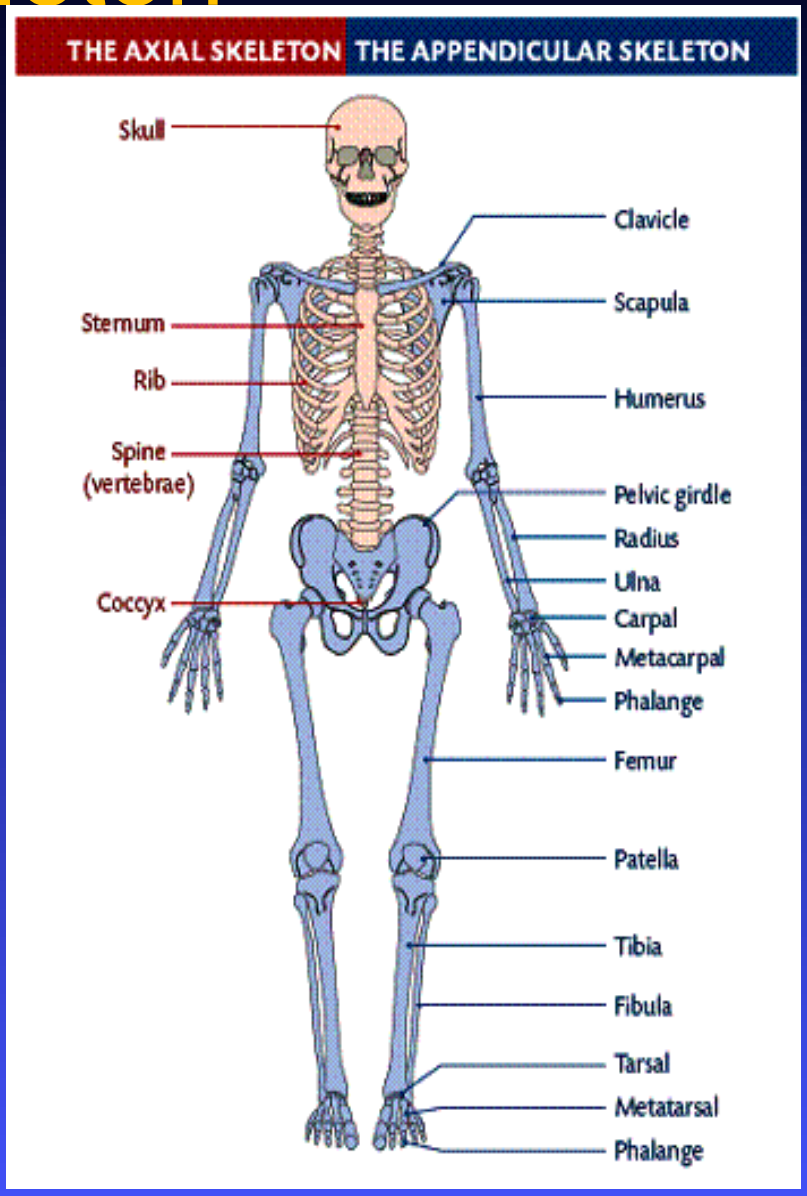


Functions of Bones

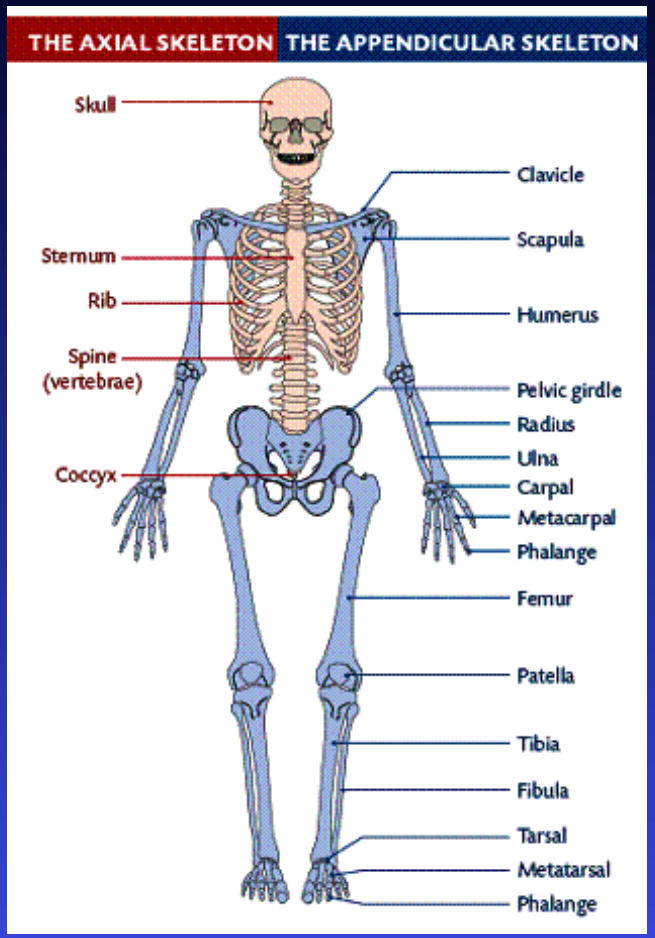
1. Support of the body organs
2. Protection of soft body organs
3. Attachment of muscles
4. Movement of the body as a whole, or of the body parts
5. Storage of fat and minerals e.g. calcium and phosphorus
6. Blood cell formation

