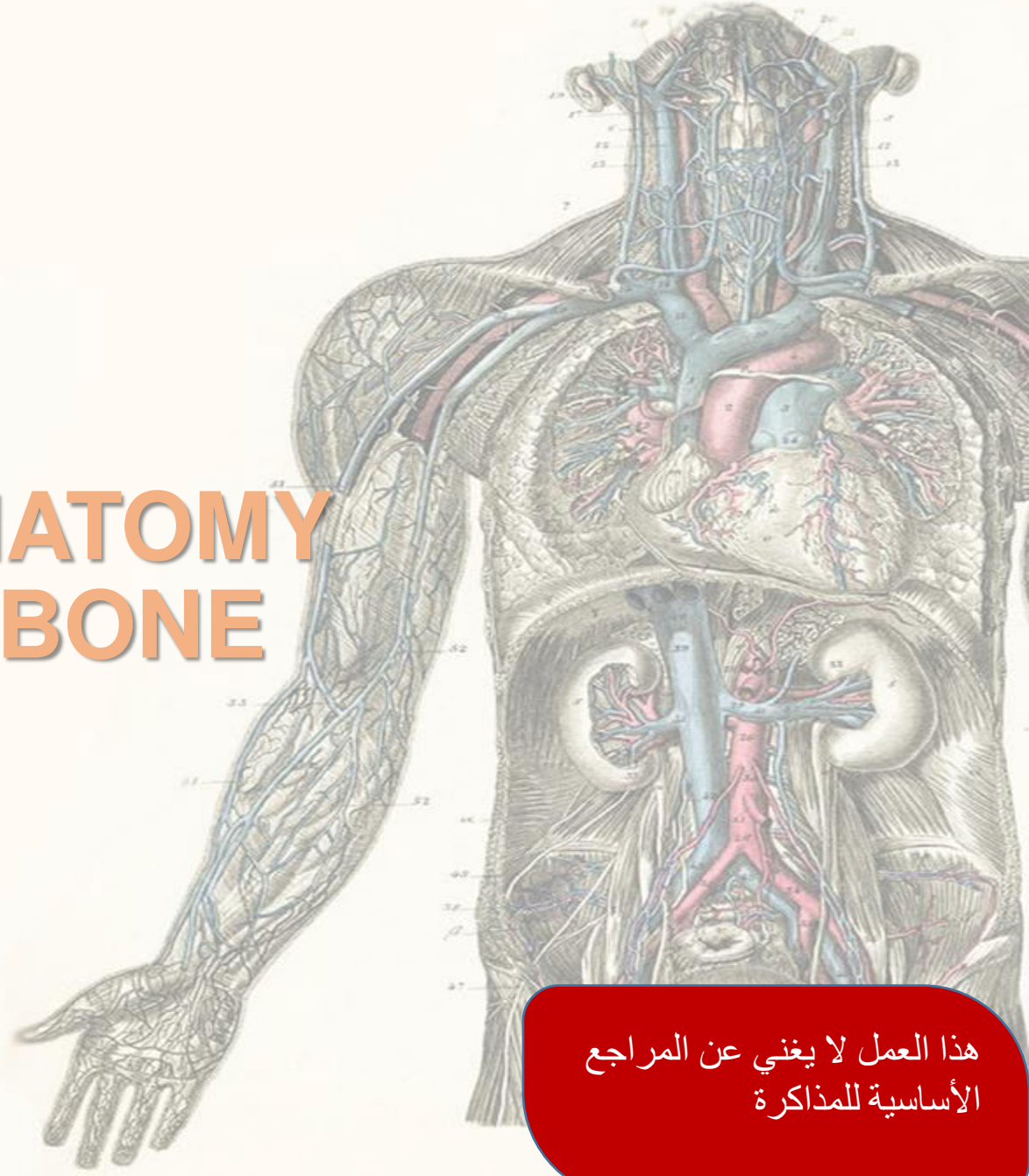
435 Anatomy Team:

First Lecture:

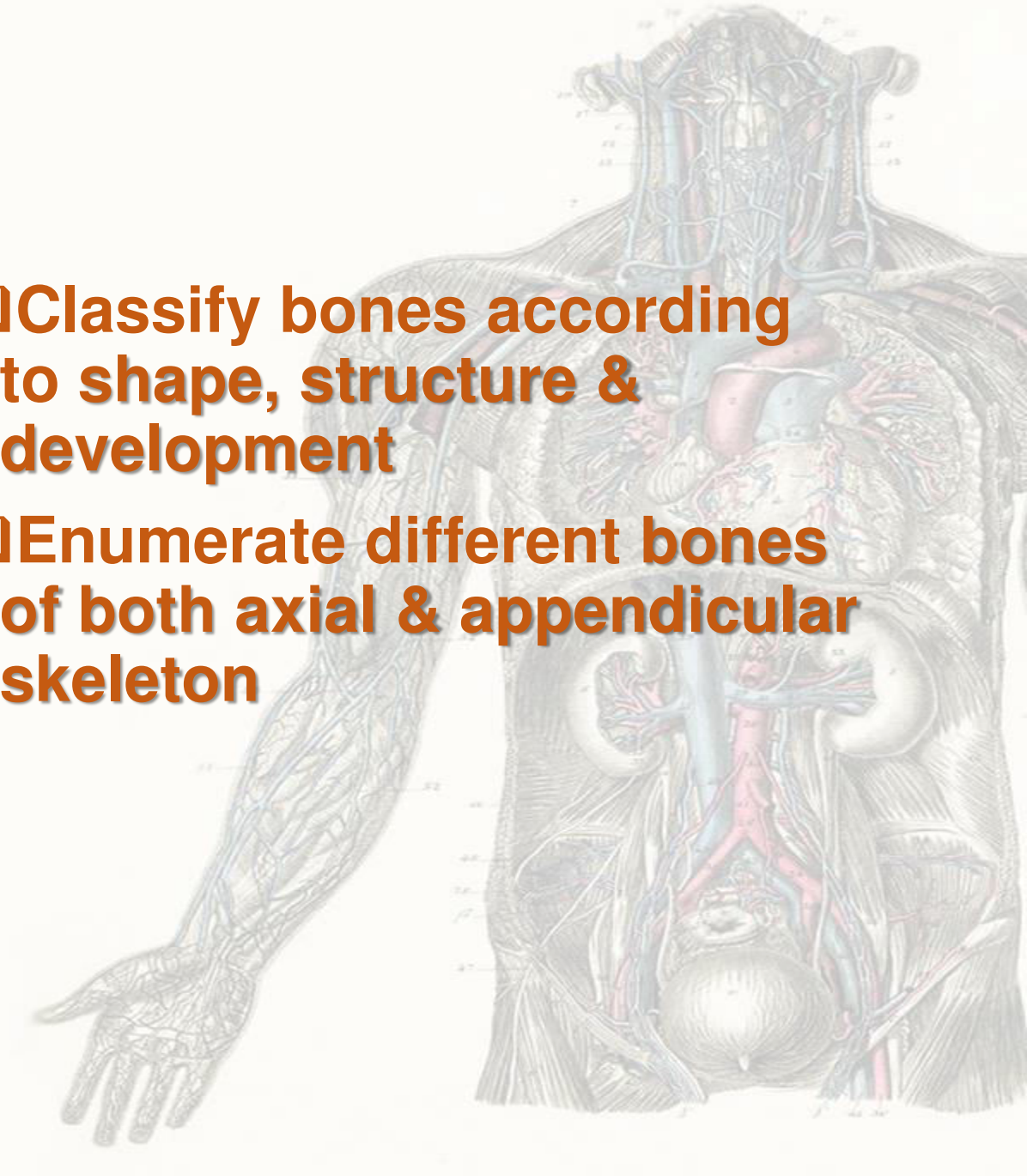
INTRODUCTION TO ANATOMY
SKELETAL SYSTEM: BONE



هذا العمل لا يغني عن المراجع الأساسية للمذاكرة

Objectives:

- ❑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 different bones of both axial & appendicular skeleton

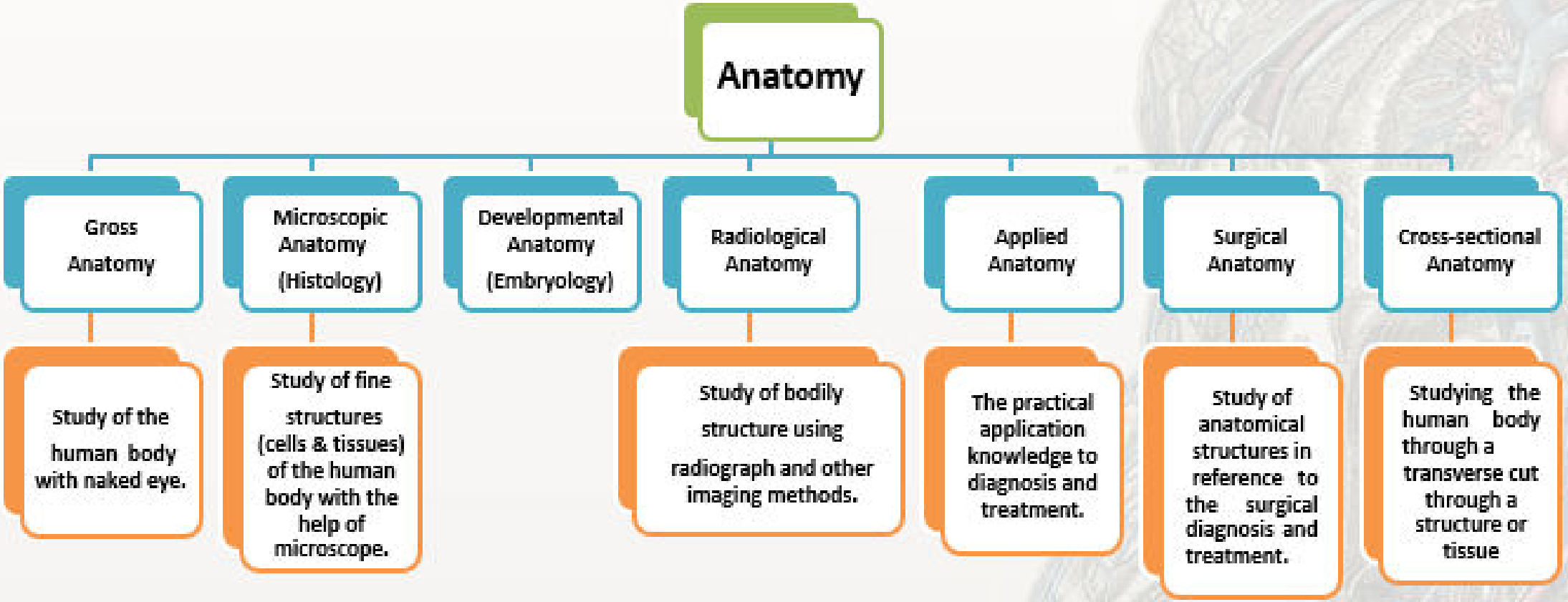


Anatomy

What is Anatomy?

It's the Study of (OR The science which deals with):

- The structure and shape of the body.
- Body parts & their relationships to one another.



ANATOMICAL TERMINOLOGY

To prevent misunderstanding, a special set of terms are used to describe the identification and location of body structures

Anatomical Position:

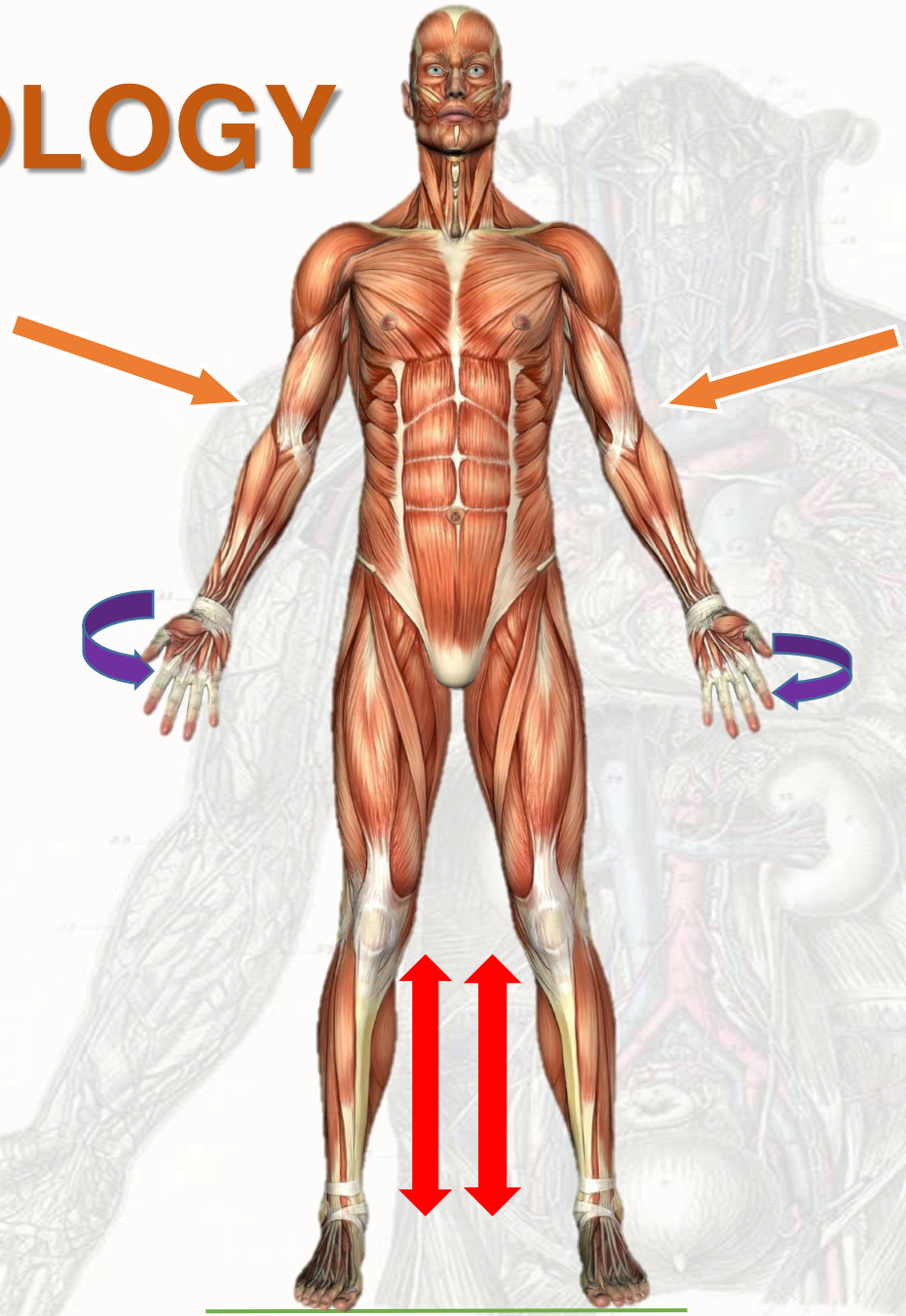
-The standard position in which the body assume to describe its parts.

-This position has four features:

1. **Body is erect**
2. **Arms hanging by the side**
3. **Palm facing forward**
4. **Feet parallel**

*Follow the colours

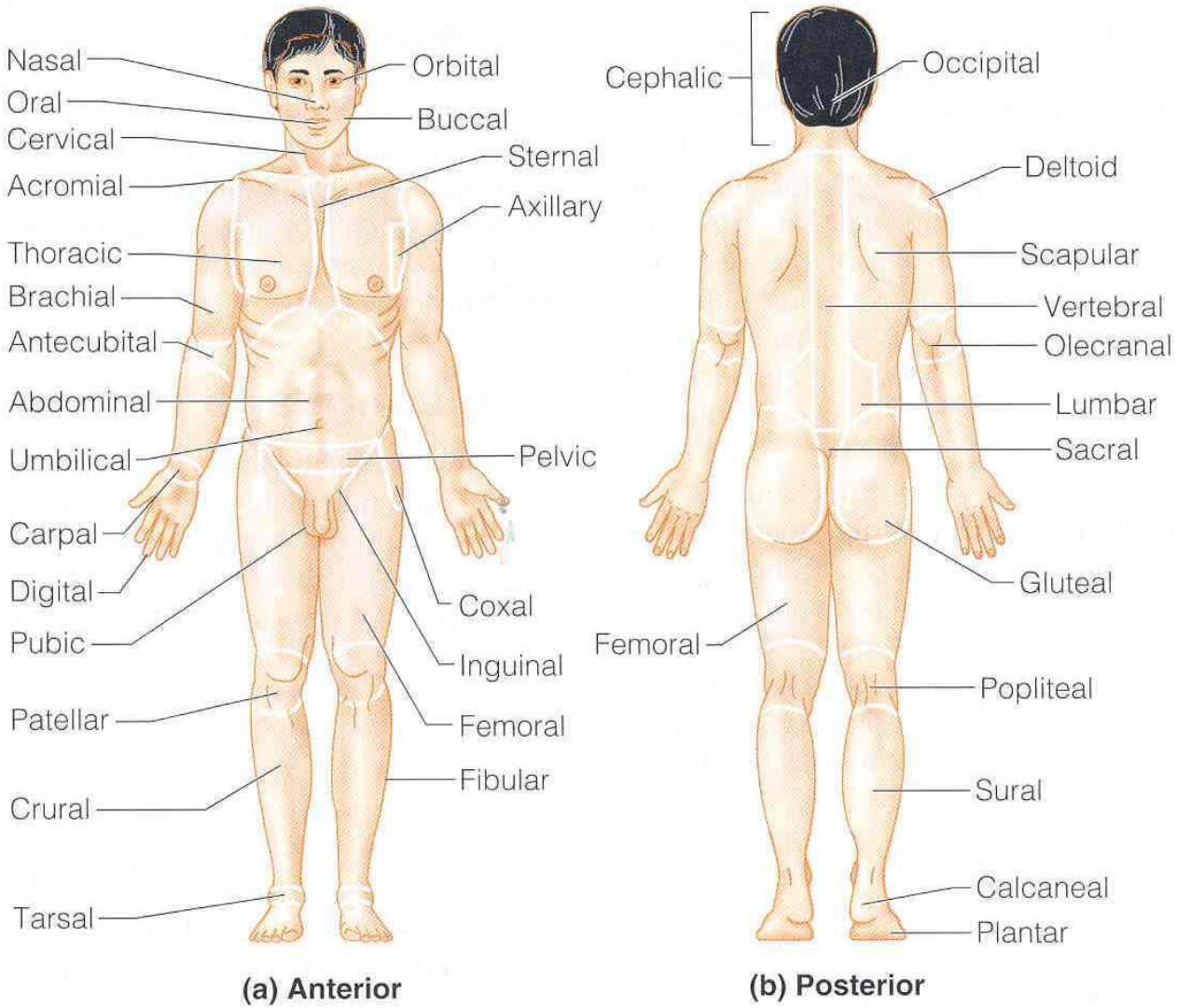
*Thumbs are always on the far end of the hand