The Skeleton

- There are 206 bones in our body, arranged to form the body framework called, the skeleton
- The skeleton is perfectly adapted to the functions of body protection and motion
- It is subdivided into two divisions:
  - **Axial skeleton**, the bones that form the longitudinal axis of the body
  - **Appendicular skeleton**, the bones of limbs and girdles



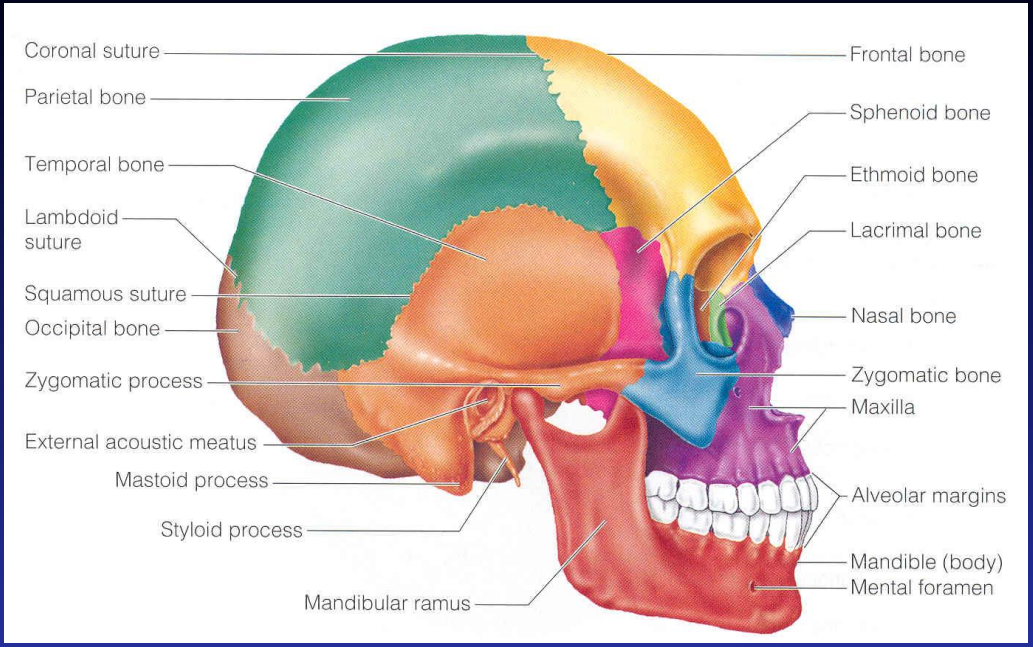
- The Axial Skeleton
  Skull bones
  - Vertebral column
  - Sternum
  - Ribs



- Appendicular Skeleton
  Pectoral & Pelvic Girdles, (connect the bones of the limbs to the axial skeleton)
  - Upper Limb
  - Lower Limb

Skull bones

- Formed of two sets of bones:

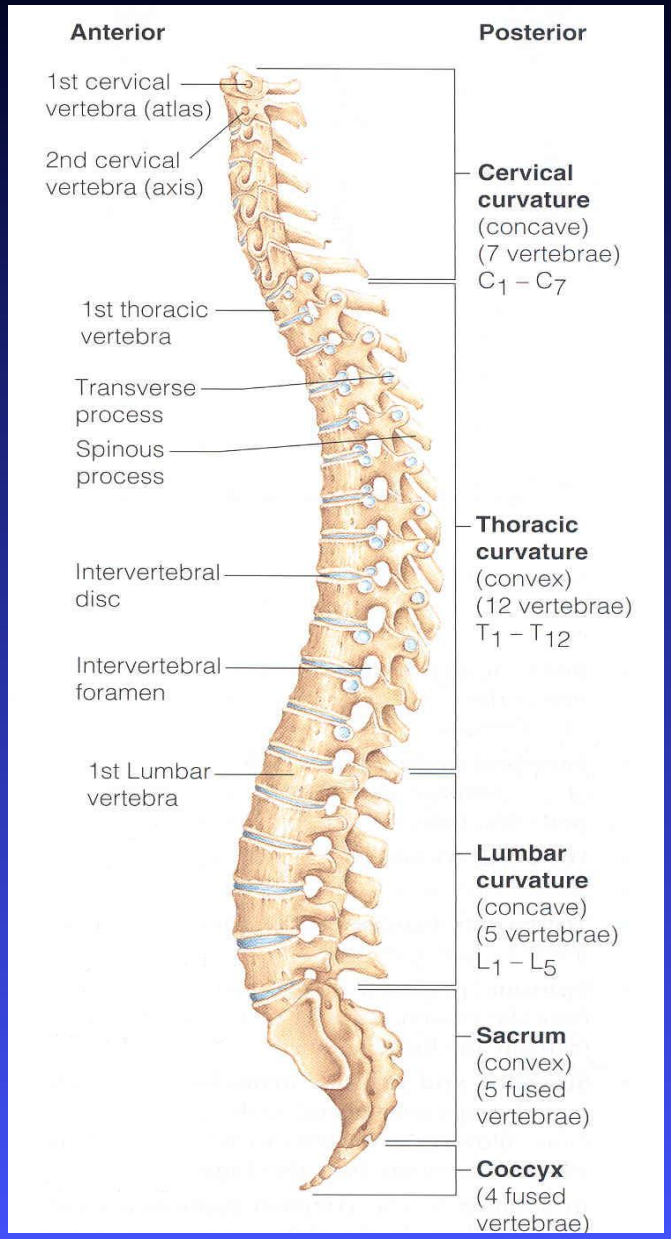


- Cranium:
  - Encloses and protects the brain.
  - Consists of the following bones:
    - Frontal
    - Parietal
    - Temporal
    - Sphenoid
    - Occipital

- Facial bones:
  - Form the skeleton of the face
  - Consists of the following bones:
    - Maxilla
    - Mandible
    - Zygomatic
    - Nasal

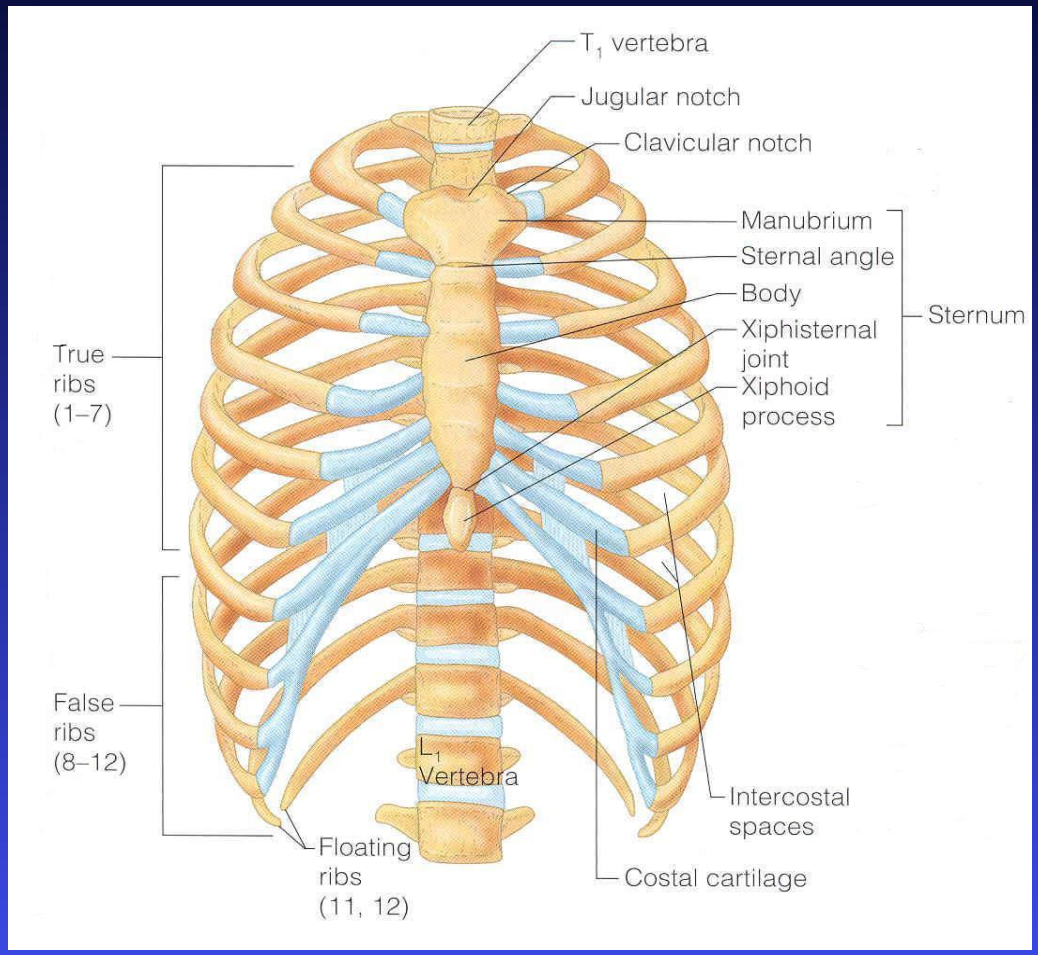
Vertebral column

- Forms the axial support of the body
- Is a flexible curved structure, formed of **33 irregular bones**, the (vertebrae)
- Running through its cavity is the spinal cord
- Is divided into 5 regions:
  - Cervical: 7 vertebrae
  - Thoracic: 12 vertebrae
  - Lumbar: 5 vertebrae
  - Sacral: 5 vertebrae fused to from a triangular bone called sacrum
  - Coccygeal: 4 vertebrae fused to form a small bone called coccyx