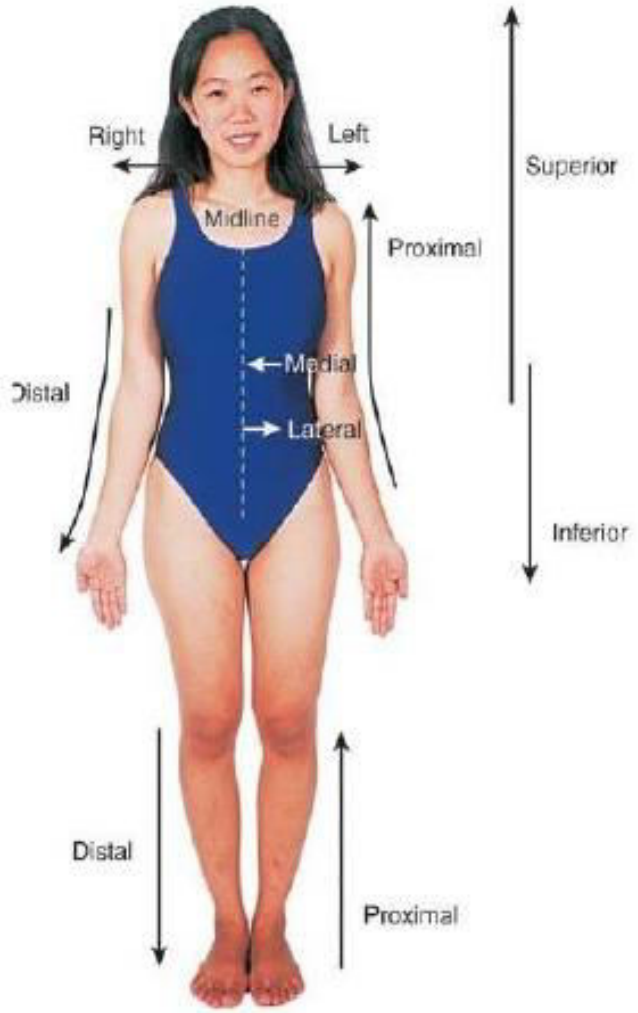
1) Erect

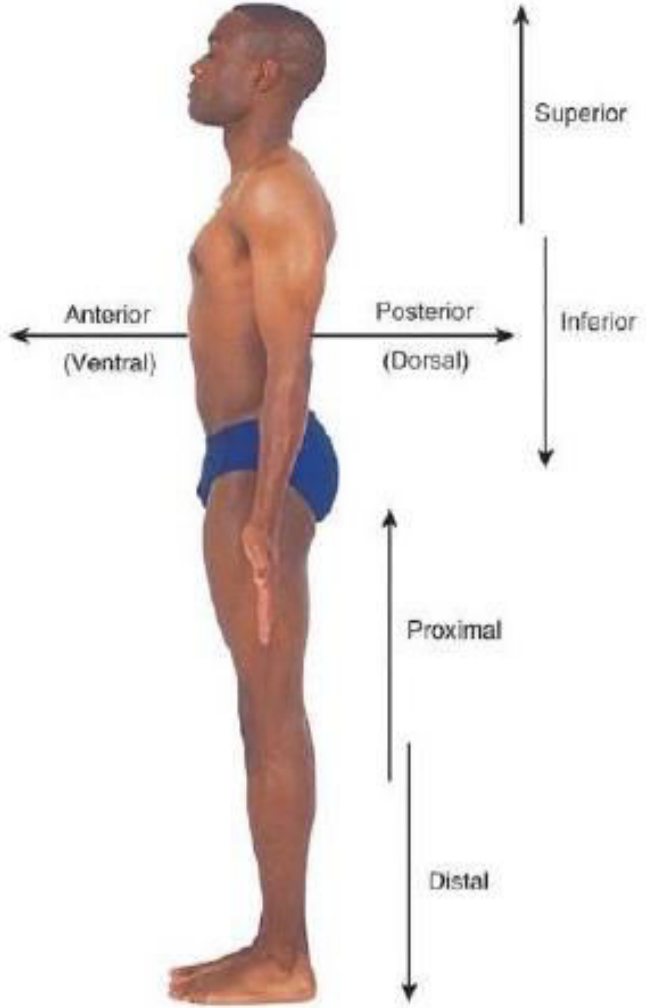
Terms of Regions

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



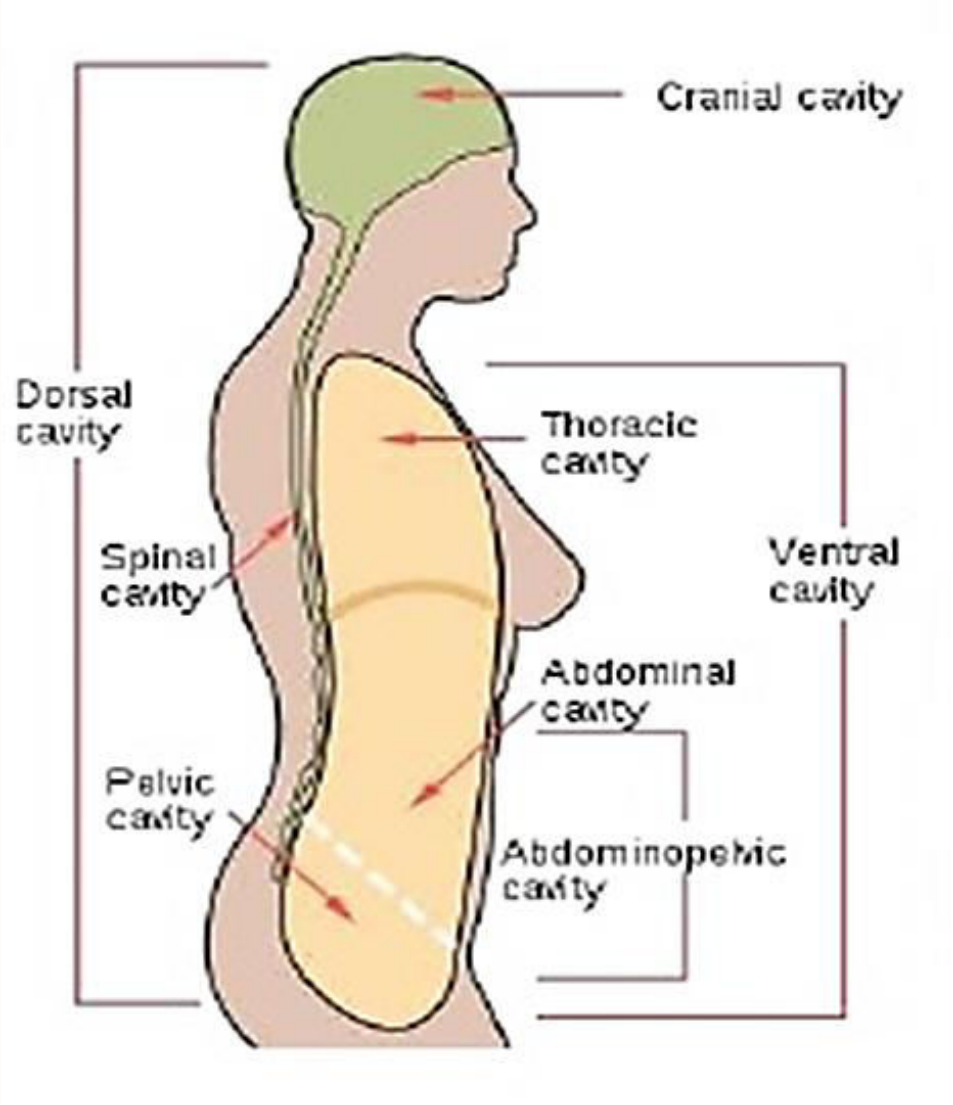
TERMS OF POSITION





- **Superior (cranial, rostral):** near to head
  Inferior (caudal): away from head
- **Anterior (ventral):** near to front
  Posterior (dorsal): near to back
- **Medial:** near to median plane
  Lateral: away from median plane
- **Proximal:** near to trunk
  Distal: away from trunk
- **Superficial:** near to skin (surface)
  Deep: away from skin

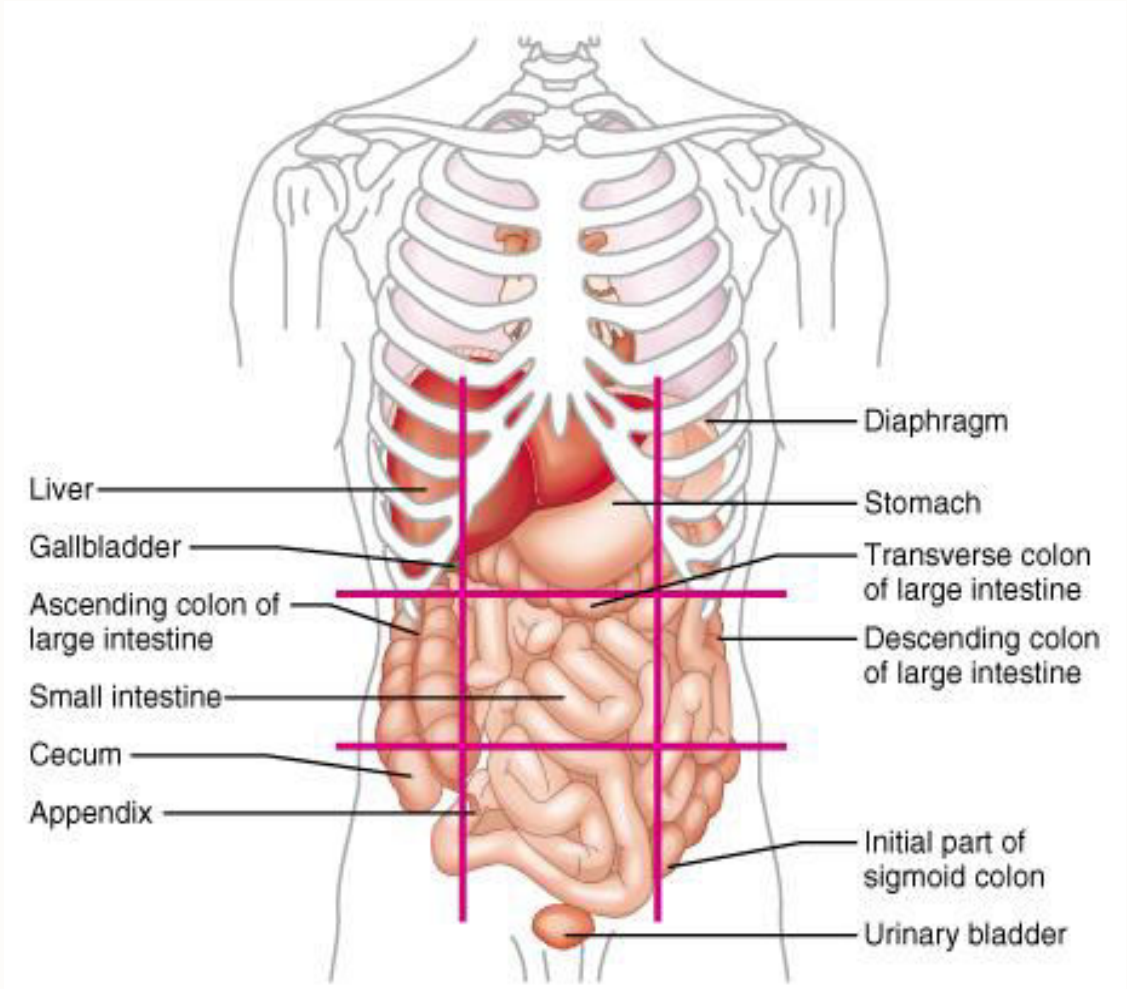
Body Cavities



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

- **Ventral body cavity**: divided by diaphragm into:
  1. **Thoracic cavity**: superior to diaphragm(above the diaphragm), contains heart & lungs.
  2. **Abdominal cavity**: inferior to diaphragm(below the diaphragm), contains stomach, intestine, liver, urinary bladder, reproductive organs, rectum etc…
- **Dorsal body cavity**: divided into 2 parts continuous with each other:
  1. **Cranial cavity**: space inside skull, contains brain.
  2. **Spinal cavity**: space inside vertebral column, contains spinal cord

Abdominopelvic Regions



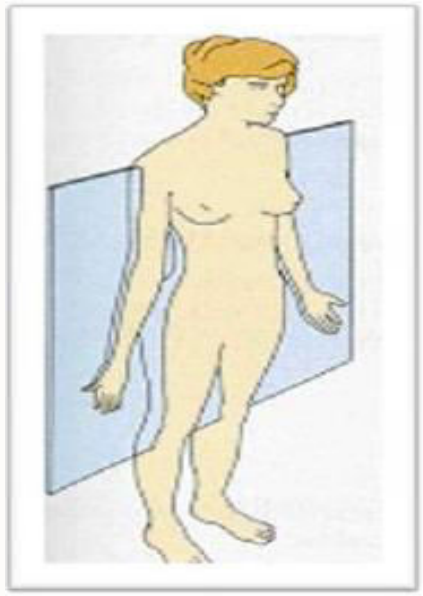
- The **Abdominopelvic** area is divided into 9 regions by 2 vertical & 2 horizontal lines or planes
- **Objective:** To locate the different organs in each region

ANATOMICAL PLANES & SECTIONS

To look at the internal structures, the body is cut into sections along imaginary lines called **planes**

❑**Sagittal (median):**

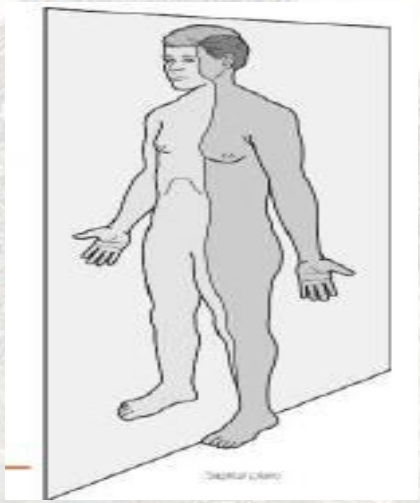
- a cut made along a **longitudinal** plane dividing the body into 2 equal halves (right & left)
- The plane passing through the midline of the body, cutting the body into the right and left equal halves is called a **midsagittal** or **median plane**.



❑**Frontal (coronal):**

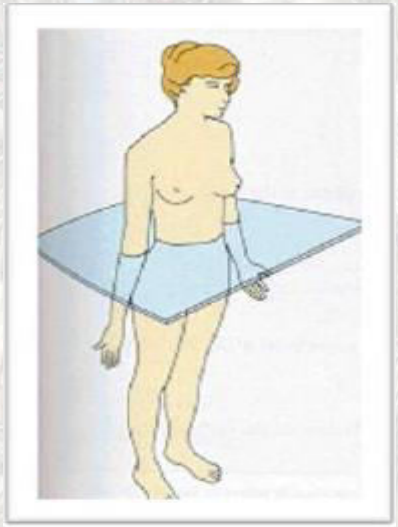
- A cut made along a **longitudinal** plane
- divides the body into anterior & posterior parts

❑**parasagittal (paramedian):** divides the body into 2 unequal parts (right & left)

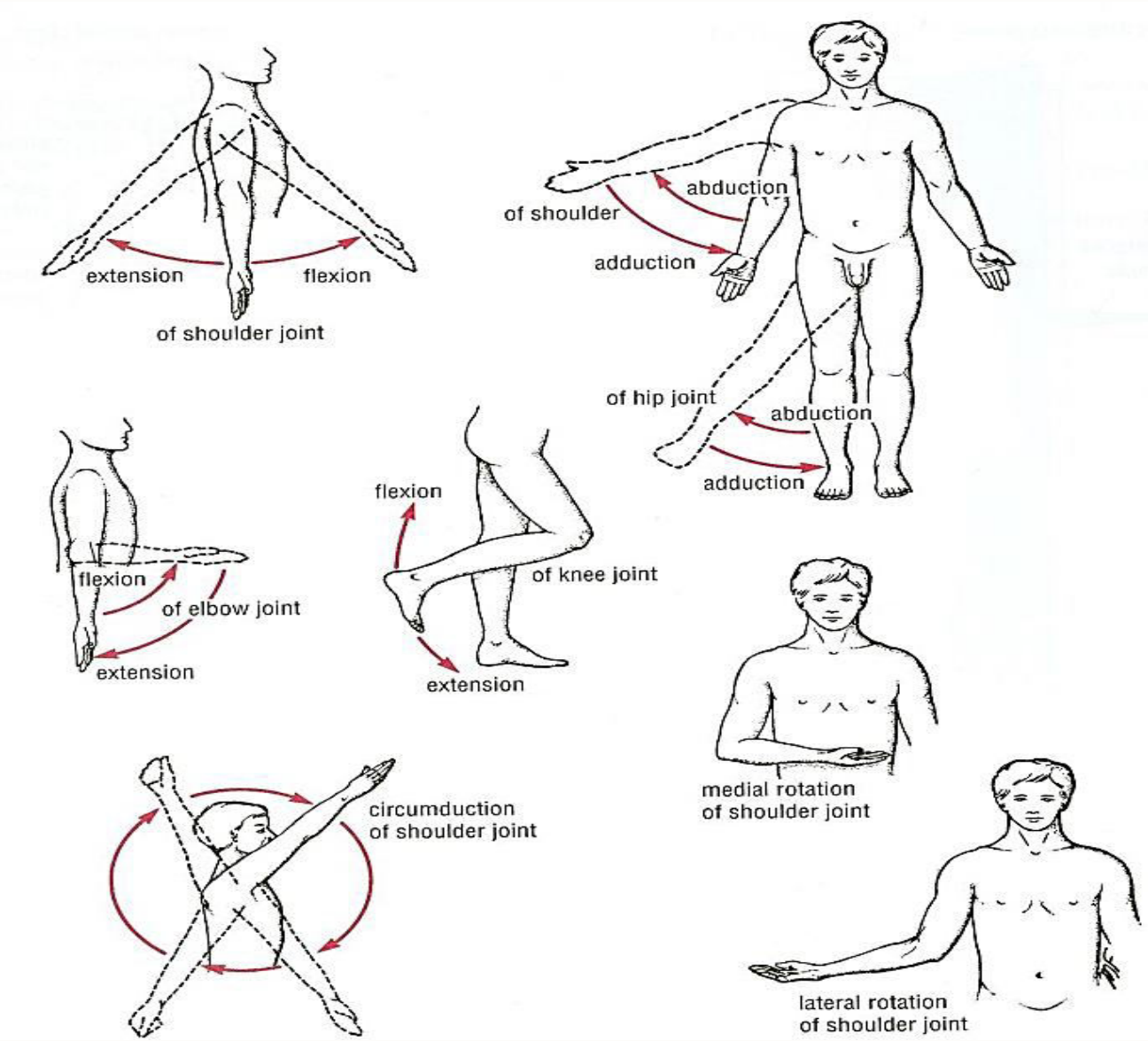


❑ **Transverse (cross):**

- A cut made along a **horizontal** plane
- divides the body into superior & inferior parts



TERMS OF MOVEMENT



- **Flexion:** approximation of 2 parts (decreasing the angle between 2 parts)

  Extension: straightening (increasing the angle between 2 parts)

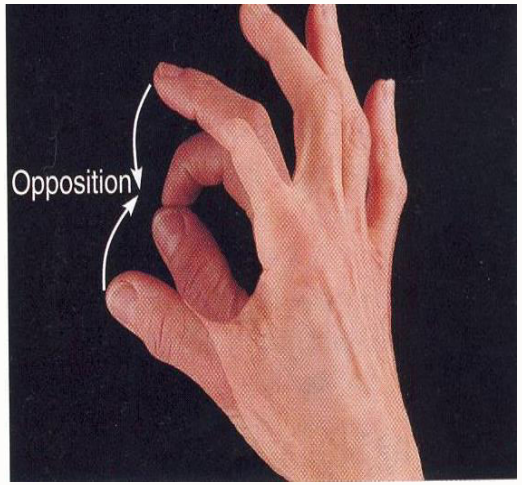
- **Abduction:** away from median plane

  Adduction: towards median plane

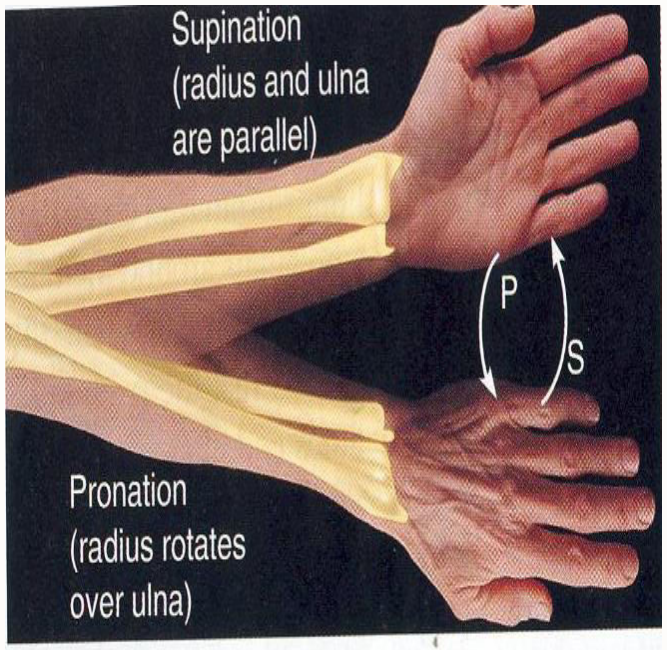
- **Lateral rotation:** rotation away from median plane

  Medial rotation: rotation toward median plane

- **Circumduction:** combined movements of flexion, extension, abduction & adduction



❑**Opposition:** bringing tips of fingers and thumb together as in picking something up



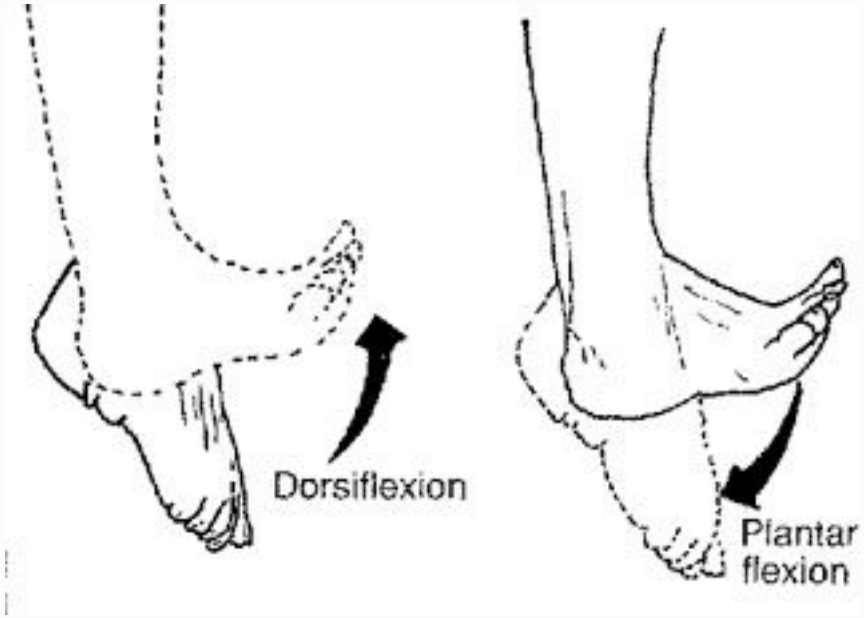
(g) Supination (S) and pronation (P)

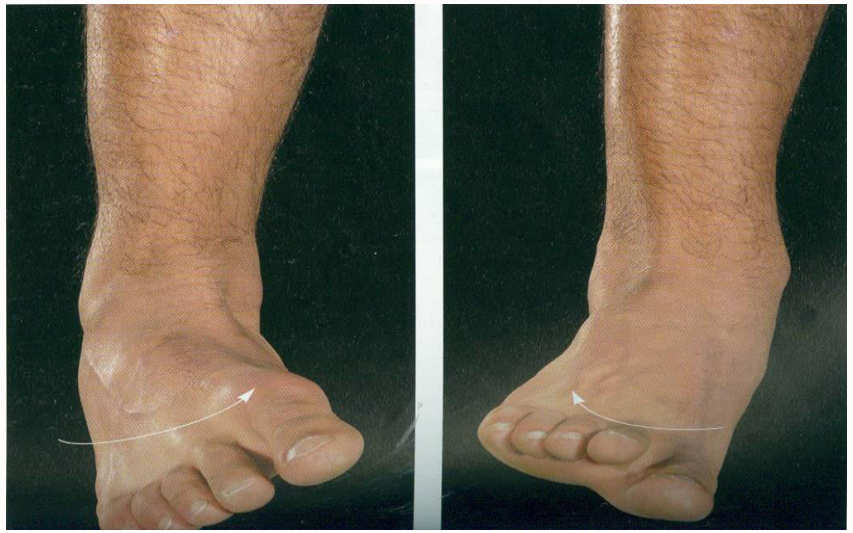
❑**Supination:**

- 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.





❑**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.