Sternum

- **Flat** bone
- Has **three parts**: manubrium, body and xiphoid process

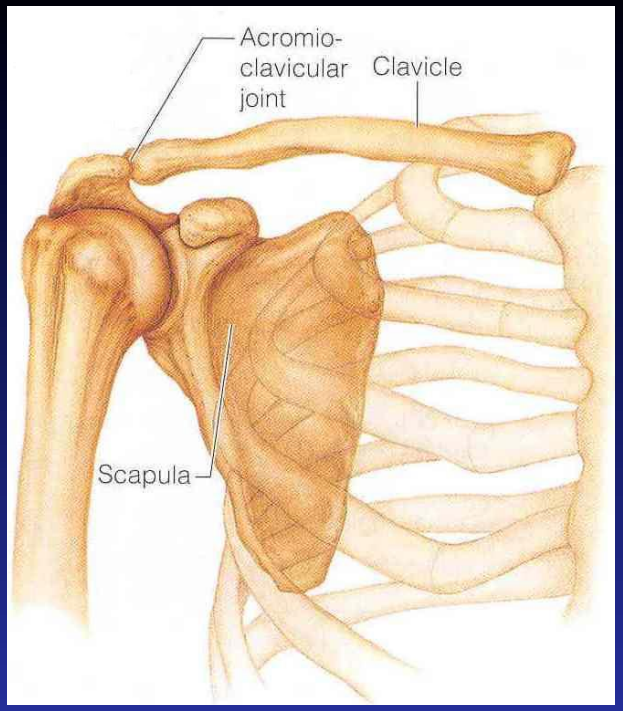


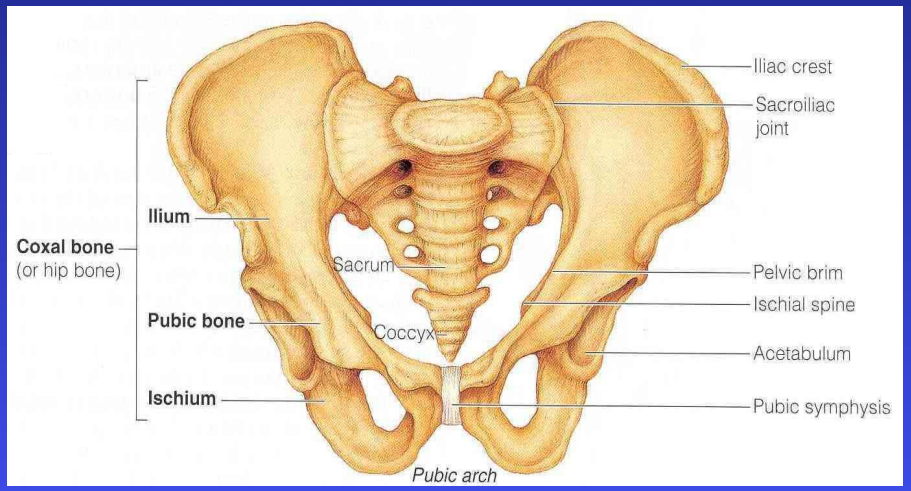
Ribs

- Number: 12 pairs
- All ribs articulate with vertebrae
- Only upper 7 pairs articulate with sternum

Bones of the Girdles

- **Pectoral Girdle**: Bones connecting the upper limb with the axial skeleton
  - Clavicle
  - Scapula
- **Pelvic Girdle**: Bones connecting the lower limb with the axial skeleton
  - Two hip bones