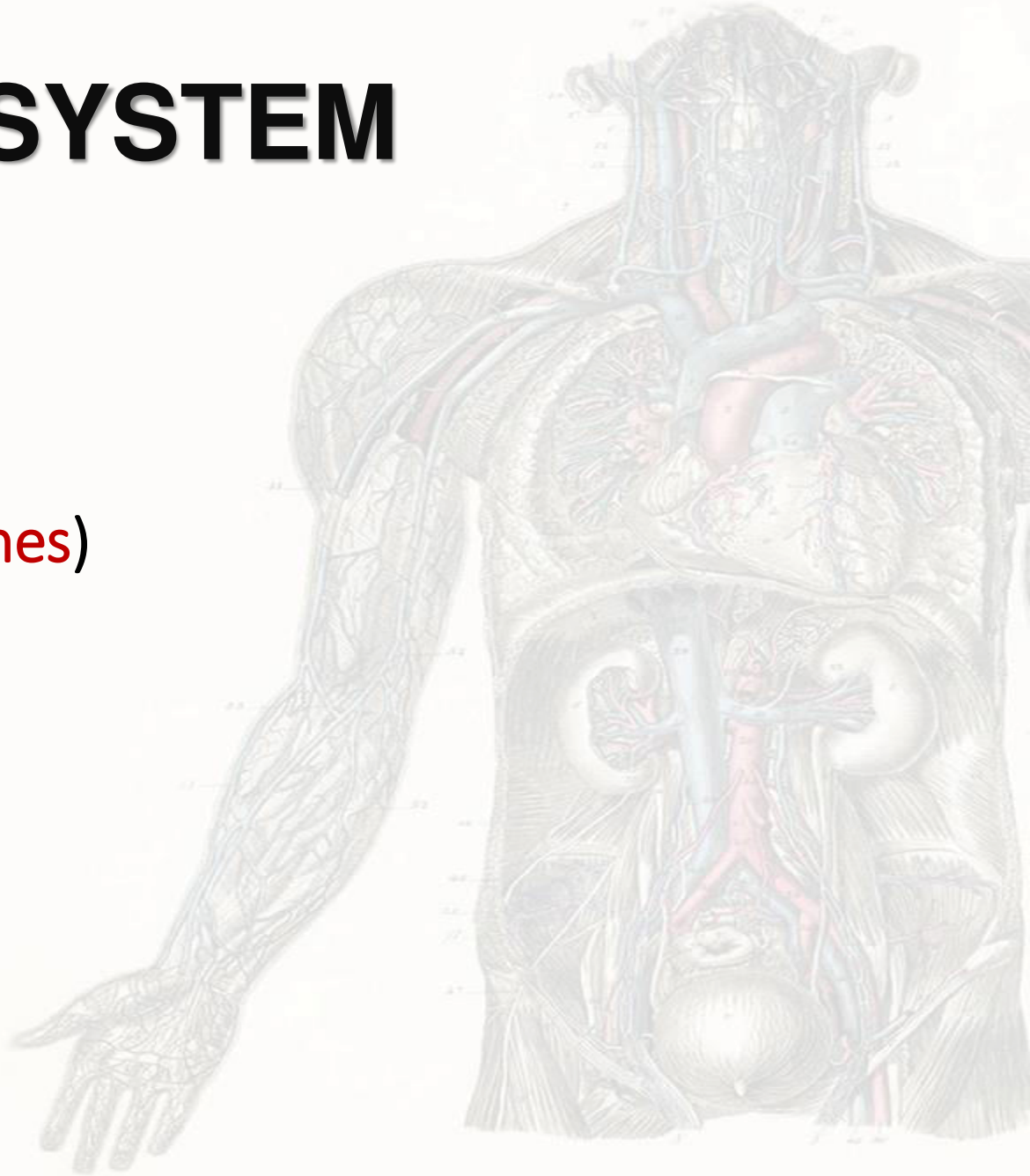
❑**Eversion :**

The sole faces in a Lateral direction.

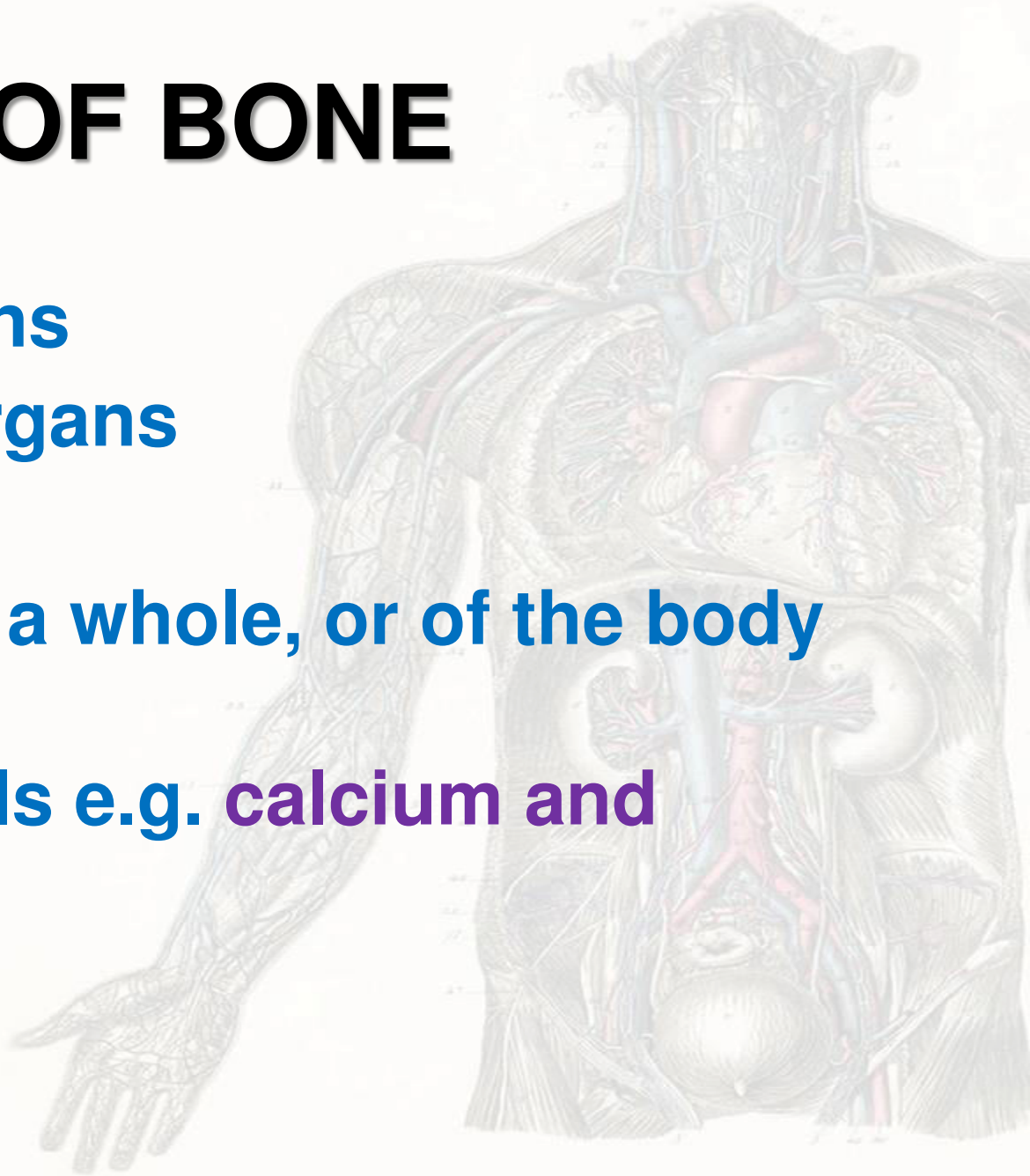
SKELETAL SYSTEM

Includes:

- ❑Bones
- ❑Joints: (articulations between bones)

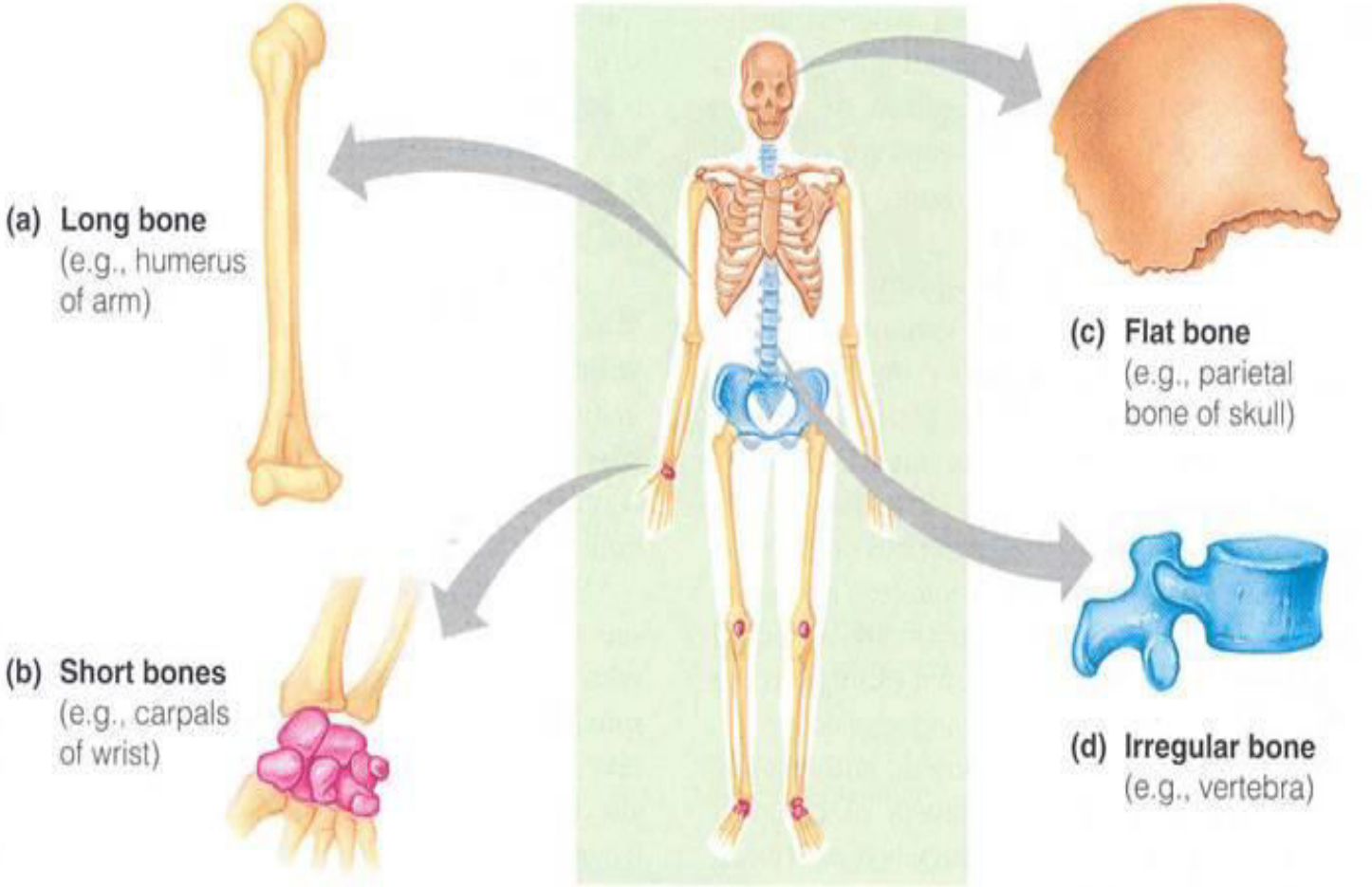


FUNCTIONS OF BONE



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**

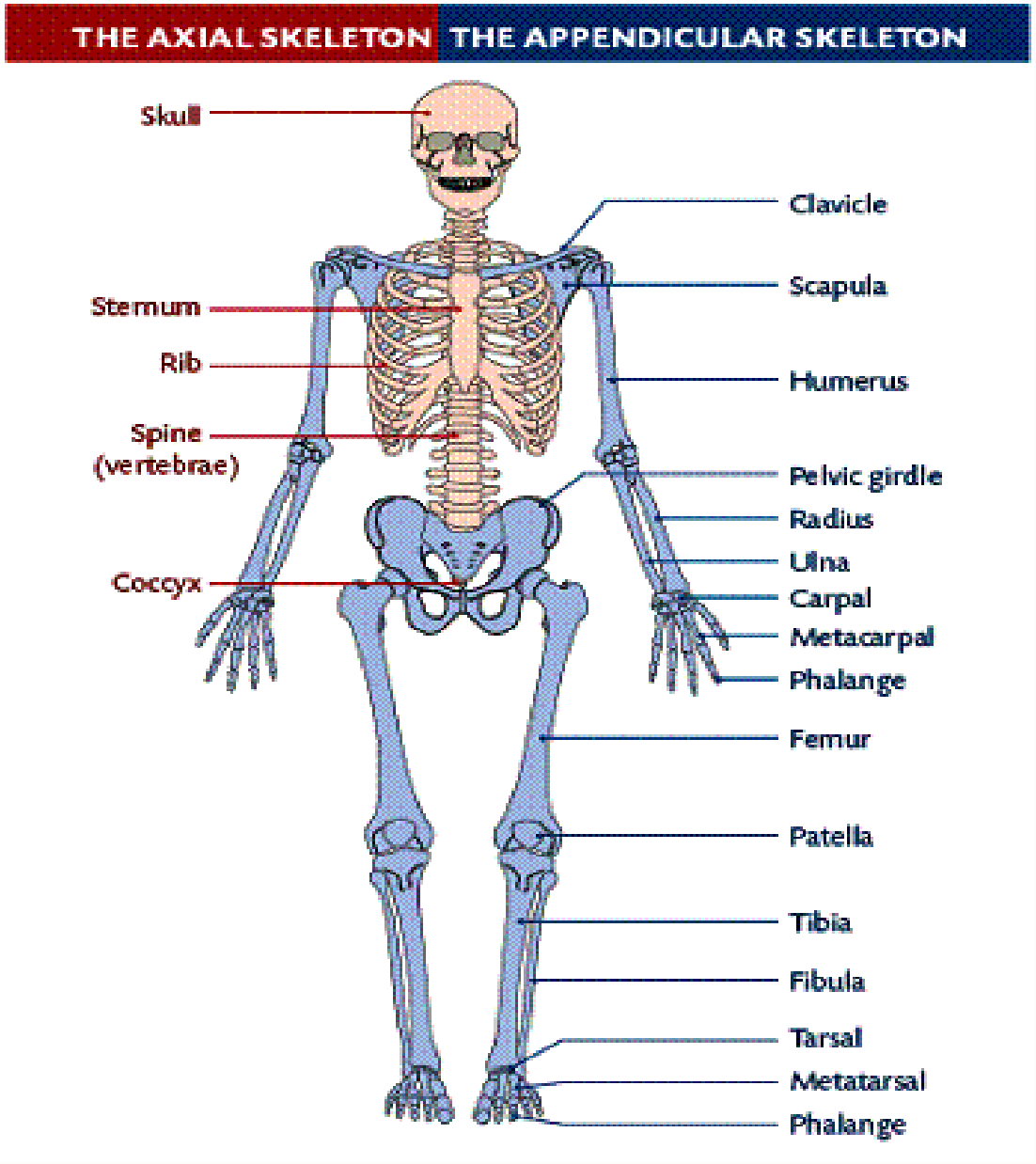
CLASSIFICATION OF BONE



Bones are classified on the bases of their:

- **Shape:**
  long, short, flat, irregular
- **Structure:**
  compact, spongy
- **Development:**
  membrane, cartilage
  (cartilaginous bones)

THE SKELETON



- **The skeleton is perfectly adapted to the functions of body protection and motion**

❑ **Formed of 206 bones**

❑ **Divided into:**

1. **Axial skeleton:** bones forming the trunk (longitudinal axis of body. Consists of :

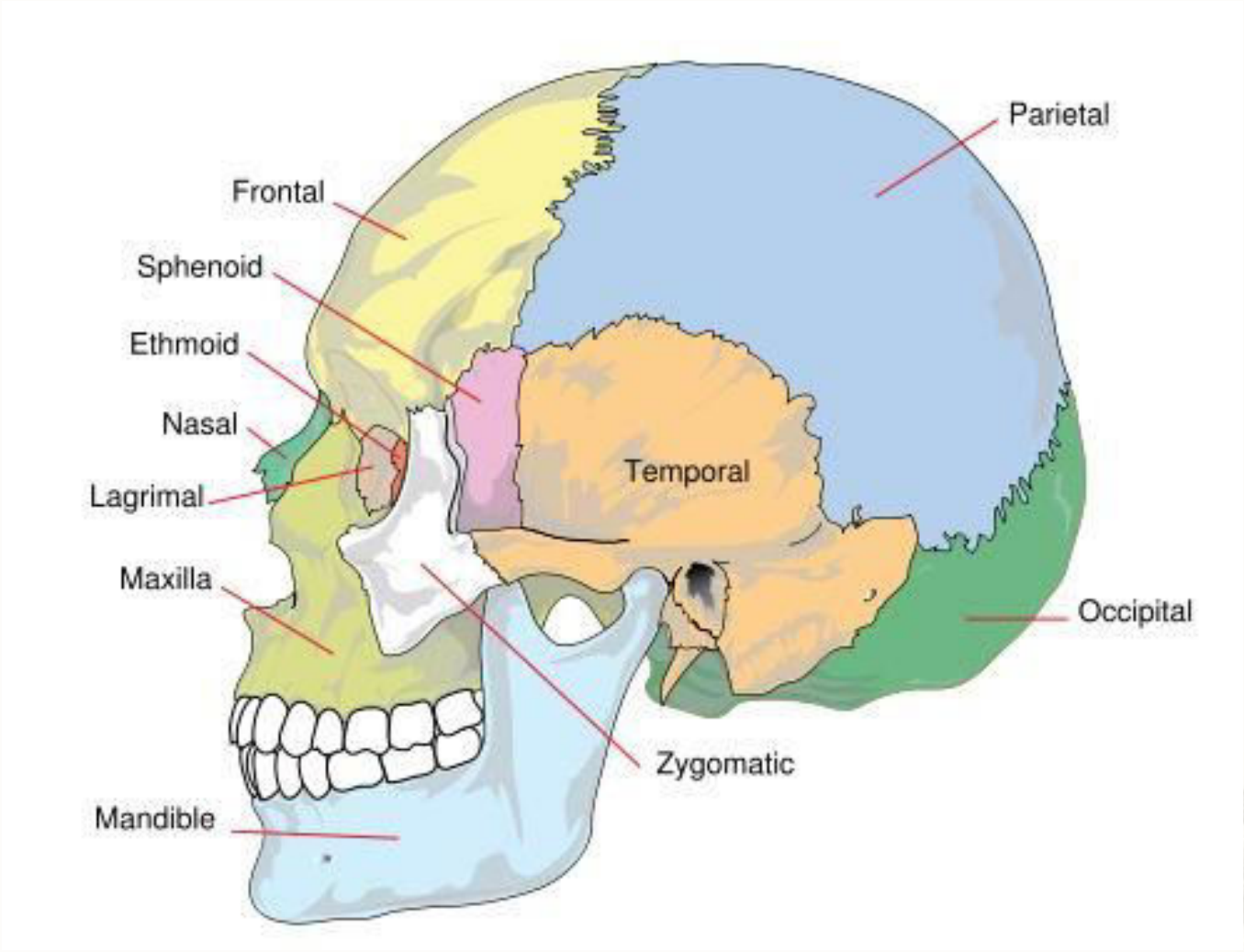
- **Skull bones**
- **Vertebral Column**
- **Sternum**
- **Ribs**

2. **Appendicular skeleton:** bones forming the girdles & limbs

Consists of :

- **Pectoral & Pelvic Girdles:** connect the bones of the limbs to the axial skeleton
- **Upper Limb**
- **Lower Limb**

BONES OF AXIAL SKELETON



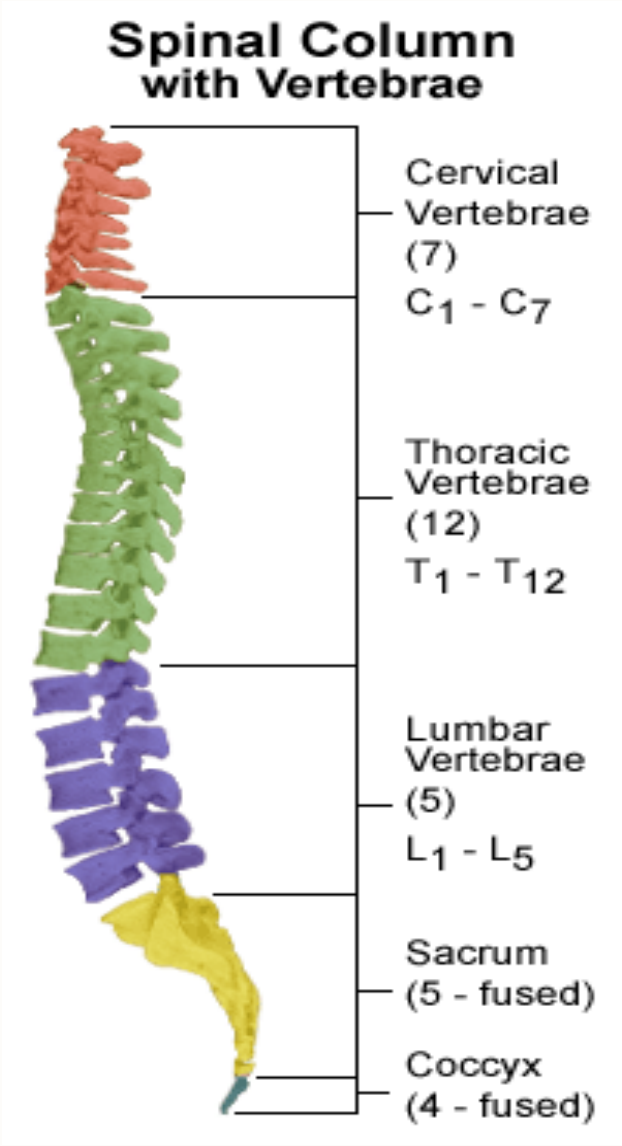
➢A) SKULL

Formed of two sets of bones:

1. **Cranium: bones enclosing and protecting the brain: *frontal, occipital, parietal, temporal and Sphenoid***

1. **Facial bones *(Form the skeleton of the face): maxilla, nasal, zygomatic, mandible***