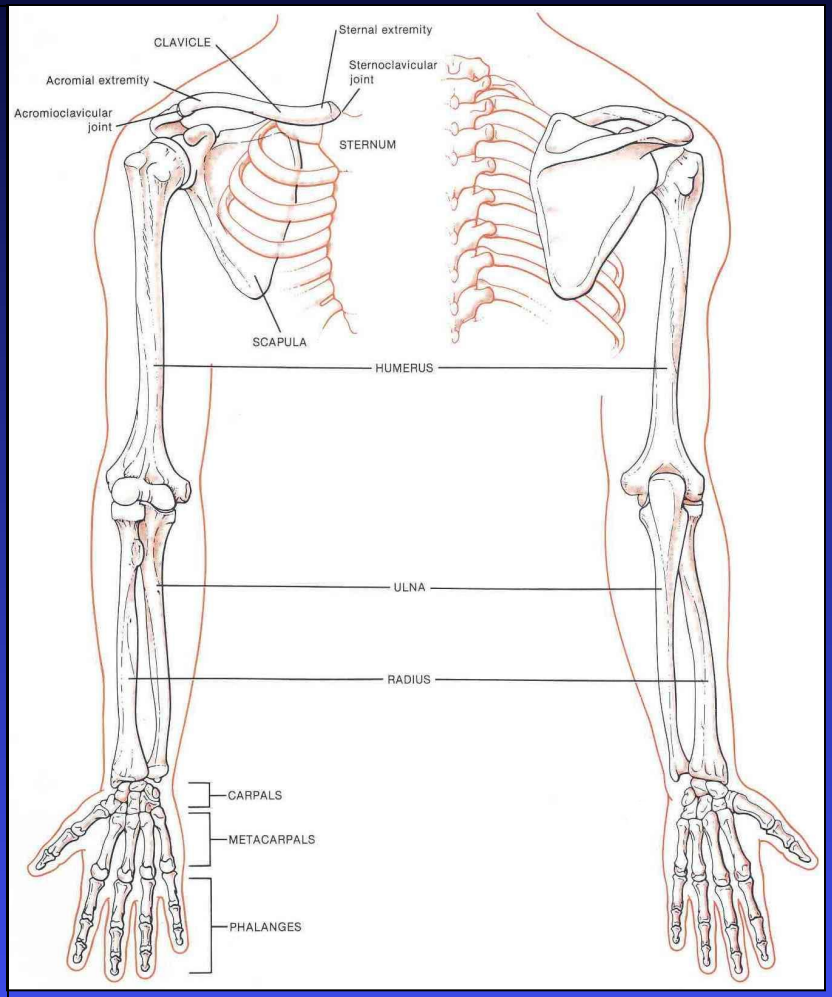




Bones of the Upper Limb

- Bone of Arm: ***Humerus***
- Bones of Forearm: ***Radius*** (lateral) & ***Ulna*** (medial)
- Bones of Hand:

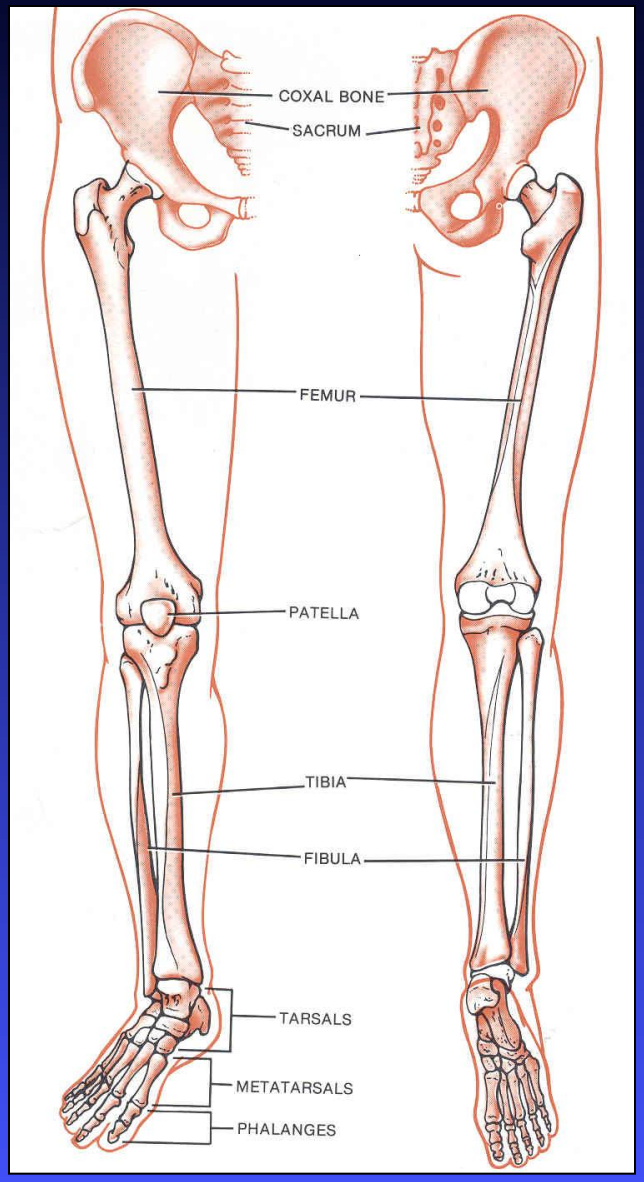
1. 8 ***Carpal*** bones
2. 5 ***Metacarpal*** bones
3. 14 ***Phalanges***:
4. 2 for thumb & 3 for each of medial 4 fingers



Bones of the Lower Limb

- Bone of thigh: ***Femur***
- Bones of leg: ***Fibula*** (lateral) & ***Tibia*** (medial)
- ***Patella***
- Bones of Foot:

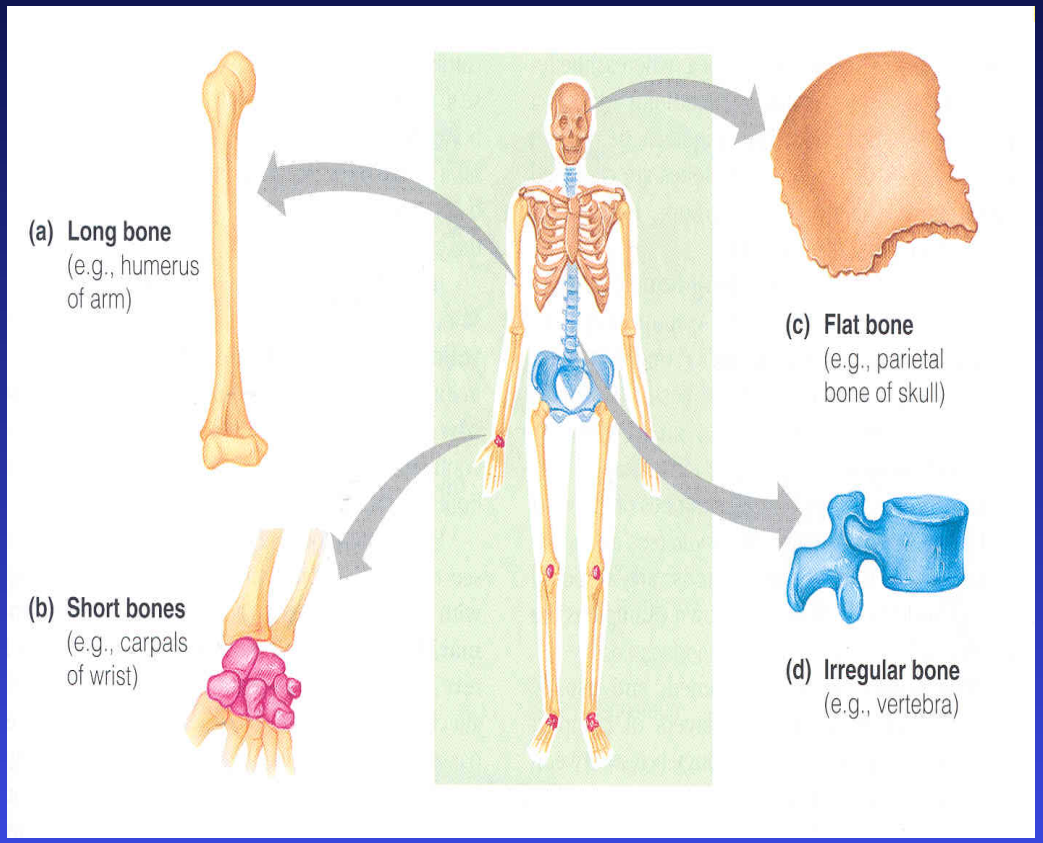
1. ***7 Tarsal*** bones
2. 5 ***Metatarsal*** bones
3. 14 ***Phalanges***:
4. 2 for big toe & 3 for each of lateral 4 toes



Classification of Bones

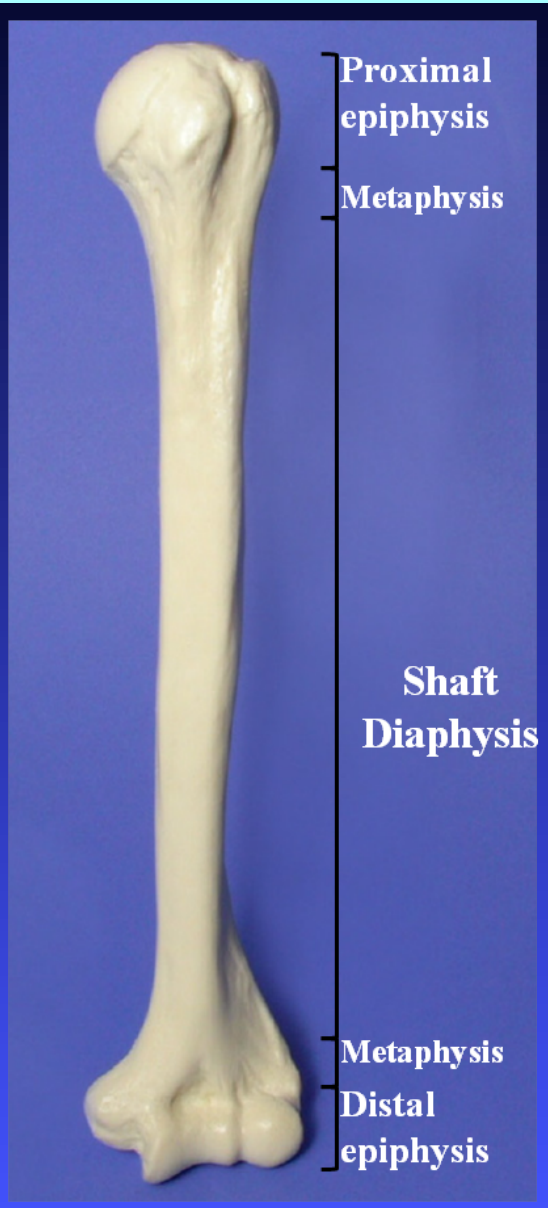
Bones are classified on the bases of their:

- **1. Shape**:
- Long, Short, Flat, Irregular
- **2. Structure**: Compact & Spongy bones
- **3. Development**: Membranous & Cartilagenous



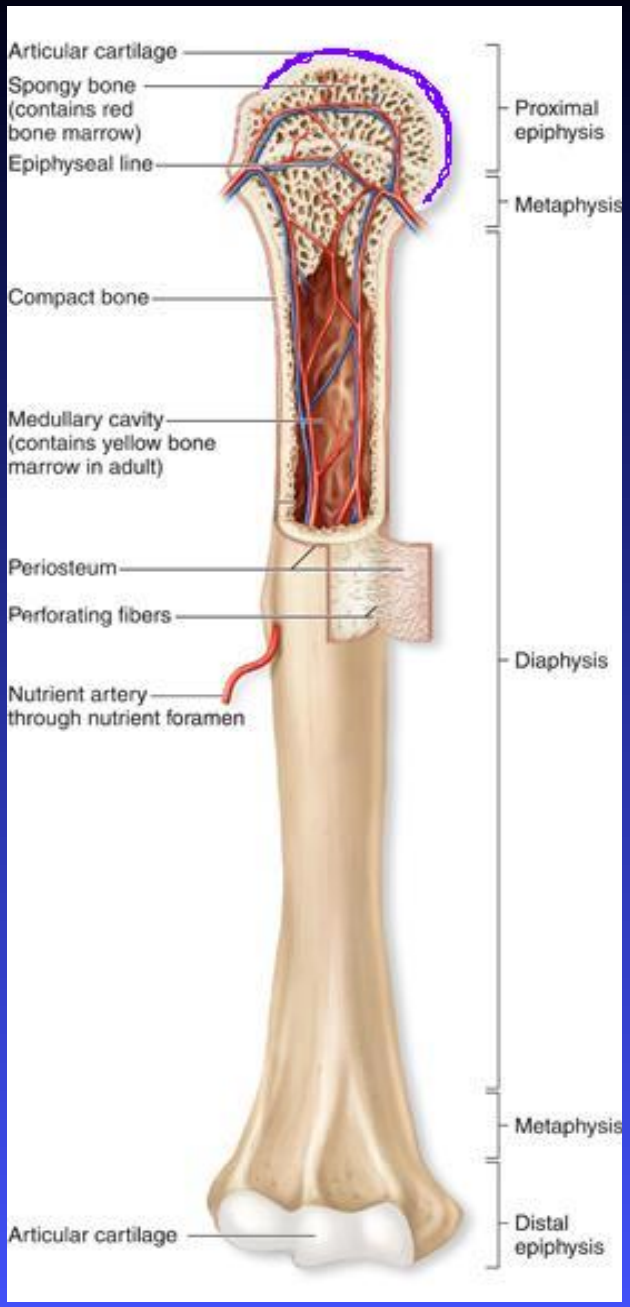
Gross Structure of a Long Bone

- Each long bone has:
  - A long cylindrical shaft called the 'diaphysis'.
  - Two ends called the 'epiphyses'
  - The region at the junction of diaphysis and epiphysis is called 'metaphysis'



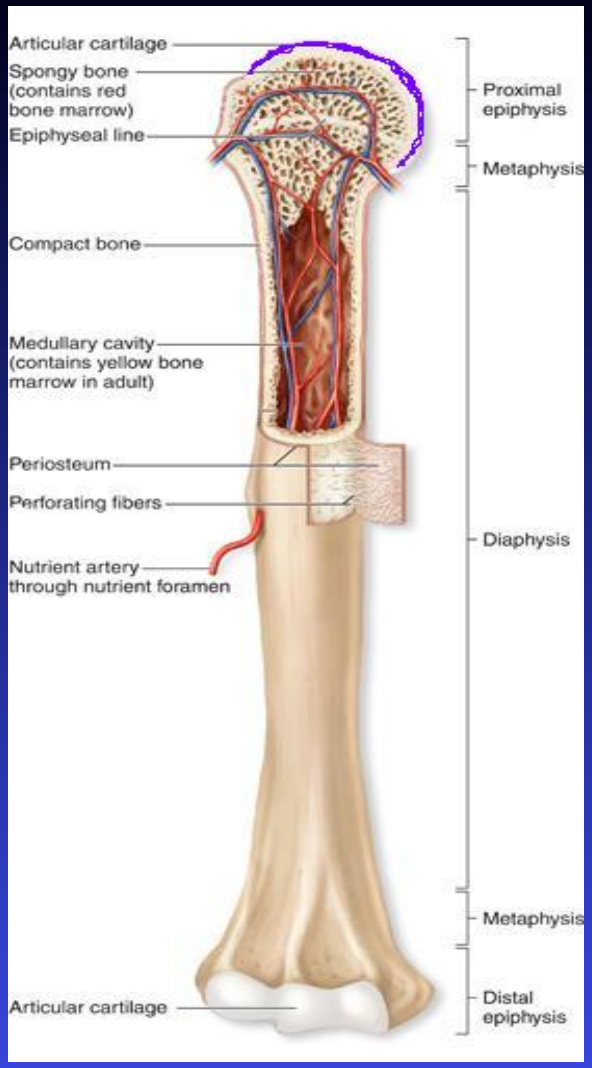
Diaphysis (Shaft)