Bones of Axial Skeleton

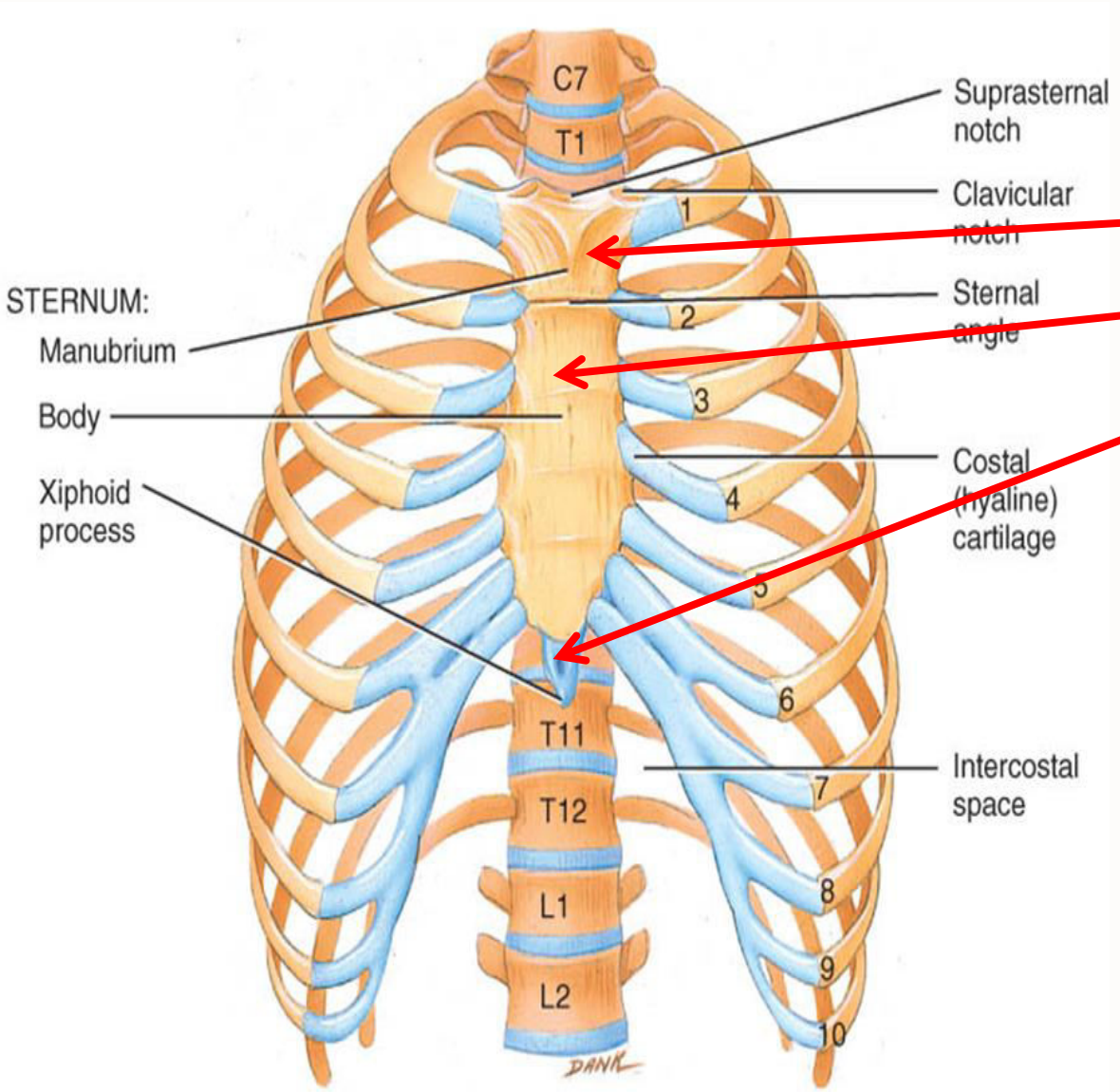


➢B) Vertebral Column

- It is a flexible curved structure formed of 33 vertebrae (irregular bones)
- Running through its cavity is the spinal cord
- Function: protect the spinal cord and support the body
- Formed of. LOOK AT THE PIC

1. **Cervical vertebrae 7**
2. **Thoracic vertebrae 12**
3. **Lumbar vertebrae 5**
4. **Sacral vertebrae fused to form sacrum (triangular bone) 5**
5. **coccygeal vertebrae fused to form coccyx (small bone) 4**

Bones of Axial Skeleton



(b) Anterior view of skeleton of thorax

C) Sternum (Flat bone)

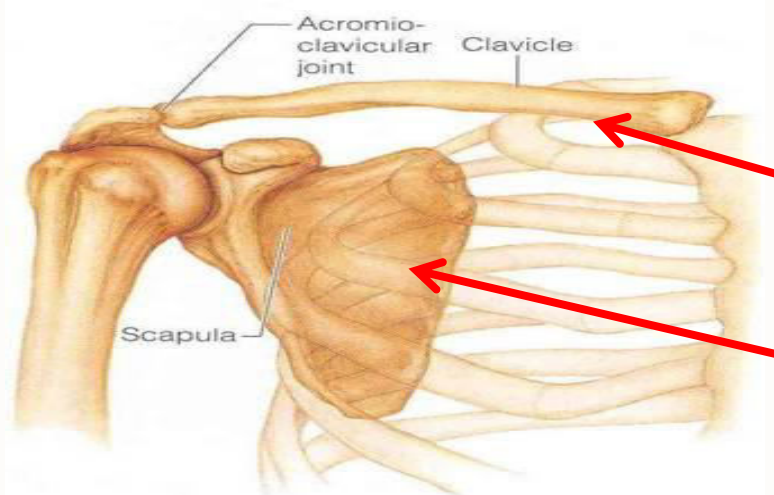
Has 3 parts:

1. **Manubrium**
2. **Body**
3. **xiphoid process**

D) Ribs

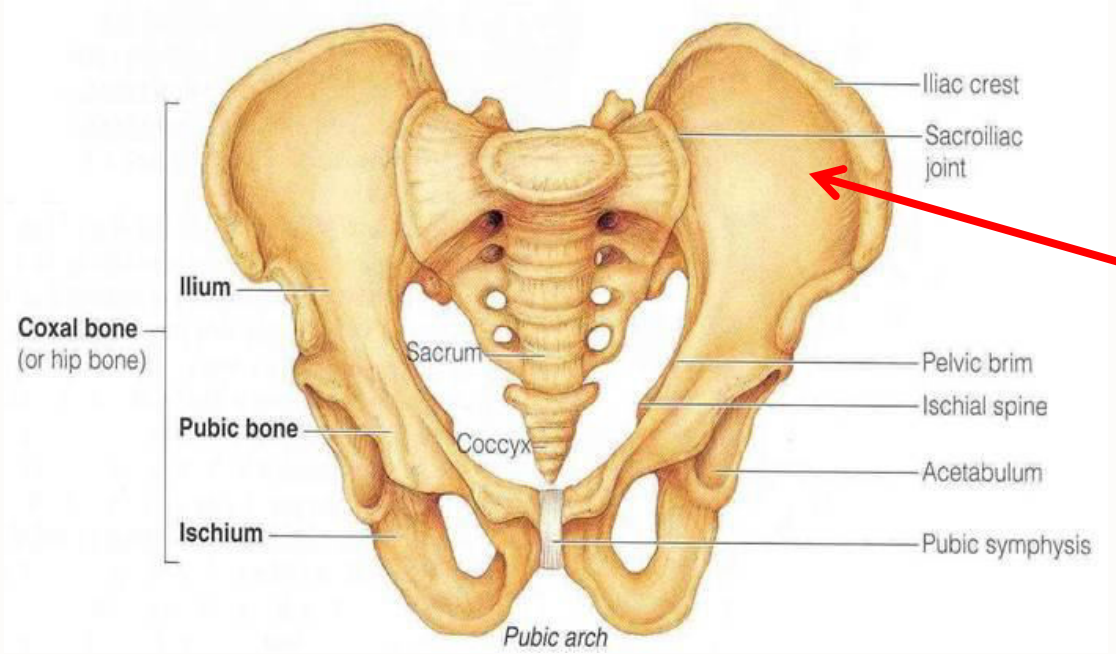
- Number: vertebrea12 pairs
- All ribs articulate with vertebrae
- Only upper 7 pairs articulate with sternum

Bones of Appendicular Skeleton



A) Pectoral Girdle

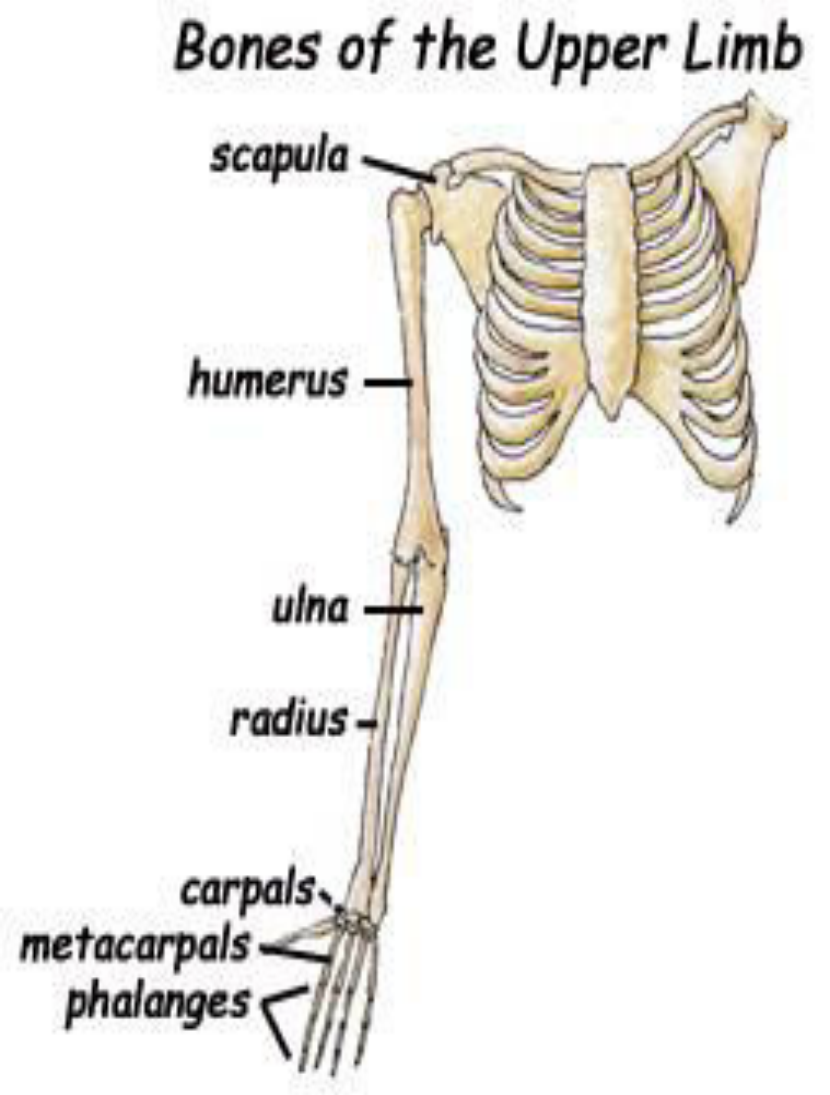
- Connects **UPPER LIMP** with axial skeleton
- Formed of: **clavicle & scapula** (2 bones in **each side**)



B) Pelvic Girdle

- Connects **LOWER LIMP** with axial skeleton
- Formed of: **TWO HIP BONES** (one bone in each side)

Bones of Appendicular Skeleton



C) UPPER LIMB

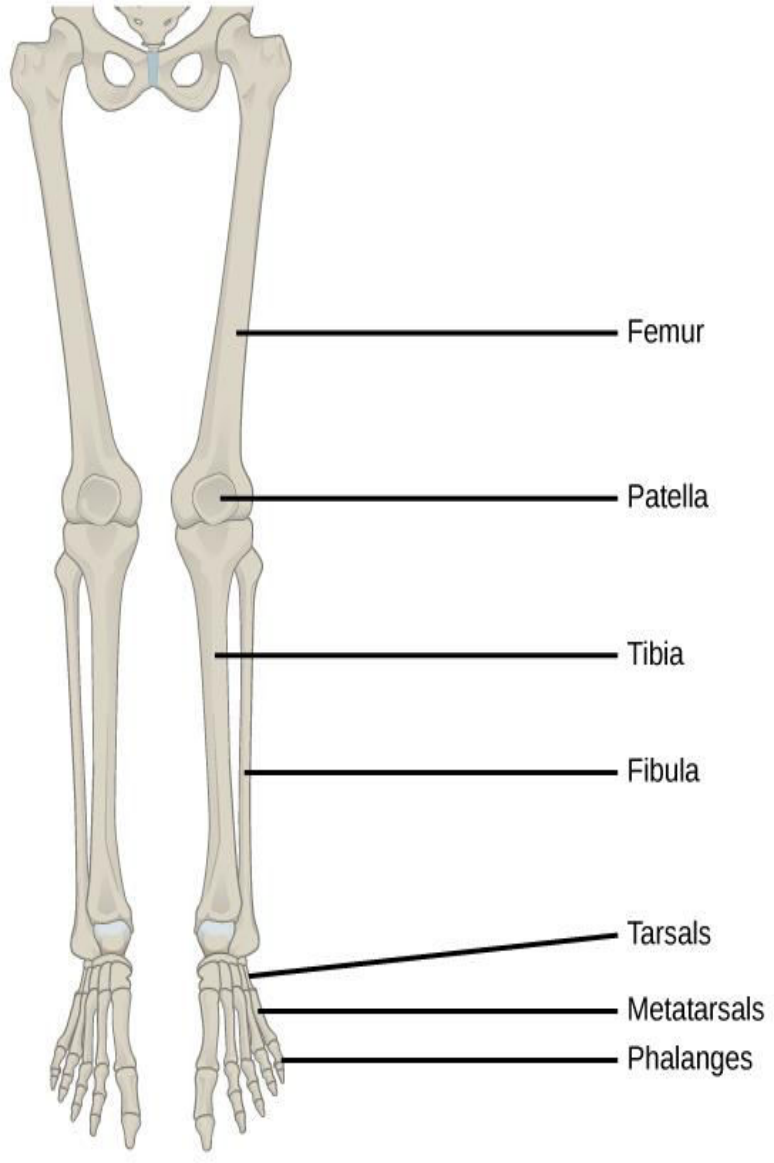
- Bone of arm: humerus
- Bones of forearm: radius(lateral) & ulna (medial)
- Bones of hand:

i. 8 **carpal** bones

ii. 5 meta**carpal** bones

iii. 14 phalanges: 2 for thumb& 3 for each of medial four fingers

Bones of Appendicular Skeleton



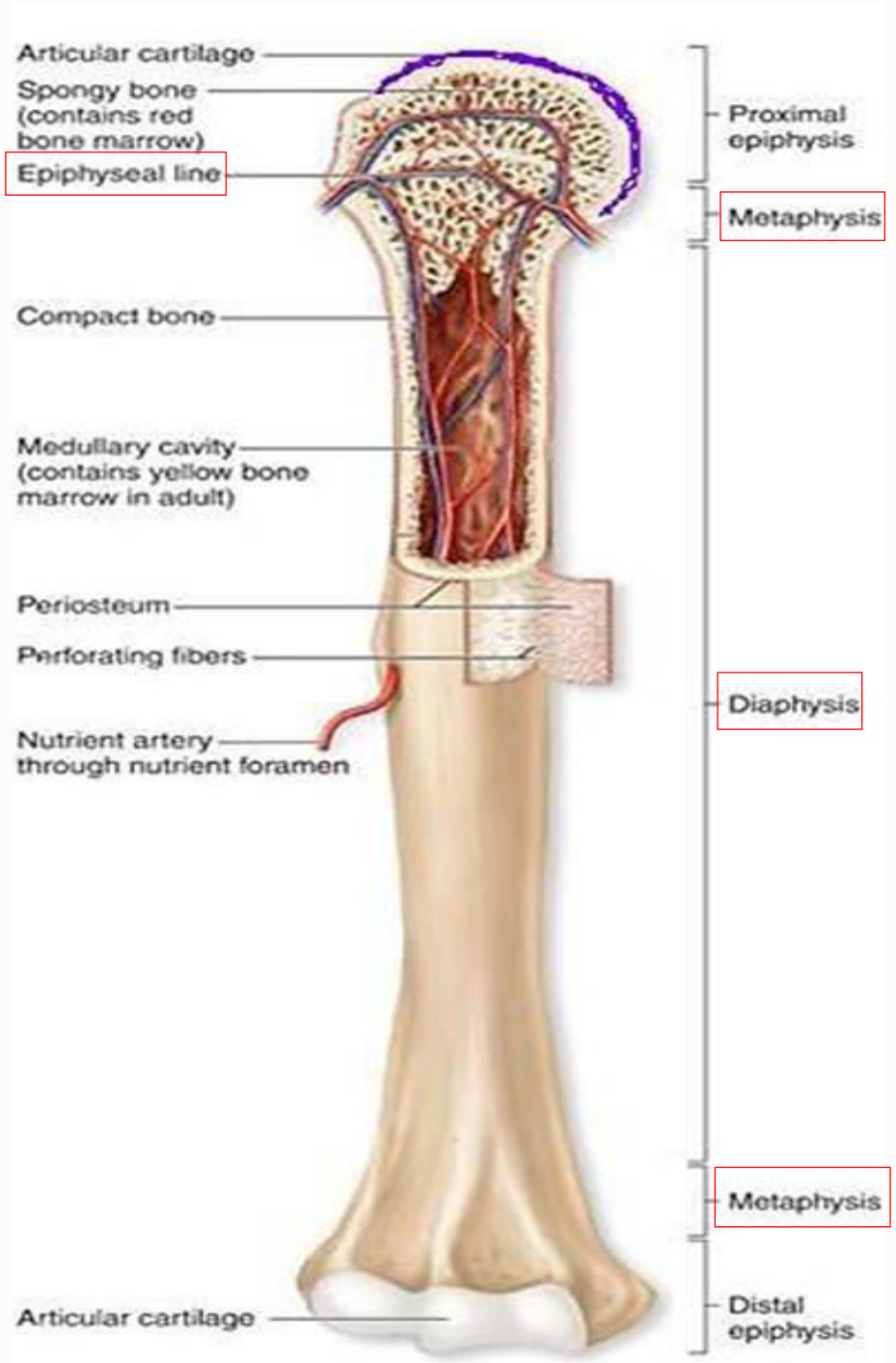
D) Lower Limb

- Bones of thigh: femur
- Bones of leg: fibula (lateral) & tibia (medial)
- Patella
- Bones of foot:

i. 7 **tarsal** bones

ii. 5 meta**tarsal** bones

iii. 14 phalanges: 2 for big toe & 3 for each of lateral four toes



Long Bones

•Diaphysis (shaft)

- long & cylindrical
- 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

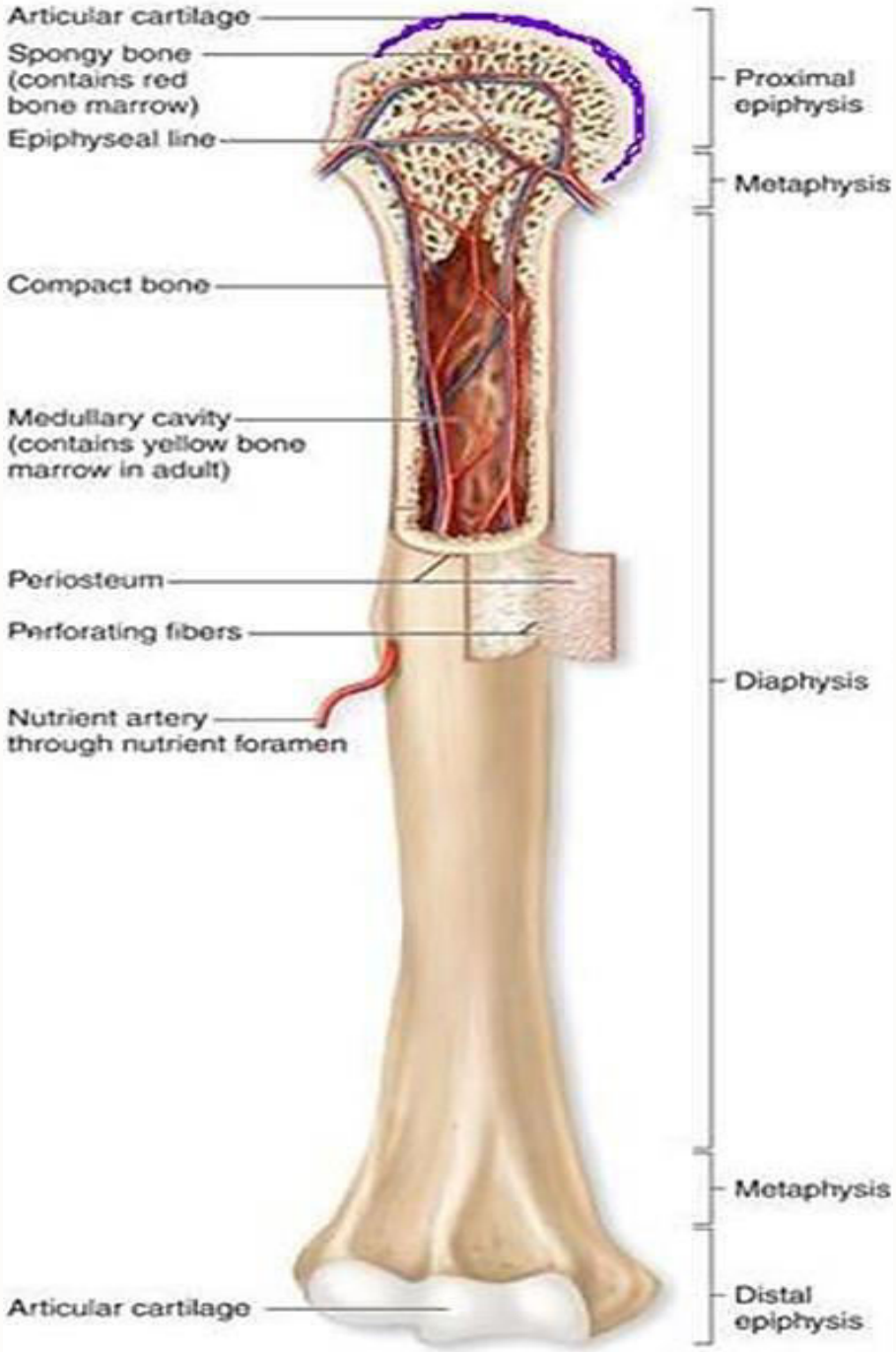
The region of contact between epiphysis & diaphysis is called:

•metaphysis

contains thin plate of cartilage called the *epiphyseal plate* that is responsible for the lengthwise growth of the long bones.

•Epiphysis (The two ends)

- 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 (provides smooth slippery surface that decreases friction at joint surfaces)



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

Some links to learn more:

Dr. Najeeb lectures:
www.drnajeeblectures.com

Videos:

1) http://youtu.be/J8x6tZI2hVI

2) http://youtu.be/TnY6l9hMOew

3) http://youtu.be/k9teJOW8SQg

4) http://youtu.be/rDGqkMHPDqE

❖ **Online quiz:**
http://cutt.us/Fqqj

Credits:

- Boys:
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  - **Abdulwahab Mohammed Sanari**
  - **Abdulrahman Ahmed AlShehri**
  - **Ibrahim Asous AlAsous**
  - **Abdulaziz Yousef AlSaif**
  - **Abdulrahman Tareq Yaslam**
  - **Mohammed Saeed AlGhamdi**
  - **Khaled Mohammed Aljedia**
  - **Rodhan Khalid Alnahdi**

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- Girls:
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  - **Deema AlRajhi**
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  - **Monerah Alsalouli**
  - **Sara Alhussein**
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  - **Samar Alotaibi**
  - **Shahad Aljeraibah**
  - **Atheer Almutairi**
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  - **Areeb AlOkaiel**
  - **Moenera Alayuni**