- Composed of **compact bone**
- Covered on its external surface by a fibrous connective tissue membrane called the periosteum.
- Has a cavity called the marrow cavity. In adults, the marrow cavity is a storage area for fat and contains yellow marrow. In infants, it contains red marrow and is the site of blood cells formation



Epiphyses

- Each epiphysis is composed of **spongy bone**, lined by a thin layer of compact bone.
- Its external surface is covered by a layer of hyaline cartilage called the **articular cartilage**
- Articular cartilage provides smooth slippery surface that decreases friction at joint surfaces



Metaphysis

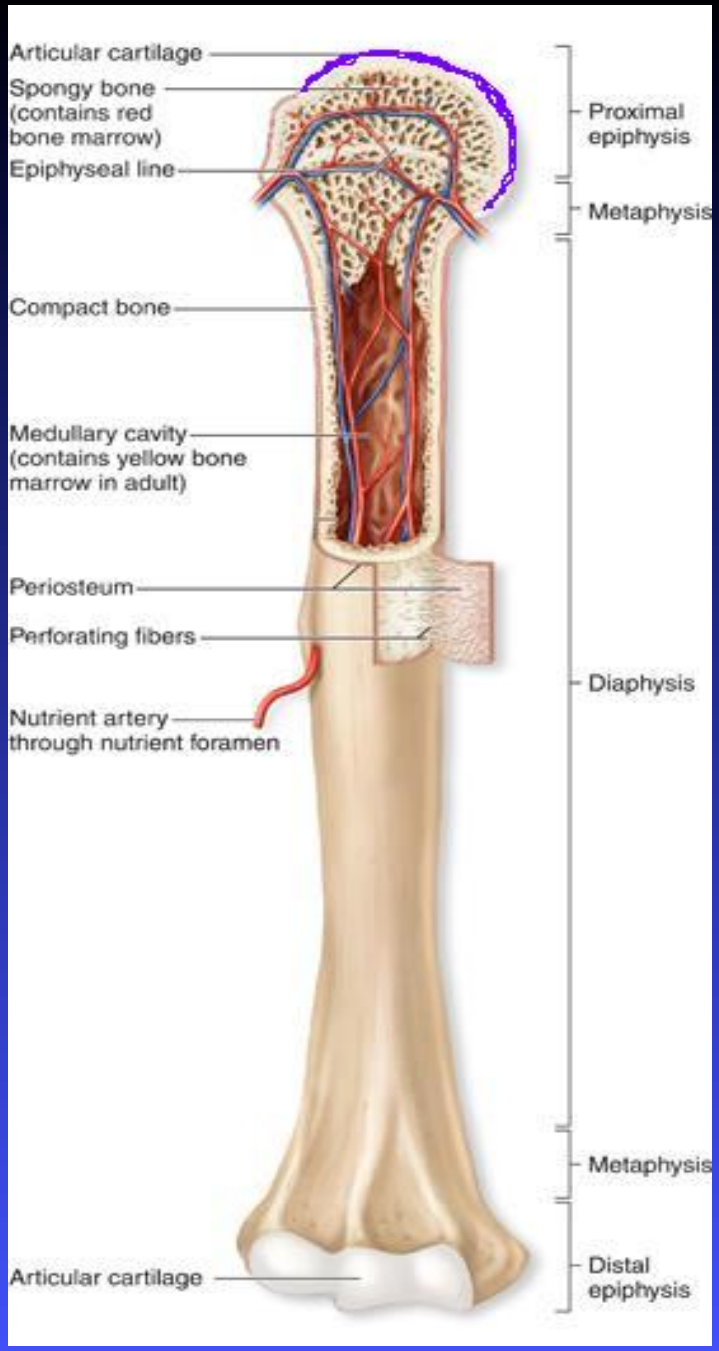
- It contains a thin plate of cartilage called the epipyseal plate, that is responsible for the lengthwise growth of the long bones.

Role of Periosteum

- Protects the bone
- Gives attachment to muscles
- Carries blood vessels and nerves to bone
- Deposits new bone on the surface thus increases the girth of bone

Growth of bone

- Increase in length: epiphyseal plates
- Increase in girth: periosteum



Thank You & Good Luck